5-20-2015 12:00 AM

An Exploration of the Influence of Nursing Education Culture on the Integration of Nursing Informatics Competencies Into a Collaborative Nursing Program Curriculum

Stephanie L. Atthill
The University of Western Ontario

Supervisor
Dr. Carroll Iwasiw
The University of Western Ontario Joint Supervisor
Dr. Lorie Donelle
The University of Western Ontario

Graduate Program in Nursing
A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

AN EXPLORATION OF THE INFLUENCE OF NURSING EDUCATION CULTURE ON THE INTEGRATION OF NURSING INFORMATICS COMPETENCIES INTO A COLLABORATIVE NURSING PROGRAM CURRICULUM

(Thesis format: Integrated Article)

by

Stephanie Atthill

Graduate Program in Nursing

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

Abstract

Information communication technologies are becoming a customary part of the way in which nurses provide care. Consequently, it makes good sense to ensure that nursing informatics competencies are integrated into nursing curricula to prepare graduates for practice. However, few schools of nursing within Canada have fully integrated nursing informatics competencies into their curricula. Nursing education culture appears to influence decision-making, and the development of organizational priorities. Nonetheless, there are no known studies examining how nursing education culture impacts nursing informatics curriculum development endeavours. Therefore, this study aimed to address the following research questions: 1) In what ways does a nursing education culture (the shared values, assumptions and behaviours of two schools of nursing) and the practices and policies within the two schools of nursing affect the incorporation of nursing informatics competencies in a collaborative undergraduate nursing program curriculum? 2) How is the incorporation of competencies related to nursing informatics in the collaborative program curriculum influenced by the systems and subsystems within two schools of nursing? 3) How do the subsystems within the two schools of nursing interact to affect the incorporation of nursing informatics competencies in the undergraduate nursing curriculum? and 4) In what ways do resources within these two schools influence the curriculum development process and incorporation of nursing informatics competencies within the curriculum? These questions were explored using a focused ethnography framed with a systems theory perspective. Data were collected through interviews, observations, and document review. The culture under investigation was a collaborative undergraduate nursing program culture, offered jointly through a partnership between a University and College. Findings identified external and internal systems and subsystems had a significant influence on how values, beliefs, and priorities within the collaborative program were determined and this ultimately influenced the selection of curricular content. Subsequently, findings suggest that commitment and priority for the topic of nursing informatics need to be established within the nursing education culture. Until faculty value the use of information communication technologies to support nursing practice, nursing informatics as a topic area will be undervalued and its incorporation within the curriculum will remain limited.

Key words: Nursing education, nursing informatics, nursing students, curriculum development, collaborative nursing program, focused ethnography, and systems theory.

Co-Authorship Statement

Stephanie Atthill performed the work of this thesis under the supervision of Dr. Carroll Iwasiw, Dr. Lorie Donelle, and Dr. Elizabeth Borycki who will be co-authors on publications resulting from Chapters 2,3,4, and 5 of this dissertation.

Acknowledgments

I am very thankful and appreciative to my committee Dr. Carroll Iwasiw, Dr. Lorie Donelle, and Dr. Elizabeth Borycki for their continued support and guidance. Each committee member has provided feedback and support which has pushed me to extend my knowledge and encouraged me to remain committed to my personal and professional goals. Dr. Carroll Iwasiw has an incredible passion and commitment to nursing education and teaching. She has mentored me since I began as a research assistant, and through her wise counsel has contributed to the completion of my Doctoral dissertation. Carroll has always been encouraging and readily available to answer my questions. She also provided clarity when the process became overwhelming; inspiring me to stay focused and committed to my goals. Dr. Lorie Donelle has always been friendly and welcoming, inspiring me to set high standards for myself. She has stimulated my thinking and has inspired me to strive for a deeper sense of clarity. Dr. Elizabeth Borycki has been an exceptional collaborative partner, someone who has contributed immensely to this research. Although she is far away, she has always been a familiar and encouraging mentor. These three individuals have been a brilliant network of individuals who have supported and carried me through to the completion of this project. Lastly, I would like to thank the faculty, staff, and students who kindly participated in interviews, document collection, as well as invited me into their classrooms. The enthusiasm these individuals demonstrated towards my research provided an enjoyable and enriching environment in which to work.

Dedication

This dissertation is dedicated to my family whose love and unwavering support has been fundamental to my success. Also to Zoey who has been my faithful companion throughout my struggles, frustrations, but also in my successes 🐾.

Table of Contents

Abstract ... ii

Co-Authorship Statement ... iv

Acknowledgments ... v

Dedication ... vi

Table of Contents ... vii

List of Appendices ... xii

Appendix A: Nursing Informatics Entry-to-Practice Competencies for Registered Nurses ... xii

Appendix B: Ethics Approval ... xii

Appendix C: Letters of Information ... xii

Appendix D: Consent Form ... xii

Appendix E: Interview Guides ... xii

Appendix F: Demographics Questionnaires ... xii

Appendix G: Description of the Systems of Culture, Human Infrastructure, and Resources ... xii

List of Figures ... xiii

Figure 1: Integrative Review Search Strategy ... xiii

Figure 2: The Interaction Amongst Systems and Subsystems Which Impact the Integration of Nursing Informatics Competencies into the Collaborative Nursing Program Curriculum ... xiii

Chapter 1 - Introduction ... 1

Background and Significance of the Study ... 3

Study Purpose ... 8

Key Terms ... 9

Theoretical Framework ... 12

Systems Theory. 12

Methods 13

Study Design. 13

Setting. 14

Data Collection. 14

Data Analysis. 15

Chapter Summary 15

Overview of Chapters 16

References 18

Chapter 2 – Nursing Education Culture and Nursing Informatics Competencies within Undergraduate Nursing Curricula: Is there a link? 23

Purpose and Research Questions 25

Search Strategy 25

Findings 27

Assessment of Nursing Education Culture 27

Curriculum and Course Development and the Incorporation of Nursing Informatics Competencies 31

Conceptual Links between Nursing Education Culture and the Incorporation of Nursing Informatics Competencies into an Undergraduate Nursing Curriculum 37

Discussion 39

Conclusion 41

References 43

Chapter 3 – A Focused Ethnography of a School of Nursing: A Methological Review 48

Study Purpose 50

Positionality 51

Theoretical Framework ... 52

Methods ... 56

Design 56

Sample ... 57

Data Collection ... 58

Data Analysis ... 60

Findings and Recommendations ... 62

Discussion ... 63

Study Limitations ... 71

Conclusion ... 72

Chapter 4 – How Attributes of Nursing Education Culture Influence the Inclusion of Nursing Informatics into a Collaborative Nursing Program Curriculum ... 78

Literature Review ... 79

Purpose ... 85

Theoretical Framework ... 85

Methods ... 86

Design 86

Setting ... 87

Data Collection Procedures and Data Sources ... 89

Data Analysis ... 92

Rigour ... 94

Findings ... 95

Discussion ... 109

Limitations ... 114

Chapter 5 – How Aspects of Nursing Education Culture Impact the Integration of Nursing Informatics Competencies into a Collaborative Nursing Program Curriculum ... 123

Literature Review ... 124

Theoretical Framework ... 127

Study Purpose ... 127

Methods ... 128

Study Design ... 128

Setting ... 129

Procedures and Data Sources ... 130

Data Analysis ... 133

Rigour ... 134

Findings ... 135

Discussion ... 151

Conclusion ... 155

References ... 157

Chapter 6 - Discussion and Conclusions ... 161

Summary of the Study ... 161

Study Purpose ... 161

Theoretical Framework ... 162

Methods ... 162

Data Analysis ... 163

Findings and Discussion ... 164

Study Implications ... 173

Recommendations ... 177

Limitations ... 179

References ... 182

Appendices ... 186

Curriculum Vitae ... 217

List of Appendices

Appendix A: Nursing Informatics Entry-to-Practice Competencies for Registered Nurses

Appendix B: Ethics Approval

Appendix C: Letters of Information

Appendix D: Consent Form

Appendix E: Interview Guides

Appendix F: Demographics Questionnaires

Appendix G: Description of the Systems of Culture, Human Infrastructure, and Resources

List of Figures

Figure 1: Integrative Review Search Strategy

Figure 2: The Interaction Amongst Systems and Subsystems Which Impact the Integration of Nursing Informatics Competencies into the Collaborative Nursing Program Curriculum.

Chapter 1 - Introduction

The use of information communication technologies (ICT) within healthcare is quickly becoming an integral aspect of providing quality patient care. These technologies, in particular the electronic health record (EHR) and social media technologies, are revolutionizing the ways in which healthcare practitioners and patients communicate, document, and retrieve health-related information. In Canada, Canada Health Infoway (CHI) is the organization working jointly with the provinces and territories to implement a nation-wide system to manage health-related information in every region (CHI, 2012). Although a nation-wide EHR system is not yet realized within Canadian healthcare, such a system will enable healthcare patients and providers to access patient and health-related information, 24 hours a day, 7 days a week, from any location with computer and internet access. Once fully implemented, functions within the nation-wide EHR will offer access to an updated computerized patient record to provide practitioners with the resources and information they need to critically evaluate care decisions, such that they are able to meet the needs of patients most effectively. Patients and their families will also see the benefits of ICTs, as these systems should promote more effective patient-provider communication, as well as offer patients access to important health information which will assist them to manage and engage in self-monitoring (Harrison & Lee, 2006).

The implementation of the pan-Canadian EHR will make ICT a customary part of patient care; therefore, students entering the practice of nursing must learn to understand, utilize, and value ICT as part of their nursing role. Nurses are key stakeholders within healthcare and their ongoing support for the implementation of the EHR and other ICTs (e.g., social media technologies, electronic medication administration records, glucometers) is critical to the successful development and adoption of informatics technology within the healthcare environment (Harrison & Lee, 2006). This highlights the importance of incorporating nursing informatics competencies within the undergraduate curriculum which prepares nurses for practice. If nurse graduates are expected to enter technology-enabled practice settings, their understanding of the benefits and skills required to utilize ICTs is crucial. In addition, if students learn to utilize ICTs when beginning to develop basic nursing competencies, the use of these technologies will become better integrated into the workflow of their nursing practice. Experts suggest that if students at the very least learn to document with and utilize the electronic health record, they will build greater familiarity with this form of documentation and patient information retrieval that will foster acceptance of this documentation format (Ash & Bates, 2004). Integration of nursing informatics competencies within nursing curricula will foster an environment which supports and promotes nurses' use of these technological advancements.

Despite the importance of preparing nursing students to practice using ICTs, Canadian undergraduate nursing education programs struggle to integrate nursing informatics content within nursing curricula. The limited nursing informatics content within undergraduate curricula creates a situation where expertise of health ICT within the professional practice environment may surpass that of academia, as information technology systems become the norm in healthcare settings (Nagle &

Clarke, 2004). Nursing educational curricula appear to lack sufficient attention to many basic competencies that promote knowledge and skill development in the area of nursing informatics. In particular, graduate nurses in Canada and the United States, are entering the workforce with low levels of knowledge and skills in relation to utilizing ICTs to document within electronic applications, create electronic nursing care plans, and perform data entry (Fetter, 2008, 2009a; Nagle & Clarke, 2004). As many healthcare environments currently rely heavily on ICTs to document and retrieve patient information, lack of student knowledge and skill in the use of these technologies will make them ill-prepared to practice within technology-enabled practice settings (Nagle & Clarke, 2004). Nursing education culture appears to influence decision-making, and the development of organizational priorities within nursing education. Consequently, understanding the culture of a school of nursing and nursing program as it relates to nursing informatics and the use of ICTs is an important step in identifying why this area of student development appears to be infrequently addressed within nursing curricula. In the remainder of this chapter, presented are a brief background and significance of the study, the study purpose and research questions, a summary of the theoretical framework which guided this research, an overview of study methods, as well as a description of this integrated article format dissertation.

Background and Significance of the Study

The importance of nursing informatics to the current healthcare arena and to nursing education has been highlighted by many organizations within Canada and the

United States (Aktan, Bareford, & Tracy, 2011; Williamson, Fineout-Overholt, Kent, & Hutchinson, 2011).

Although experts have discussed the importance of preparing nurses who can utilize these technologies, a survey of faculty at Canadian Schools of Nursing (SON) revealed that only 33% of nursing programs offered a credit course in nursing informatics and that nursing students' primary access to the EHR applications occurred in their acute care placement settings (Nagle & Clarke, 2004). Of those members of schools of nursing surveyed, only 33% believed that students and faculty have adequate nursing informatics competencies and computer skills (Nagle & Clarke, 2004). These findings are similar to those reported in the United States where researchers have identified that students are graduating with low levels of knowledge and skill in relation to health information technology use, particularly related to using electronic applications to document, create a nursing care plan, and perform data entry (Fetter, 2008, 2009a).

In response to the limited integration of nursing informatics content within undergraduate nursing education programs within Canada, the Canadian Association Schools of Nursing (CASN) in collaboration with CHI, has developed a number of documents to support nurse educators. These documents include the: 1) *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012a), *2) Nursing Informatics Inventory* (CASN, 2012b), and 3) *Nursing Informatics Teaching Toolkit* (CASN, 2013). Through publishing the *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012a) members of CASN aim to support nurse educators to identify nursing informatics competencies required for entry-to-practice. The publication of the *Nursing Informatics Inventory* (CASN, 2012b) serves to direct nurse educators to available nursing informatics teaching and learning resources. Finally, the *Nursing Informatics Teaching Toolkit* supports nurse educators to integrate the nursing informatics competencies identified in the CASN *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012a) within their undergraduate nursing curricula. The development of these three documents for Canadian Schools of Nursing, highlights the need for nurse educators to consider nursing informatics competencies as an important part of their undergraduate nursing curricula.

Barriers identified as influencing whether nursing informatics competencies are incorporated within the undergraduate nursing curriculum are lack of: 1) human and material infrastructure to support health informatics training, 2) faculty knowledge, skill, and 'buy-in' to use this technology to support nursing care, and 3) a fully integrated EHR/electronic medical record (EMR) system within some professional practice settings or restricted student access to the EMR and other ICT systems (Curran, 2008; Fetter, 2009a 2009b; Griffen-Sobel et al., 2010; Kushniruk, Borycki, Armstrong, Joe, & Otto, 2009; Melo & Carlton, 2008; Nagle & Clarke, 2004; Nickitas et al., 2010; Taylor, Hudson, Vazzano, Naumann, & Neal, 2010). Facilitators described in the literature which assist in promoting the success of nursing informatics curriculum development efforts include: 1) development of a clear plan to guide the implementation process, 2) allocation of resources (e.g., release time for faculty to engage in faculty development in informatics, monies to support the purchasing of ICTs for teaching purposes, etc.) to support integration, 3) development of academic partnerships between a school and a clinical agency or an EHR technology vendor (Curran, 2008; Fetter, 2009a; Griffen-Sobel et al., 2010; Kushniruk et al., 2009; Nickitas et al., 2010), and 4) accreditation standards that focus on nursing informatics competencies in nursing graduates (CASN, 2012).

It is evident from the description of barriers and facilitators that integration of nursing informatics competencies within undergraduate nursing curricula is a difficult process which requires commitment from the school to provide the necessary conditions (e.g., resources - human and financial) to ensure success. In addition, it requires a group of nursing faculty, who embrace the use of technology and 'buy-in' to the importance of educating nursing students who are able to practice within technology-enabled practice settings. In many case study exemplars described in the literature, the presence of a champion or leader skilled in the area of nursing informatics was identified as imperative to curricular integration success. Champions were instrumental to forming a curriculum development project group, developing research proposals and grants to support integration, and negotiating with the school for release time to allow faculty to participate in curriculum development (Griffen-Sobel et al., 2010; Nickitas et al., 2010). Additionally, champions worked with other nursing faculty to educate them in the use of ICTs and to assist them to explore where within the curriculum this content could be addressed (Gloe, 2010; Griffen-Sobel et al., 2010; Johnson & Bushey, 2011).

Champions in the area of nursing informatics have provided nurse educators with direction as to what core competencies nurses must possess in order to effectively assume their role. The available literature suggests that educational programs focus student learning first on developing computer, information literacy, and information management knowledge and skills (CASN, 2012a; Fetter, 2009b; Technology Informatics Guiding Educational Reform [TIGER], 2010). These skills are considered prerequisites to becoming proficient users of ICTs. Additionally, the CASN document, *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012a) specifies that faculty members in nursing academia consider incorporating competencies which assist students to use: 1) basic ICT devices and applications to communicate, 2) relevant information and knowledge to support the delivery of evidence-informed patient care, 3) ICTs in accordance with professional and regulatory standards and workplace policies, and 4) ICTs in the delivery of patient care (CASN, 2012a). What is also useful about the CASN nursing informatics entry-to-practice competencies, is that embedded within each of the competencies described above, are indicators which nurse educators can use to evaluate student acquisition of these particular skills (Appendix A). The development of these competencies is an important achievement in the area of nursing informatics within Canada as this confirms the commitment that this national accrediting body has to student development in this area. In addition, the document serves as a contextually relevant guide to direct faculty involved in curriculum development in the area of nursing informatics.

Although there are a number of articles which provide valuable insight into the process of integrating nursing informatics content within nursing curricula, the literature continues to lack empirical studies which have evaluated nursing informatics educational initiatives. Most literature in this area is comprised of case study descriptions from U.S. schools of nursing that have incorporated these competencies into their nursing curricula either as stand-alone courses or integrated within existing nursing courses. The lack of studies based in Canadian schools of nursing may suggest that there has been little progress or attention in Canada to incorporating this content into undergraduate nursing curricula. As the Nagle and Clarke (2004) study is the most recent account of nursing informatics competencies within Canadian undergraduate curricula, there is a need to again evaluate nursing education and its progress toward developing graduates with competence in nursing informatics. In addition, there is a need to understand further how to best educate future nursing professionals in Canada to develop knowledge and skill in relation to nursing informatics, particularly the use of ICTs such as the EHR.

Further exploration of Canadian schools of nursing curricula is necessary in order to identify what competencies Canadian nurse graduates are obtaining in relation to nursing informatics. However, more importantly, closer examination of the facilitators and barriers to incorporating nursing informatics competency within Canadian schools of nursing is necessary and will offer insight into how policies and procedures embedded within a school structure serve to impact the curriculum development process. Through an examination of the culture of a collaborative nursing program, this research project aimed to understand how the systems and subsystems of two schools of nursing influence what was taught in the nursing curriculum in relation to nursing informatics. In addition, through conducting this analysis, the researcher identified what nursing informatics competencies these nursing graduates possessed upon graduation from the program.

Study Purpose

This dissertation study examined a collaborative nursing program culture, to understand how the practices and policies that are inherent within two schools of nursing influence the inclusion of nursing informatics competencies into an undergraduate nursing curriculum. This collaborative program was offered as a 4-year BScN degree through a partnership between a university and college. A cultural analysis of a collaborative nursing program culture provided a means to answer the following research questions:

1. In what ways does a nursing education culture (the shared values, assumptions, and behaviours of two schools of nursing) and the practices and policies within the two schools of nursing affect the incorporation of nursing informatics competencies in a collaborative nursing program curriculum?
2. How is the incorporation of competencies related to nursing informatics in the collaborative program curriculum influenced by the systems and subsystems within the two schools of nursing?
3. How do the subsystems within the two schools of nursing interact to affect the incorporation of nursing informatics competencies in the undergraduate nursing curriculum?
4. In what ways do resources within these two schools influence the curriculum development process and incorporation of nursing informatics competencies within the curriculum?

Key Terms

C*urriculum* was defined as being comprised of the "philosophical approaches, curriculum outcome statements, (the) overall design, courses, teaching-learning strategies, delivery methods, interactions, learning climate, evaluation methods, curriculum policies, and resources" (Iwasiw, Goldenberg, & Andrusyszyn, 2009, p. 5), as described in curriculum documents and by faculty and students. For this study, the researcher examined the espoused and enacted curriculum. The espoused curriculum is the curriculum as it is described in curricular documents, whereas the enacted curriculum is how the espoused nursing curriculum becomes enacted and taught to students through individual faculty members teaching and learning practices. Additionally, for the purpose of this research, curriculum was considered to be developed and revised such that it remains context-relevant. A context-relevant curriculum is "responsive to learners; current and projected societal, health, and community situations; and current and projected imperatives of the nursing profession; [is] consistent with the mission, philosophy, and goals of the educational institution and school of nursing; [and] feasible within the realities of the school and community" (Iwasiw & Goldenberg, 2015, p. 7).

Nursing Informatics in this study is defined as the "science and practice [which] integrates nursing, its information and knowledge, and their management, with information and communication technology to promote the health of people, families and communities worldwide" (International Medical Informatics Association, 2010). Embedded within the concept of nursing informatics is the term *information communication technology (ICT)*. ICTs are "information and communication technologies used to handle information and facilitate communications" (Canadian Nurses Association [CAN], 2006). Specifically, for this study, the researcher was interested in ICTs which enable nurses in their practice (research, education, and client-focused practice) to communicate and utilize patient and other health-related information. Therefore, in order for novice nurses to develop the knowledge and skill to utilize ICTs, nursing informatics competencies must be addressed within nursing curricula.

Nursing Informatics Competencies are those learning competencies that are foundational to the development and use of ICT. The competencies used to guide data collection and analysis in this study were the *Nursing Informatics Entry-to-Practice*

Competencies for Registered Nurses, developed by the Canadian Association of Schools of Nursing (CASN, 2012a) through funding that was provided by Canada Health Infoway (Appendix A). The purpose for developing these educational competencies was to develop "a culture within nursing education in Canada that embraces the integration of nursing informatics in curricula and professional practice" (CASN, 2012a, p. 1). These competencies were chosen to guide this study as they are the most recently published nursing informatics competencies that are specifically aimed at providing information to assist nursing educators in Canada to prepare new graduates for practice.

Culture, for this study was defined as a system of learned behaviour which was characteristic of the shared norms and values that are held by a group of individuals (Schein, 2004). A culture was something that every member brought with them and was influenced by a plethora of other cultures and subcultures (Straub, Loch, Evaristo, Karahanna, & Srite; 2002). As a result, organizational culture was defined as an amalgamation of each member's culture, a combination of cultures which came together to create and shape an overall organizational culture for the school of nursing.

Within the study of this collaborative program culture, the researcher studied the *practices and policies* inherent within the program which impacted the integration of nursing informatics within the curriculum. These encompassed those p*ractices* that structure the school to function in a specific way. *Practices and policies* impact all aspects of the two schools, particularly the implementation and execution of teaching and learning activities. In addition, practices and policies impact the structure, the imposed or hidden hierarchy of members, and the development and management of decision making within the schools of nursing.

Theoretical Framework

Systems theory was the theoretical framework which guided this study. This theory influenced the study design, research questions, and data collection and analysis strategies.

Systems Theory.

Systems theory was developed by Ludwig von Bertalanffy to study the interaction of a system with its environment (Walonick, 1993). A system is a structure that is made of interrelated and interdependent elements which influence one another to maintain a state of homeostatsis within the system. As a system exchanges information with the environment in which it is situated, systems theory is driven by a number of basic tenets: 1) a system is open to its environments; 2) behaviour within a system is purposeful and occurs to move a system towards its goals; 3) a system is made up of a set of interrelated subsystems that interact; 4) there is always a constant exchange of inputs and outputs between a system and its environment;5) feedback loops are in place within a system to assist the system to obtain a 'steady' state or its goal of dynamic equilibrium; and 6) lastly, a system goal is to reach homeostatsis. This means that a system reacts in a way that assists it to achieve optimum potential (Walonick, 1993). Embedded within a system are subsystems. Subsystems follow the same tenets as a system and interact with one another to shape the larger system within which they are situated.

Using systems theory, one can explore the complex set of interrelationship amongst subsystems, as a system is constantly exchanging information with its environment (Ansari, 2004). Preliminary analysis of available literature identified that the subsystems of culture, human infrastructure, and resources could impact the curriculum development process and inclusion of nursing informatics competencies within the collaborative program curriculum. These subsystems influence the position of schools of nursing within the larger systems of educational institutions and the social world, shaping what knowledge and skill students have obtained as they graduate from their program. Identification of these systems served as a beginning framework to guide study procedures. A systems perspective within this study provided a lens with which to deconstruct the greater educational system into smaller more understandable subsystems. In addition, systems theory guided the development of the semi-structured interview guides, as well as the data analysis procedures.

Methods

Study Design.

A focused ethnography was used to examine how the values, assumptions, and behaviours embedded within the culture of one collaborative nursing program impacted the curriculum development process and the incorporation of competencies specific to developing student knowledge and skill in nursing informatics. A focused ethnography is characterized by short field visits in collaboration with intensive data-collection through interviews, document analysis, and observation (Knoblauch, 2005). When conducting a focused ethnography, the researcher enters into the study setting with a thorough understanding of the study field, in order to focus the analysis on aspects of the culture which relate directly to the research questions and aims of the study (Morse & Richards, 2002). This methodology was chosen to focus the analysis on aspects of the culture related to nursing informatics and curriculum development.

Setting.

The culture of a collaborative nursing program was the unit of analysis for this study. This collaborative program was offered as a 4-year BScN degree through a partnership between a university and college. The two program sites (two Schools) were located in the same city in Ontario, had their own administrative structure, and offered other nursing programs in addition to the collaborative program under investigation. The collaborative BScN curriculum offered was undergoing curriculum development during the data collection period. New first-year courses were being implemented and course design and development for years 2-4 of the revised curriculum were ongoing during this time.

Data Collection.

Data were obtained through semi-structured interviews, document review, and observations. Twenty-six in-depth individual interviews were conducted with faculty members, support staff, and students from the collaborative nursing program. Interviews lasted approximately one hour, took place at a convenient location for each participant, and were guided by a semi-structured, researcher-developed interview guide. Documents were obtained through communication with faculty at both sites, and in consultation with administrative staff. Documents included: the college and university mission and vision statements, the nursing mission and vision statements, curriculum and course development committee meeting minutes, reports outlining resources and physical space, and curricular documents such as: program year goals, a curriculum overview, course syllabi, and course descriptions. Additionally, information from the college and university school of nursing web sites was acquired. Fifteen observations were completed. Observations were conducted during classes (15 hours), committee and course development meetings (15 hours), and research presentations (4 hours). During the observation sessions, field notes related to the observations were made.

Data Analysis.

All data from interviews and field notes were transcribed concurrently. The researcher conducted an in-depth analysis focusing on aspects of the culture of the collaborative program which were within the aims of the identified research questions. A thematic analysis of the interview transcripts, observation data, and documents was conducted. Data collection and analysis occurred concurrently to enhance the integrity of study findings (Polit & Beck, 2008).

Chapter Summary

As nurses in their daily practice are required to manage and integrate many forms of patient data, having the knowledge to effectively use ICTs has become an important aspect to providing quality patient care. Within healthcare nurses' ongoing support with the implementation of ICTs is critical to the successful development and adoption of this technology (Harrison & Lee, 2006). Developing knowledge and skill in the use of ICTs within nursing will assist graduates to view the use of these technologies as an integral part of their nursing practice (Ash & Bates, 2004). Through careful consideration and inclusion of informatics content within undergraduate curriculum, nursing faculty will create an educational environment which supports and promotes use of these technologies.

Despite the importance of student learning in the area of nursing informatics, many nursing curricula within Canada lack student learning activities which develop the knowledge and skill required for students to become proficient users of ICTs. Students are completing their nursing programs and entering into practice limited in the skills to document within electronic applications, create electronic nursing care plans, and perform data entry (Fetter, 2008, 2009a; Nagle & Clarke, 2004). Therefore, this study aimed to understand how a collaborative nursing program culture, and the practices and policies inherent within two schools of nursing, influence the inclusion of nursing informatics competencies within the undergraduate nursing curriculum. Systems theory was the theoretical framework which was used to guide the study design, research questions, and data collection and analysis strategies. This is the first study to the researcher's knowledge to examine nursing education culture in relation to the integration of nursing informatics curricular initiatives.

Overview of Chapters

This thesis will follow the integrated-article format outlined by School of Graduate and Postdoctoral Studies at Western University. Chapters 2, 3, 4, and 5 are considered stand-alone chapters which will be submitted for publication. Consequently, there is some repetition within these chapters related to background, literature review, and methodology components. Chapter 2 consists of an integrated review, aimed to provide the reader within an understanding of the available literature which has conceptually linked nursing education culture to the integration of nursing informatics competencies into an undergraduate nursing curriculum. Chapter 3 provides an overview of systems theory as the guiding framework of this research and outlines focused ethnography as the methodology of this study. Specifically, this paper addresses the challenges encountered when employing this methodology to study a nursing education environment. Chapters 4 and 5 present the study findings. Chapter 4 describes the facilitators and barriers which influence the successful integration of nursing informatics content within undergraduate nursing curriculum, and chapter 5 outlines how attributes of the collaborative nursing program culture shape and influence the inclusion of nursing informatics content within the curriculum. Chapter 6 presents a general discussion and conclusion of the thesis, relating the findings to research, education, and practice.

References

Aktan, N., Bareford, C., & Tracy, J. (2011) Computerized documentation and community health nursing students. *Journal of Nursing Education and Practice*, 1, 25-31. doi: 10.5430/jnep.v1n1p25

Ansari, S. (2004). *Systems Theory and Management Control*. Retrieved from http://faculty.darden.virginia.edu/ansaris/systems%20theory%20and%20mcs-tn.pdf

Ash, J., & Bates, D. (2005). Factors and forces affecting EHR system adoption: Report of a 2004 ACMI discussion. *Journal of American Medical Informatics Association*, 12, 8-12 doi: 10.1197/jamia.M1684.

Canadian Nurses Association. (2006). *Position statement: Nursing information and knowledge management.* Retrieved from http://www.cna-aiic.ca/CNA/documents/pdf/publications/PS87-Nursing-info-knowledge-e.pdf

CASN. (2012a). *Nursing informatics entry-to-practice competencies for registered nurses*. Retrieved from. http://www.casn.ca/en/Whats_new_at_CASN_108/items/123.html

CASN. (2012b). *Nursing informatics inventory exisiting teaching and learning resources*. Retrieved from. https://www.google.com/url?q=https://www.infoway-inforoute.ca/index.php/component/docman/doc_download/2153-nursing-informatics-inventory-a-report-of-existing-teaching-and-learning-resources&sa=U&ei=Wu-qVJrSLsX_yQSEuYGgAw&ved=0CAYQFjAB&client=internal-uds-cse&usg=AFQjCNGCzjiWzRWvTLjb6gyRkbNfI-2rOQ

CASN. (2013). *Nursing informatics teaching toolkit: Supporting the integration of the CASN nursing informatics competencies into nursing curricula*. Retrieved from. https://www.google.com/url?q=https://www.infoway-inforoute.ca/index.php/component/docman/doc_download/2154-nursing-informatics-teaching-toolkit&sa=U&ei=Wu-qVJrSLsX_yQSEuYGgAw&ved=0CAgQFjAD&client=internal-uds-cse&usg=AFQjCNHJjoq47HKobqzdoR_97zvBHkNOlQ

CHI. (2012). *What we do*. Retrieved from. https://www.infoway-inforoute.ca/index.php/about-infoway/what-we-do

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *The Nursing Clinics of North America*, 43, 523-533. doi:10.1016/j.cnur.2008.06.001

Fetter, M. (2008). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Fetter, M. (2009a). Improving information technology competencies: Implications for psychiatric mental health nursing. *Issues in Mental Health Nursing*, 30, 3-13. doi: 10.1080/01612840802555208

Fetter, M. (2009b). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Gloe, D. (2010). Selecting an academic electronic health record. *Nurse Educator*, 35, 156-161. doi: 10.1097/NNE.0b013e3181e337d3

Griffin-Sobel, J., Acee, A., Sharoff, L., Cobus-Kuo, L., Wookstock-Wallace, A., &

Dornbaum, M. (2010). A transdisciplinary approach to faculty development in nursing education technology. *Nursing Education Perspectives*, 31, 41-44.

Harrison, J., & Lee, A. (2006). The role of e-health in the changing health care environment. *Nursing Economics*, 24, 283-288, p. 284.

International Medical Informatics Association. (2009) *The nursing informatics special interestgroup –definition.* Retrieved from: http:www.imiani.orgindex.phpoption=com_content&task=view&id=27&Itemid=5

Iwasiw, C., Goldenberg, D., & Andrusyszyn, M. (2009). *Curriculum development in nursing education* (2nd ed.). Sudbury, MA: Jones and Bartlett.

Johnson, D., & Bushney, T. (2011). Integrating the Academic Electronic Health Record into Nursing Curriculum: Preparing Student Nurses for Practice. *Computers, Informatics, Nursing*, 29, 133-137. doi: 10.1097/NCN.0b013e3182121ed8

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*, 1-11.

Kushniruk, A., Borycki, E., Armstrong, B., Joe, R., & Otto, T. (2009). Bring electronic patient records into health professional education: Towards an integrative framework. *Medical Informatics in a United and Heathy Europe*, 150, 883-887.

Melo, D., & Carlton, K. (2008). A collaborative model to ensure graduating nurses are ready to use electronic health records. *Computers, Informatics, Nursing*, 26, 8-12.

Morse, J., & Richards, L. (2002). *Read Me First for a Users Guide to Qualitative Methods*. Thousands Oaks: Sage.

Nagle, L., & Clarke, H. (2004). *Assessing Informatics in Canadian Schools of Nursing*. Retrieved from http://cmbi.bjmu.edu.cn/news/report/2004/medinfo2004/pdffiles/papers/4284Nagle.pdf

Nickitas, D., Nokes, K., Caroselli, C., Mahon, P., Colucci, D., & Lester, R. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Plastic Surgical Nursing*, 30, 103-107. doi: 10.1097/01.NCN.0000336491.11726.4e

Polit, D.F., & Beck, C.T. (2008). *Nursing research: generating and assessing evidence for nursing practice (8th ed.).* Philadelphia: Lippincott.

Schein, E (2004). *Organizational culture and leadership (3rd edition).* Retrieved from. http://books.google.ca/books?hl=en&lr=&id=xhmezDokfnYC&oi=fnd&pg=PR11&dq=organizational+culture+definition&ots=m5KV2Sk6pL&sig=7kF9ZyS1SO0xROm6xyTgzG0Yytg#v=onepage&q=organizational%20culture%20definition&f=false

Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Srite, M. (2002). Towards a theory based measurement for culture. *Journal of Global Information Management,* 10, 13-23

Taylor, L., Hudson, K., Vazzano, J., Naumann, P., & Neal, M. (2010). The electronic health records meets baccalaureate nursing curriculum: Stories from the battlefield. *Nurse Leader*, 8, 40-44.

TIGER. (2010). *The tiger imitative: Evidence and informatics transforming nursing*. Retrieved from. http://www.aacn.nche.edu/Education/pdf/TIGER.pdf.

Walonick, D. (1993). *General Systems theory*. Retrieve from. http://statpac.org/walonick/systems-theory.htm

Williamson, Fineout-Overholt, Kent & Hutchinson, (2011). Teaching EBP: Integrating technology into academic curricula to facilitate evidence-based decision-making. *Worldviews on Evidence-Based Nursing*, 4, 247-251.

Chapter 2 – Nursing Education Culture and Nursing Informatics Competencies within Undergraduate Nursing Curricula: Is there a link?

Faculty teaching in undergraduate nursing programs must prepare graduates to enter into technology-enabled practice environments. As a result, knowledge and skill in the use of information communication technologies (ICTs) has become an essential part of the nursing role and a way of enhancing the quality of care provided to patients (Canadian Nurses Association, 2006; Canada Health Infoway (CHI), 2009). Despite the importance of ICTs within the healthcare environment, content which prepares graduates to practice nursing utilizing ICTs remains limited within undergraduate nursing curriculum (Nagle & Clarke, 2004). Graduates from schools of nursing in Canada and the United States have reported low levels of knowledge and skills in relation to using ICTs to document within electronic applications, create electronic nursing care plans, and perform data entry (Fetter, 2009, 2009b; Nagle & Clarke, 2004). Faculty knowledge and skill in relation to nursing informatics competencies is also lacking and nursing informatics educational initiatives have been met with resistance (Fetter 2009). Progressively ICTs , in particular electronic health records (EHR) and social media technologies, are being incorporated into healthcare practice settings, and it is predicted that the lack of planned initiatives to incorporate nursing informatics competencies into nursing curricula will result in technology use within the professional practice environment surpassing that of academia (Nagle & Clarke, 2004). Understanding the cultural values, beliefs, and assumptions embedded within schools of nursing in relation to curriculum development in the area of nursing informatics is an area of research which could lead to the identification of facilitators and barriers that have impacted the curriculum development process.

Currently there are a limited number of publications in which researchers have examined the culture of a school of nursing in relation to the incorporation of nursing informatics competecnies as part of curriculum development. Consequently, an integrative literature review offered a systematic approach to explore and evaluate available quantitative, qualitative, and case study articles written in this area (LoBiondo-Wood, 2013). An integrative review is a systematic method for exploring and evaluating literature related to a focused research question (LoBiondo-Wood, 2013). This review method includes not only quantitative research studies; consequently statistical analysis of research findings is not conducted. Rather, the researcher conducts an in-depth synthesis and evaluation of all available literature which meets specific inclusion criteria (Armstrong, 2011; LoBiondo-Wood, 2013). An integrative review was chosen in order to consider all quantitative, qualitative, and case study literature, and to focus the review on the conceptual link between nursing education culture and the integration of nursing informatics competencies within undergraduate nursing curricula.

Central to the focus of this review is the concept of *culture*, which is defined as a system of learned behaviour which is characteristic of the shared norms and values that are held by a group of individuals (Schein, 2004). A culture is something that every member brings with them and that is influenced by a plethora of other cultures and subcultures (Straub, Loch, Evaristo, Karahanna, & Srite; 2002). As a result, an organizational culture is an amalgamation of each member's culture, a combination of cultures which have come together to create and shape an overall organizational culture for the school of nursing. Through conducting a cultural assessment one can uncover the way that culture is intertwined with and influences decision-making, affects the development of organizational priorities, and shapes the organizational and structural processes embedded within the structure of an organization.

Purpose and Research Questions

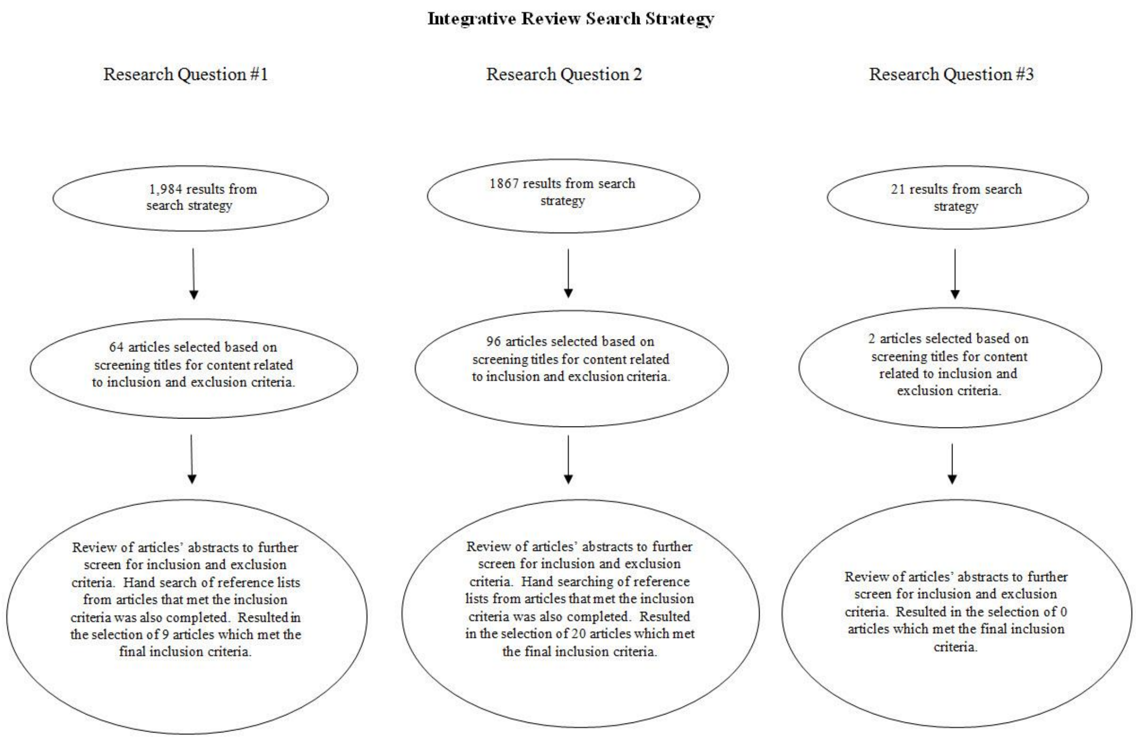
The purpose of this integrative literature review was to understand how nursing education culture impacts the curriculum development process, particularly in relation to incorporating nursing informatics competencies within it. The following research questions guided this review:

1. What is the current state of knowledge regarding nursing education culture?
2. What is the current state of knowledge regarding curriculum development and course design which incorporates nursing informatics competencies?
3. What is the current state of knowledge regarding the relationship between nursing education culture and the incorporation of nursing informatics competencies into an undergraduate nursing curriculum?

Search Strategy

A comprehensive search of Cumulative Index for Nursing and Allied Health Literature (CINAHL), Scopus, Medline, and Educational Resources Information Center (ERIC) databases was conducted. Search terms consisted of: *culture, values, buy-in, nursing informatics, information communication technology, nursing education, school of nursing, curriculum development, and course development.* Each term was searched individually before being combined with other search terms. The inclusion criteria were that articles: be research based or case studies; published in English between 2000 and 2014 in Canada or the United States; focus on a school of nursing that offers an undergraduate nursing degree; and be pertinent to the research questions. Publication after the year 2000 ensured that nursing informatics curriculum development endeavours were current with emerging healthcare trends. Specifically, the aim of the first research question was to locate articles in which the culture of a school of nursing is assessed in some way. Articles written about teaching of culturally competent nursing care and/or culture shock were excluded from this review. Research question two was used to identify articles that addressed the process of incorporating nursing informatics content within an undergraduate nursing curriculum. Of particular interest were those articles that considered what nursing informatics competencies should be taught to students and articles where researchers described how curriculum was refined to incorporate this area of student learning. Articles where researchers reported the use of technology (e.g., simulation technology, clickers, etc.) solely for teaching other nursing content were excluded from this review. The third research question was used to determine if there was a conceptual link between nursing education culture and the inclusion of nursing informatics competencies within an undergraduate nursing curriculum (See Figure 1 for search strategy).

Figure 1.



This article is arranged into three sections. First, an examination of research exploring nursing education culture is presented. This is followed by an assessment of literature where researchers have described the process of incorporating nursing informatics content within an undergraduate nursing curriculum. Finally, research literature that examines the conceptual links between nursing education culture and nursing informatics educational initiatives is addressed.

Findings

Assessment of Nursing Education Culture

Nine articles were reviewed in which a school of nursing culture was assessed (See Figure 1). Specifically, three main areas of research have been the focus 1) Effect of

Organizational Culture on School Members, 2) Culture of Successful Nursing Programs, and 3) Cultural Change.

Effect of Organizational Culture on School Members.

Of the nine articles reviewed, there were 5 articles where researchers examined the influence of nursing education culture on school members. Two examined nursing organizational culture and the influence it has on empowering students and faculty to assume their nursing role (Bosley, 2005; Johnson, 2009). In these quantitative studies, researchers identified a weak, positive relationship between students' perceptions of organizational culture in their nursing program, and their self-perceived rating of empowerment ($r= 0.249$, $p<0.01$) (Bosley, 2005) and a moderate impact between organizational culture and faculty empowerment ($F= 43.86$, $P< 0.01$) (Johnson, 2009). Curriculum revision was a program factor that significantly influenced faculty empowerment ($F=5.53$, $P<0.01$) (Johnson, 2009). These findings suggest that faculty should be involved with curriculum refinement as well as have input into the functioning of the organization as this will promote an organizational culture that empowers nursing faculty to effectively assume their role.

In addition to faculty empowerment, one quantitative study explored the relationship between organizational climate and organizational commitment (Gormley & Kennerly, 2010). The authors conclude that organizational commitment can be fostered through creating friendly faculty social relations, promoting physical and psychological health of members, as well as providing socialization into the academic role (Gormley & Kennerly, 2010). Another study used a phenomenological method of ethnographic inquiry to explore how culture impacts the experience of nurses transitioning into a faculty role (Schriner, 2004). New faculty experience a sense of cultural dissonance which creates conflict as they transition from the world of practice into academia, thus suggesting that socialization into the faculty role is essential (Schriner, 2004).

The final area of research that has considered the impact of culture on school of nursing members was a descriptive qualitative study which explored the impact of nursing education culture and teaching and learning practices on the success of minority (defined as people with diverse ethnicities and national origins) nursing students (Kossman, 2003). Within the minority students' nursing educational experience, there was a universal perception of struggle. Minority students struggled with coping with the demands of a challenging program; dealing with a lack of social support from friends and family; and managing the financial stress of juggling a work/school balance. Nursing education culture has a large impact on all members, particularly nursing students. Faculty values and ways of being with students can impact students' success and their ability to have a positive learning experience (Kossman, 2003).

Culture of Successful Nursing Programs.

In two studies, researchers assessed the culture of a school of nursing that they identified as a successful nursing program (Leiker, 2011). Successful nursing programs were those with a strong structure, supported through strong leadership, management processes, and well-defined professional and internal values (Leiker, 2011). In addition, values such as trust, respect, collegiality, open communication, and integrity among members support a school in achieving excellence (Leiker, 2011; McNish, 2003). Supporting students as being the center of the academic nursing community and promoting their transition into the practice area were other important cultural values (Leiker, 2011; McNish, 2003).

Cultural Change.

The final two articles related to educational culture examined cultural change. Springer, Clarke, Strohfus, & Belcheir (2012) used Kotter's eight-stage process for transformational change (Kotter, 1996) to direct and improve their school culture. This approach fostered the development of a new shared governance model, strategic plan, vision, and behavioural norms. Faculty concerns in relation to poor communication and ineffective leadership were improved using this change model (Springer et al., 2012). Cultural change is attainable if there is a designated plan and support from all members. Change is a time-consuming and slow process (Springer et al., 2012).

Similarly, Porter & Bean (2004) examined the cultural change of a school of nursing during the years in which a program of nursing was offered (1954-1994). This school was affiliated with a Methodist church and was one of the first 4-year collegiate schools in the United States. A shift in cultural values from those of career preparation and religious influence towards values which encompassed an appreciation for academic excellence had an overall negative effect on the functioning of the school. Researchers also identified that the school of nursing failed to adapt to the rural and religious environment which was comprised of a mature student population with part-time work requirements. Failing to tailor the culture of the school to the individuals which it serves (students) was a contributing factor to the breakdown of the school system.

In response to Research Question 1 (examining the current states of research literature regarding nursing education culture), there is a limited number of research articles that have examined nursing education culture. Findings appear to support that the cultural values of a school of nursing are important to the success of the program and its members. Researchers have suggested values need to include respect, trust, integrity, and a strong sense of collaboration and communication among members; as this will promote empowerment, trust, and equal opportunity (McNish, 2009; Gormley & Kennerley, 2010; Kossman, 2003). In addition, the culture of the school of nursing must align with the external environment, which includes that of practice, and meet the needs of the students they serve (Schriner, 2004; Porter & Bean, 2004). The limited number of published research articles which have examined nursing education culture does not provide a clear depiction of the extent to which nursing education culture influences education, practice, and nursing curriculum. Additional studies in these areas will further validate the existing research findings, as well as offer a new and expanded understanding of nursing education culture in general and the influence that aspects of culture have on the functioning of a school of nursing and its programs. In particular, research which examines the influence of nursing education culture on aspects of organizational structure and the process of curriculum development is needed.

Curriculum and Course Development and the Incorporation of Nursing Informatics Competencies

Twenty articles that met the inclusion criteria for the second research question (See table 2). Twelve of the articles included were case studies, four were mixed methods studies, two were quantitative studies, and two were qualitative studies. The review revealed four main themes: 1) Barriers, 2) Curriculum Development Strategies, 3)

Teaching and Learning Strategies, and 4) Informatics Curricular Content. Each theme will be discussed followed by a review and critique of the existing literature.

Barriers.

Integrating nursing informatics competencies within an undergraduate nursing curriculum was described as a process which required a significant investment from faculty and the school of nursing. The main barriers identified were lack of: funding, faculty time, and faculty knowledge, skills, and motivation (Fetter, 2009; McNeil et al., 2003; McNeil et al., 2006; Meyer, Sternberger, & Toscos, 2011; Weber, 2004). Specifically, nursing faculty appear to be knowledgeable in teaching information and computer literacy skills; however, they require assistance and faculty development initiatives in order to teach higher level nursing informatics competencies (Fauchald, 2008; McNeil et al., 2003). Faculty from programs of nursing in the United States were rated at the advanced beginner level, with only two schools of nursing identifying faculty abilities to teach and use information technology at the expert level (McNeil et al., 2003). Similarly, in a study of Canadian Schools of Nursing, faculty stated that nursing informatics content had been integrated throughout the curriculum; however, they were unsure of exactly where it was integrated or how many hours were devoted to this content (Nagle & Clarke, 2004).

This suggests that nursing faculty need to develop knowledge and skill in the area of nursing informatics in order to be adequately prepared to teach this content (Curran, 2008; Fauchald, 2008; Meyer, Sternberger, & Toscos, 2011). What is concerning however, is that many nursing programs in the United States had no plans or resources to engage in faculty development in this area (McNeil et al., 2006). Providing faculty with opportunities to work hands-on with ICTs was described as an effective faculty development initiative (Curran, 2008). Faculty should also be encouraged to design and develop assignments, case studies, and evaluation strategies which foster student learning about ICTs (Curran, 2008). These educational strategies build faculty confidence in their ability to try out new ideas and get creative with available technology (Curran, 2008).

In addition, the time necessary to orientate students to the system, establish passwords, and acquire access were barriers described as negatively impacting student engagement with electronic records within their professional practice experiences (Mahon et al., 2010). The extensive time required to train students to be users of clinical EHR systems takes a large amounts of time away from students' clinical learning. Yet, despite lengthy hospital training sessions, strict institutional policies continue to limit students from having their own access codes to the EHR system, resulting in limited learning opportunities with ICTs (Mahon et al., 2010).

Curriculum Development Strategies.

Authors of case study reports describe successful nursing informatics educational initiatives. Faculty need to consider identifying student learning needs, selecting courses to include nursing informatics competencies within, and mapping nursing informatics competencies throughout the curriculum (Barton & Skiba, 2009; Curran, 2008; Fetter, 2009). The *Nursing Informatics: Scope and Standards of Practice* (Staggers, Gassert, & Curran, 2002) (nursing informatics competencies developed for four different levels of practice - beginning nurse, experienced nurse, informatics specialist, and informatics innovator) have frequently been used to guide nursing informatics educational initiatives. Planning is essential as faculty need to consider what ICTs will suit their academic needs, and determine whether the school has the technical capacity and support staff necessary to manage the project (Connors et al., 2007). An evaluation plan was described as useful for monitoring project success (Fetter, 2009). In addition to careful planning, a project manager is necessary to assist with technical skill development, supply a vision to transform the learning environment, as well as support faculty to develop and utilize teaching strategies which incorporate ICTs (e.g., an academic electronic record (AEHR)) (Connors et al., 2007).

Another strategy to assist in lessening the cost associated with purchasing and accessing ICTs, in particular an AEHR, was the development of an academic/vendor or agency partnership. An academic/vendor or agency partnership can provide access to an academic record which faculty can tailor to suit the needs of the learning environment (Bowers, Kavanagh, Gregorich, Shumway, Campbell, & Stafford, 2011; Connors, Warren, & Weaver, 2007; Fauchald, 2008; Kennedy, Pallikkathayil, & Warren, 2009; Weber, 2004).

Teaching and Learning Strategies.

The primary teaching and learning strategy described within the literature was the use of a case study (Fauchald, 2008; Kennedy, Pallikkathayil, & Warren, 2009; Loftus, 2013; Meyer et al., 2011; Weber, 2004). Case study learning approaches were integrated within lecture and lab courses and provided a safe environment for students to access real-life data from a variety of patient situations (Fauchald, 2008; Kennedy et al., (2009). In one teaching approach, AEHR screen shots were projected onto a wall so that the instructor could "monitor and comment on individual progress, call attention to oversights, question reasoning, and highlight exemplary work" (Weber, 2004, p. 2).

Authors suggest that a case study teaching approach can be used not only to facilitate student development in the area of nursing informatics, but also to develop other key nursing competencies such as students' ability to understand the nursing process and evidence-based practice (Fauchald, 2008; Kennedy et al., 2009; Weber, 2004). Feedback suggested that students appreciated the case study learning strategy, identifying it as hands-on and assisting them to link theory to their practice (Kennedy et al., 2009). In order to promote an effective teaching and learning environment with the use of ICTs, faculty must ensure they are: 1) using the right equipment, 2) having a balanced instructor-to-student ratio, 3) focusing on longer training periods without distractions, 4) supporting student troubleshooting concerns, and 5) assisting students to experience the benefits of using the technology in the professional practice environment (Elfrink et al., 2000).

In addition to a case study method, faculty have developed student learning in the area of nursing informatics through: (1) encouraging student electronic documentation following professional practice experiences (Meyer et al., 2011), (2) developing stand-alone nursing informatics courses to target specific learning needs (Bowers, Kavanagh, Gregorich, Shumway, Campbell, & Stafford, 2011; Perry & King, 2009), and (3) working one-on-one with students through ICT documentation demonstrations (Mahon, Nickitas, & Noken, 2010). Overall, students embraced the use of ICTs seeing these systems as an organizing framework for planning and documenting the care they were providing (Connors et al., 2007; Elfrink et al., 2000). Students' negative comments reflected technical issues that students encountered (Meyers et al., 2011).

Informatics Curricular Content.

There have been three quantitative studies, one mixed method study, and one qualitative study which have specifically examined nursing informatics curricular content. Emphasis within nursing curricula is on computer and information literacy rather than developing higher level informatics competencies (Fetter, 2009b; McNeil et al., 2003, 2006; Nagle and Clarke, 2004; Ornes & Gassert, 2007). Students have the skills to use the internet, word processing programs, networks and operating systems, and to access electronic resources (Fetter, 2009b; McNeil et al., 2003; Nagle & Clarke, 2004; Ornes & Gassert, 2007; Stephens-Lee, 2013). Alternatively, using applications for documenting patient care activities, creating an online nursing care plan, understanding ethical use of information systems and computer-based records, and developing value for informatics knowledge has been given less attention within nursing curricula (Fetter, 2009b; McNeil et al., 2003, Nagle & Clarke, 2004; Ornes & Gassert, 2007). The *Nursing Informatics: Scope and Standards of Practice* (Staggers et al., 2002) were used as an evaluation framework to guide the identification of nursing informatics competencies in two of the studies described (Fetter, 2009b; Ornes & Gassert, 2007).

Authors of case study reports suggest that nursing informatics educational initiatives have assisted students to develop information literacy skills, in particular, the ability to search, critically evaluate, and apply sources of information to professional practice (Bowers, et al., 2011; Flood et al., 2010). Students were also identified as being able to use ICTs to document and evaluate care, as well as understand the ethical and legal implication involved with the use of these systems (Bowers et al., 2011; Connors et al., 2007; Curran, 2008).

In response to Research Question 2 (how schools of nursing have incorporated nursing informatics content within an undergraduate curriculum) there are a large number of case studies describing faculty members' experiences of integrating informatics content within the nursing curriculum. There are however, a limited number of qualitative and quantitative research articles that have evaluated these curriculum development endeavours, or those that have examined student learning outcomes. Current research findings suggest that a partnership between academia and a vendor or clinical partner is essential for successfully integrating an AEHR within the curriculum (Connors et al., 2007; Fauchald, 2008; Weber, 2004). In addition, faculty commitment to developing their knowledge and skill in the area of nursing informatics was identified by researchers as integral to project success (Curran, 2008; Fetter, 2007; Meyers et al., 2011; Weber, 2004). Faculty not only needed to be committed to developing their knowledge and skill in the area of nursing informatics, but remain committed to the curriculum development process. Although the published research provides some insight into the barriers and facilitators that are encountered in the process of incorporating nursing informatics within an undergraduate nursing education curriculum, further research is needed to determine the effects of curricular changes on student learning. In addition, evaluation of teaching and learning strategies used to develop student learning in this area is needed.

Conceptual Links between Nursing Education Culture and the Incorporation of Nursing Informatics Competencies into an Undergraduate Nursing Curriculum

No journal articles were found which have specifically assessed the conceptual link between nursing education culture and the incorporation of nursing informatics competencies into an undergraduate nursing curriculum. Although culture has been described as significantly affecting a school of nursing and its members, links between aspects of the culture of a school and curriculum development endeavours that occur in relation to nursing informatics have not been explicated. Further research in this area would provide an understanding of the barriers and facilitators which impact a school of nursing and the curriculum development process. This research could cultivate knowledge which assists nursing faculty to develop and maintain a culture which ensures that a curriculum remains context-relevant and adequately prepares nurses for practice.

In summary, there are limited numbers of published articles which have examined nursing education culture. The focus of available literature has been to link organizational culture to student and faculty empowerment and organizational commitment, describe the differences between the nursing academic culture and the nursing practice culture, and understand culture in relation to the minority nursing student experience. There are a number of case studies and research-based articles which have explored nursing informatics educational initiatives. The focus of this literature has been to describe successful nursing informatics curriculum development strategies, explore effective teaching and learning strategies for developing student learning in the area of nursing informatics, and outline the informatics curricular content taught to students. Although these articles provide insight into the facilitators and barriers which impact the curriculum development process and integration of nursing informatics within it, the conceptual links between aspects of nursing education culture and curriculum development initiatives in the area of nursing informatics have not been explicated.

Discussion

Despite the comprehensive search strategy, no articles were found that specifically examined the conceptual link between nursing education culture and the incorporation of nursing informatics competencies into undergraduate nursing curricula. The findings from this review suggest that schools of nursing in Canada and the USA are engaging in nursing informatics curriculum development endeavours; however, there are limited empirical studies which have evaluated these implementation efforts or examined student competency in relation to nursing informatics. Although aspects related to culture (resources, knowledge, values) were described and examined in case study and research reports, none of the published literature has identified or specifically related these concepts to the culture of a school of nursing. Those researchers who have examined nursing education culture have focused on identifying how a school of nursing culture impacts the attributes of its members, how culture is related to the development of a successful nursing program, and lastly how culture evolves and changes overtime. There is no research which has examined how a school of nursing culture impacts curriculum development or school processes promoting students to acquire nursing informatics competencies upon completion of their baccalaureate nursing program.

Although the literature offers some insight to guide nurse educators in their nursing informatics curriculum development efforts, caution must be used when drawing conclusions from these studies. Methodological weaknesses exist in all of the studies. Much of the available literature are in the form of case study reports, offering descriptions of implementation initiatives. However, no further evaluation of these initiatives or the change in student informatics competencies were examined following inclusion of this content within the curriculum. In addition, most of the literature has utilized the *Nursing Informatics: Scope and Standards of Practice* (Staggers et al., 2002) to guide their implementation efforts. These 2002 standards are a useful guide but, they may no longer be an accurate representation of the competencies required to function within a technology-enabled practice environment. These nursing informatics standards of practice, were developed as a guide for nurses at all levels of practice not specifically as a guide for nursing education and entry-level practitioners. Finally, within the available literature, transferability of the findings presented needs to be considered with caution as reports provide a limited description of how nursing education programs defined nursing informatics and what specific teaching and learning strategies were being used to develop student competencies. In many of the studies there was a limited description of what specific competencies were addressed in a particular course and minimal or no description was provided about the effectiveness of teaching and learning strategies used. Lastly, most of the available literature has been published within the United States, and therefore may not be generalizable to a Canadian educational context.

In order to further inform nursing informatics educational initiatives, further research is needed. Specifically, research is required which examines how the culture of a school of nursing impacts the curriculum development process and inclusion of nursing informatics content within it. Culture is an important component which guides the school of nursing in relation to developing priorities and making decisions. It would appear that aspects related to culture such as the value that members have in relation to nursing informatics, the knowledge and skill faculty possess, and the availability of resources, all impact the curriculum development process. Further exploration to specifically understand this process would offer valuable insight into the functioning of a school and provide direction to inform curriculum development endeavours. In addition, further examination and evaluation of the curriculum development process and teaching and learning strategies implemented to advance student knowledge in the area of informatics needs to be undertaken. At present there appears to be limited empirical literature to guide the selection of teaching and learning strategies suited to this curricular content.

Conclusion

Research which conceptually links nursing education culture to curriculum and course development in the area of nursing informatics is absent from the published research literature. Literature in the area of nursing education culture focuses on identifying a conceptual link between organizational culture and student and faculty empowerment and organizational commitment, as well as examining the difference in cultural attributes between nursing academia and nursing practice. Articles which outline nursing informatics educational initiatives have focused on describing successful curriculum development strategies, exploring effective teaching and learning strategies and outlining the informatics curricular content taught to students. As culture influences decision-making, affects the development of organizational priorities, and shapes the organizational and structural processes within a school of nursing, understanding the impact that culture has on curriculum development will provide insight to guide future curriculum development endeavours and assist to ensure graduates are competent to practice in technology-enabled practice settings. Future research is needed to conceptually link aspects of nursing education culture to the curriculum development process. Additionally, research which evaluates nursing informatics teaching and learning strategies, as well as student learning resulting from these curriculum development initiatives will provide insight to guide future nursing informatics curriculum development.

References

Armstrong, R., Hall, B. J., Doyle, J., & Waters, E. (2011). Cochrane Update. "Scoping the scope" of a cochrane review. *Journal of public health (Oxford, England)*, *33*(1), 147–50. doi:10.1093/pubmed/fdr015

Barton, A., & Skiba, D. (2009). Informatics curriculum integration for quality and safety education for nurses. *Studies in Health Technology & Informatics.* 146, 593-597.

Bosley, C. (2005). Organizational culture and student empowerment in baccalaureate nursing programs (Doctoral dissertation). Retrieved from Dissertation and Theses database (UMI Number: 3197067)

Bowers, A., Kavanagh, J., Gregorich, T., Shumway, J., Campbell, Y., & Stafford, S. (2011). Student nurses and the electronic medical record a partnership of academia and healthcare. *Computers, Informatics, Nursing.* 29, 692-697.

Canadian Health Infoway. (2009). *EHR vision 2015: Advancing Canada's next generation of healthcare*. Retrieved from https://www2.infoway-inforoute.ca/Documents/Vision_Summary_EN.pdf

Canadian Nurses Association. (2006). *Position statement: Nursing information and knowledge management.* Retrieved from http://www.cna-aiic.ca/CNA/documents/pdf/publications/PS87-Nursing-info-knowledge-e.pdf

Connors, H., Warren, J., & Weaver, C. (2007). HIT plants SEEDS in healthcare education. *Nursing Administration Quarterly*. 31, 129-133.

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *Nursing Clinics in North America.* 43, 523-533.

Elfrink, V., Davis, S., Fitzwater, E., Castleman, J., Vurley, J., Gorney-Moreno, M., Sullivan, J., Nichols, B., Hall, D. Queen, K., Johnson, S., & Martin, A. (2000). *Nurse Educator*, 25, 136-144.

Fauchald, S. (2008). An academic-industry partnership for advancing technology in health science education. *Computers, Informatics, Nursing.* 26, 4-8.

Fetter, M. (2009). Curriculum strategies to improve baccalaureate nursing information technology outcomes. *Journal of Nursing Education*, 48, 78-85.

Fetter, M. (2009b). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Flood, L., Gasiewicz, N., & Delpier, T. (2010). Integrating information literacy across a BSN curriculum. *Journal of Nursing Education*. 49, 101-104.

Gormley, D., & Kennerly, S. (2010). Influence of work role and perceptions of climate on faculty and organizational commitment. *Journal of Professional Nursing*, 26, 108-115.

Kennedy, D., Pallikkathayil, L., & Warren, J. (2009). Using a modified electronic health record to develop nursing process skills. *Journal of Nursing Education*, 48, 96-100.

Kotter, J.P. (1996). Leading change. Boston, MA: Harvard Business School Press.

Johnson, B. (2009). Empowerment of nurse educators through organizational culture. *Nursing Education Perspectives*, 30, 8-13.

Kossman, S. (2003). Student and faculty perceptions of nursing education culture and its impact on minority students (Doctoral dissertation). Retrieved from Dissertations and Theses database (UMI Number: 3087869)

Leiker, T. (2011). Cultural characteristics of a nursing education center of excellence: A naturalistic inquiry case study (Doctoral dissertation). Retrieved from *Dissertation & Theses database* (UMI Number: 3457559)

Loftus, J. (2013). Improving technology literacy and skills among minority nursing students. *Journal of Nursing Education*, 52,238. DOI 10.3928/01484834-20130322-11.

LoBiondo-Wood, G. (2013). Systematic reviews and clinical practice guidelines. In. LoBiondo-Wood, G. & Haber, J. (2013). Nursing Research 8th Edition. (p. 218-230). Toronto, Ontario: Mosby/Elsevier.

Mahon, P., Nickitas, D., & Nokes, K. (2010). Faculty perceptions of student documentation skills during the transition from paper-based to electronic health records systems. *Journal of Nursing Education*. 49, 615-621.

McNeil, B., Elfrink, V., Beyea, S., Pierce, S., & Bickford, C. (2006). Computer literacy study: Report of qualitative findings. *Journal of Professional Nursing*. 22, 52-59.

McNeil, B., Elfrink, V., Bickford, C., Pierce, S., Beyea, S., Averill, C., & Klappenbach, C. (2003). Nursing information technology knowledge, skills, and preparation of student nurses, nursing faculty and clinicians: A U.S. survey. *Journal of Nursing Education*, 42, 341-347.

McNish, G. (2003). The organizational culture in successful nursing programs (Doctoral dissertation). Retrieved from *Dissertations and Theses* (UMI Number: 3127177)

Meyer, L., Sternberger, C., & Toscos, T. (2011) How to implement the electronic health record in undergraduate nursing education. *American Nurse Today*, 6, 40-44.

Nagle, L., & Clarke, H. (2004). Assessing Informatics in Canadian Schools of Nursing. *Studies in Health Technology & Informatics.* 107, 912-916.

Ornes, L., & Gassert, C. (2007). Computer competencies in a BSN program. *Journal of Nursing Education*. 46, 75-78.

Perry, P., & King, M. (2009). Course development: Nursing informatics. *Online Journal of Nursing Informatics,* 13, 1-20.

Porter, M., & Bean. J. (2004) Organizational lifecycle in a school of nursing. *Western Journal of Nursing Research*, 26, 444-460.

Schriner, C. (2004). Clinical nurses transitioning into a faculty role: A cultural analysis of the nursing profession, the academic discipline of nursing, and the academic professorate (Doctoral dissertation). Retrieved from *Dissertation and Theses* (UMI Number: 3160368)

Schein, E (2004). *Organizational culture and leadership (3rd edition).* Retrieved from. http://books.google.ca/books?hl=en&lr=&id=xhmezDokfnYC&oi=fnd&pg=PR11&dq=organizational+culture+definition&ots=m5KV2Sk6pL&sig=7kF9ZyS1SO0xROm6xyTgz G0Yytg#v=onepage&q=organizational%20culture%20definition&f=false

Springer, P., Clarke, C., Strohfus, P., & Belcheir, M. (2012). Using transformational change to improve organizational culture and climate in a school of nursing. *Journal of Nursing Education*, 51, 81-88.

Staggers, N., Gassert, C., & Curran, C. (2002). A Delphi study to determine informatics competencies for nurses at four levels of practice. *Nurse Res.* 51, 383-390.

Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Srite, M. (2002). Towards a theory based measurement for culture. *Human factors in information systems.* Retrieved from.

http://books.google.ca/books?hl=en&lr=&id=p_Whr3BSlMC&oi=fnd&pg=PA61&dq=culture+definitions&ots=_aT2mIZnzy&sig=YP2CaoaRUXhxTMpGt3mNnqP_k7Q#v=on epage&q=culture%20definitions&f=false

Stephens-Lee, C., Lu, D., & Wilson, K. (2013). Preparing students for an electronic workplace. *Online Journal of Nursing Informatics*. 17, 1-11.

Weber, D. (2004). Transforming the student nurse experience: A university integrates e-health technology into the nursing curriculum. *Patient care staffing report.* 4, 1-3.

Chapter 3 – A Focused Ethnography of a School of Nursing: A Methological Review

The incorporation of information communication technologies (ICT) within professional practice environments is revolutionizing how healthcare professionals and patients access and manage health-related information. As a result, knowledge and skill in the area of nursing informatics is an essential requirement for nursing students' success in healthcare practice (Canada Health Infoway [CHI], 2009; Canadian Nurses Association [CAN], 2001). Development of nursing informatics competencies will enable nursing students to effectively retrieve, manage, and critically evaluate information which informs their nursing practice and promotes an enhanced nurse-patient care relationship (Deese & Stein, 2004; Fauchald, 2008; Fetter, 2009c; Melo & Carlton, 2008). Despite the importance of nursing students' acquisition of nursing informatics competencies, many schools of nursing have yet to fully incorporate these competencies within undergraduate curricula (Borycki & Foster, 2014; Clarke, Baker, & Baker, 2009).

Reasons for the lack of planned nursing informatics educational initiatives within nursing curricula have been attributed to low faculty knowledge and skill (McNeil, 2003; Taylor, Hudson, Vazzano, Naumann, & Neal, 2010), restricted student access to ICTs within professional practice settings (Fetter, 2009a; Melo & Carlton, 2008; Vestal, Krautwurst, & Hack, 2008), and a lack of accreditation standards focused on nursing informatics competencies (Fetter, 2009a, 2009b). In addition, there are few research-based reports which provide guidance to nurse educators who wish to incorporate nursing informatics within their nursing curriculum (Canadian Association Schools of Nursing [CASN], 2012a, 2012b, 2013).

Despite these challenges, successful nursing informatics educational initiatives have been driven by effective curriculum planning which includes: determining members of the curriculum development team (Curran, 2008; Fetter, 2009c; Griffen-Sobel et al., 2010), securing financial and human resources to support integration (Fauchald, 2008; Fetter, 2009c), and formulating curriculum development goals with target completion dates (Gloe, 2010). Additionally, creation of an academic partnership between a school of nursing and an agency or vendor partner assists in lessening the cost associated with purchasing and maintaining these ICT systems (Nickitas et al., 2010). The existing literature examining nursing informatics curriculum development initiatives is predominantly case study reports, and additional research studies are needed to examine the facilitators and barriers to incorporating nursing informatics competencies within Canadian schools of nursing.

Culture refers to the values, assumptions, and behaviours that are held by members, guides the development of priorities, and shape the organizational or structural processes embedded within a school of nursing (Schein, 2004). Although culture has been described as significantly affecting a school of nursing and its members (Gormley & Kennerly, 2010; Leiker, 2011; McNish, 2003), links between aspects of culture and curriculum development in relation to nursing informatics remains unstudied, and thus, a conceptual link has not been explicated. Consequently, an ethnographic study was undertaken to understand the influence of culture on curriculum, specifically, nursing informatics curriculum.

The purpose of this paper is to describe and critique the use of a focused ethnography framed in a systems perspective to study the influence of nursing education culture on the integration of nursing informatics competencies within a collaborative nursing program curriculum. This paper will provide an overview of the study, describe the positionality of the researcher, discuss the application of systems theory to this study, offer a critique of the use of a focused ethnography, and discuss study limitations.

Study Purpose

The study purpose was to examine a collaborative nursing program culture in order to understand how the practices and policies that are inherent within two schools of nursing influence the inclusion of nursing informatics competencies in the undergraduate nursing curriculum. An analysis of a collaborative nursing program culture provided a means to answer the following research questions:

1. In what ways does a nursing education culture (the shared values, assumptions and behaviours of two schools of nursing) and the practices and policies within the two schools of nursing affect the incorporation of nursing informatics competencies in a collaborative nursing program curriculum?
2. How is the incorporation of competencies related to nursing informatics in the collaborative program curriculum influenced by the systems and subsystems within the two schools of nursing?
3. How do the subsystems within the two schools of nursing interact to affect the incorporation of nursing informatics competencies in the undergraduate nursing curriculum?

4. In what ways do resources within these two schools influence the curriculum development process and incorporation of nursing informatics competencies within the curriculum?

Positionality

The researcher came to engage in this study with an interest and passion for nursing education. My desire to pursue graduate studies resulted from the enjoyment I felt when engaging with students on the clinical unit in which I worked. Pursuing graduate studies in the area of nursing education provided an opportunity to continue my education such that I could become involved further in the preparation of graduates for the practice environment. As part of my Masters degree, I conducted a study whose purpose was to understand students' learning needs in relation to using an electronic documentation system. The available research demonstrating limited integration of informatics competencies within the nursing curricula, in addition to the findings from my research created a desire to further understand why this important area of student learning (nursing informatics competencies) had not been well integrated within nursing curriculum. Additionally, from my teaching experiences on the clinical unit, I realized that keeping undergraduate education at pace with the constantly changing healthcare environment was a challenge. Understanding aspects of the curriculum development process and particularly how it related to nursing informatics therefore became my interest and the area that I chose to pursue for my doctoral research.

From my graduate studies which focused in the area of nursing education, I bring to this study an extensive understanding of nursing education, and teaching and learning. In addition, being a student representative on the Canadian Association of Schools of

Nursing Accreditation Bureau of Canada has also fostered an in-depth understanding of the accreditation process. Throughout the research process, I was an insider in that I knew many of the faculty and staff of the University and College educational units. In addition, I also had an extensive overview of the nursing programs offered at the University, and of the Collaborative program offered at the College. During the data collection and analysis process, I remained an outsider to the Collaborative Nursing Program. I had not taken any of the program courses, nor was I employed as an instructor within the collaborative program. Knowledge and experience at the institutions under investigation provided the opportunity to connect with key personnel who had valuable information and this contributed to answering my research questions. In addition, having an understanding of the educational units and programs offered, gave me the opportunity to conduct a focused ethnography, concentrating on how aspects of nursing education culture influence the inclusion of nursing informatics competencies into the undergraduate nursing curriculum. Despite my connections to the academic institutions under investigation, consultation with my committee determined that the benefits out-weighed the challenges and potential limitations of conducting the study within these two schools of nursing.

Theoretical Framework

Systems theory was the theoretical framework which guided this study. This theory influenced the study design, research questions, and data collection and analysis strategies. The academic institution in which a school of nursing is situated is complex and contains a plethora of cultures. Applying a systems analysis with the use of a focused ethnography allowed the researcher to separate the schools of nursing and collaborative nursing program into systems and subsystems to create manageable units of study within the complexity. In addition, pairing an ethnographic study with a theoretical perspective has been described as enhancing the research process (Wilson & Chaddha, 2010). The application of a theoretical perspective stimulates researchers to utilize their own theoretical knowledge to make sense of new data uncovered in a particular research field. Further, a theoretical approach prevents the researcher from merely reporting their conclusions and shaping the findings to fit within preconceived notions which are not supported by the data (Wilson & Chaddha, 2010). Consequently, systems theory was selected to guide this study.

Systems Theory

Developed by Ludwig von Bertalanffy, systems theory is used to study the interaction of a system with its environment (Walonick, 1993). A system is a structure that is made of interrelated and interdependent elements which influence one another to maintain a state of homeostatsis within the system. Systems analysis explores the complex set of interrelationship amongst subsystems, as a system is constantly exchanging information with its environment in an effort to maintain a state where optimum potential can be reached (Ansari, 2004). During this systems analysis, change was examined within and between the systems of the two schools of nursing as well as within the collaborative program system. Two forms of change were examined, detail complexity and dynamic complexity. Detail complexity was "the specific consequences of change, (while) dynamic complexity involves long-term consequences of change" (Way & MacNeil, 2007, p. 165). Each form of change is caused by interactions within the system that either reinforce or counteract actions and practices to maintain the status quo. Within the current study, change to the curriculum in relation to integrating nursing informatics within it was assessed. Specifically, the culture of the collaborative nursing program was examined to understand how changes to policies, procedures, and cultural attributes were facilitated within these systems to move towards a curriculum which integrated nursing informatics competencies. Performing a systems analysis allowed the researcher to identify dynamic patterns that led to system changes, thus creating an understanding of why certain decision were made and actions taken to evolve the schools of nursing in a particular way.

Systems theory has been described as an effective lens in which to study an educational setting. Within the realm of nursing education, Carrick (2011) describes the nursing program system as greater than just the faculty and students within it. She contends that the educational system contains many interdependent processes that are used by faculty and students for teaching and learning. To demonstrate how effectively the educational system fits within a systems perspective, Carrick provides the example of the practice of teaching. According to Carrick, the practice of teaching is described as a subsystem within the greater nursing education system. The art of teaching is non-linear with students' responses to teaching techniques being unpredictable. Additionally, the availability of resources or teaching equipment within the school of nursing educational system act to either impede or promote the teaching and learning processes. The availability of resources as well as students' responses to teaching activities provides feedback to the teacher who then can evaluate their teaching strategies to determine which are most effective and what resources are necessary to optimize the art of teaching. As this is one example of how systems theory can be applied to the educational setting, it must be noted that there are many other subsystems which impact the teaching processes and the larger nursing school system.

When examining a culture such as that of an educational program, systems theory provides a lens in which to deconstruct the schools of nursing and educational program into systems and subsystems. As schools of nursing are contained within a larger academic system, the academic culture influences the culture of the school, the availability of resources, and the faculty and students contained within the educational environment. The interactions within and between the systems and subsystems of the educational environment act as feedback loops which inform other subsystems and shape the overall position of the school of nursing, the content taught to students, and the specific teaching strategies employed. Analysis of this collaborative nursing program culture aimed to identify how each system and subsystem within the two Schools of Nursing interacted to shape the position of the collaborative program within its social environment.

Review of the literature suggested a number of subsystems within schools of nursing which impact the curriculum development process and inclusion of nursing informatics competencies within the curriculum. These subsystems included: culture, human infrastructure, and resources. Although these were not the only systems and subsystems that were observed throughout the analysis, they provided a starting point and beginning focus for the data collection and analysis process. Systems theory was also used to inform the semi-structured interview guides, assisting to provide uniformity and organization to the interview process. Additional detail about the effectiveness of using systems theory is provided below.

Methods

Design

As the culture of a collaborative nursing program was the unit of analysis for this study, a focused ethnography was employed. Ethnography is a methodology which is employed to understand culture or cultures through the perspective of those who live in them (Crang & Cook, 2007). A focused ethnography is similar to a traditional ethnography; however, in this methodology the researcher enters into the study setting with a thorough understanding of the study field and then collects a large amount of data on a specific aspect of the culture (Morse & Richards, 2002). This methodology was selected to examine how the practices, values, and beliefs embedded within the two Schools of Nursing impact the curriculum development process and the incorporation of nursing informatics competencies within it. A focused ethnography is complementary to a traditional ethnography and is characterized by short field visits in collaboration with intensive data-collection through interviews, documents analysis, and observation (Knoblauch, 2005).

Context

The unit of analysis for this study was the culture of an undergraduate collaborative nursing program. The program under investigation was a 4-year BScN degree offered through a collaborative partnership between a university and college. Both sites were located in the same city within Ontario, had their own administrative structures, and offered other nursing programs in addition to the program under investigation. During the period of data collection the collaborative nursing program was undergoing curriculum development with course design and development for years 2-4 of the curriculum ongoing during this time. Within the design of the revised concept-based curriculum, informatics had been selected as a key concept to be integrated throughout all years of the program. In addition, during the data collection period, faculty were in the process of developing an informatics course which was to be a required course taken by students in the revised curriculum. Both program sites have one shared mission, vision, and philosophy.

Sample

Permission from both academic leaders at each of the nursing program sites was provided to conduct the study. This permission granted the researcher with access to contact potential participants, engage in observation session at the University site, and access relevant documents available through administrative assistants and to the public. Once ethics approval was granted (Appendix B), a criterion sampling strategy was employed. A criterion sampling strategy ensured that participants were involved with the collaborative program and could provide information about the phenomena under investigation (Polit & Beck, 2008). Participants were recruited by asking the academic leaders of the nursing program sites to identify key informants or personnel with a specialized knowledge about the phenomena of interest (Appendix C). Potential faculty and staff participants were then contacted by email to request their participation in the study (Appendix C). During the interview process, faculty and staff identified additional potential participants who were also contacted by email to request their participation in the study. Students were recruited through email and in-person during class sessions where the letter of information about the study was explained (Appendix C). If students chose to participate, they contacted the researcher by email or in-person during one of the three in-class recruitment sessions. All faculty, staff, and students who participated in the study completed a consent form (Appendix D). Participants were recruited in an effort to obtain a perspective from individuals across all levels of the program as well as from a variety of academic ranks.

Data Collection

Interviews.

Twenty-six in-depth individual interviews were conducted with faculty, support staff, and students from the collaborative nursing program. Interviews lasted approximately one hour and were guided by semi-structured, researcher-developed interview guides (Appendix E). The interview guides focused on how the systems of human infrastructure, culture, and resources impacted the curriculum development process and inclusion of nursing informatics within it. For a description of the systems of culture, human infrastructure, and resources see Appendix G. There were four interview guides developed, one for each of faculty, staff, students, and the academic leaders. In particular, the aim of the interviews were to understand the culture of the schools of nursing and the values, beliefs, and assumptions that relate to incorporating nursing informatics competencies within the collaborative nursing program. Additionally, interview questions sought information about: policies, practices, and resources which support the schools' value system; the knowledge and skill level of faculty in relation to nursing informatics; student nursing informatics knowledge and skill upon graduation; and how the concept of nursing informatics was considered during the curriculum development process and incorporated within the revised curriculum. As data collection and analysis occurred concurrently, interview questions also evolved during this period and were used to further understand as well as confirm preliminary study findings. During the interview process, all participants were also asked to complete a demographics questionnaire (Appendix F).

Documents.

Documents were obtained through communication with faculty at both sites and in consultation with administrative staff. Documents included: the College and University mission and vision statements, the nursing mission and vision statements, curriculum and course development committee meeting minutes, documents outlining resources and physical space available, additional content available on college and university school of nursing web pages, and curricular documents such as: program year goals, a curriculum overview, course syllabi, and course descriptions. Documents were included in the data analysis if they focused on the study goals and impacted the collaborative nursing program.

Observation.

Fifteen observations were completed throughout the data collection period. These consisted of 15 hours of class sessions, 15 hours of committee and course development meetings, and 4 hours of research presentations. Inclusion criteria for observations were that they be associated with the collaborative nursing program and fit within the aims of the research questions. In addition, at random the researcher selected a number of nursing courses to observe for the presence of nursing informatics competencies. Verbal consent from the individuals involved in the observation was provided. During the observation sessions, the researcher was a silent observer. Field notes were taken and contained data such as the content of the observation session, the facilities in which it took place, student responses to teaching strategies, and curricular content specific to informatics.

Data Analysis

All data from interviews and field notes were transcribed. The researcher conducted an in-depth analysis focusing on aspects of the culture of the schools which were within the aims of the identified research questions. A thematic analysis of the interview transcripts, observation data, and documents was conducted concurrently. All data from interviews, observations, and documents were collected and organized within NVivo version 10 software. Data analysis was an inductive process and began with reading and rereading all data to identify patterns (Aronson, 1994). The identification of patterns lead to the development of categories and themes. Once major categories had been identified, the researcher further examined each to consider how it related to other categories to further develop an understanding of the schools of nursing and collaborative program system (Aronson, 1994). Categories and themes were again compared and contrasted and this resulted in the collapsing of categories and the exploration of new themes (Aronson, 1994). Major categories were then analyzed to determine if there was triangulation amongst the data sources. Specifically, the researcher assessed whether identified categories were supported by all three sources of data collected. Conducting this analysis provided a holistic understanding of the study findings and the interaction between identified categories.

In addition to coding data into common patterns, data were also coded as they aligned with the Canadian Association Schools of Nursing (CASN) *Entry-to-Practice Competencies for Registered Nurses (*CASN, 2012a). As data collection and analysis occurred simultaneously, coding according to the CASN *Entry-to-Practice Competencies for Registered Nurses* provided an opportunity to identify important documents, observation experiences, and potential participants to include in the data collection process. The CASN competencies served as a reference to identify nursing informatics content within the existing and revised collaborative program curriculum. Through identifying what nursing informatics content had been selected for inclusion within the collaborative program curriculum, the researcher was then able to further examine how the systems and subsystems of the nursing education culture, and school policies and procedures influenced the selection of this curricular content. Finally, coding in relation to the *Entry-to-Practice Competencies for Registered Nurses* provided the researcher guidance in determining what nursing informatics competencies students were obtaining during completion of the collaborative program.

During the interpretation of findings, the researcher did not have an apriori coding scheme. Rather the names of categories, which were later refered to as the systems and subsystems, came from the data analysis procedures and were informed only by the study findings. In the final phase of data analysis, a diagram of the relationship between and amongst systems and subsystems was developed to provide a visual depiction of the study findings.

As interviews took place with faculty at both the College and University sites, careful consideration was given to understanding whether there were unique cultural attributes at each of the locations. Because there were so many commonalities between the two locations (i.e., same courses, curriculum development was a collaborative process, administrative processes and decision-making procedures were similar) the data from both sites were combined and analyzed together. Unique cultural attributes of each institution were considered during data analysis to identify the influence that they had on the integration of nursing informatics within the curriculum. The main difference between the college and university sites was the emphasis given to research activities. Within the university, research achievements were highly valued. Faculty in tenured and tenure track positions had a large portion of their workload time devoted to research activities and engaging in research was described as a scholarly endeavour that brought recognition and prestige to the schools of nursing and faculty members. Meanwhile, there was less emphasis given to research achievements at the college site. Faculty workload devoted to research was allocated on an individual basis and determined according to the research activities that a particular faculty member was engaged in. The college site however, had recently invested additional resources to support faculty engaging in research through the development of a center for research and innovation.

Findings and Recommendations

External cultures, the cultures of the two schools of nursing, the faculty culture, and school resources were systems that influenced the inclusion of nursing informatics content within the collaborative program curriculum. External system cultures, as well as members' values and beliefs, had a significant impact on the nursing educational culture; the educational culture in turn influences how resources are allocated and the value and priority dedicated to the curriculum development process and integration of nursing informatics competencies. Subsequently, findings suggest that commitment and priority for the topic of nursing informatics need to be established within the nursing education culture and in the value system of members. Within the faculty role, opportunity and incentive for faculty to engage in faculty development in the area of nursing informatics must be provided and financial resources need to be allocated to support curricular integration. Finally, faculty as nursing leaders must have the knowledge and skill to make informed decisions about what nursing competencies are essential requirements for the graduate nurse. Faculty development and professional practice experiences are necessary in order to broaden faculty knowledge and skill in nursing informatics topics (Fetter, 2009).

Discussion

This is the first study known to examine the nursing education culture in relation to integrating nursing informatics competencies within it. Systems theory provided an effective means of conceptualizing this study and answering the research questions. Overall a systems analysis provided an innovative approach to guide a focused ethnography in an effort to comprehensively examine the culture of a collaborative nursing program and the effect that culture has on the curriculum development process in relation to nursing informatics competencies.

Systems theory

Systems theory was an effective lens to focus the data collection procedures. Preliminary analysis of the literature identified a number systems and subsystems which appeared to have an impact on the inclusion of nursing informatics content within undergraduate nursing curricula. These systems and subsystems were determined to be aspects of the nursing education program culture and included: culture, human infrastructure, and resources. Pairing systems theory with a focused ethnography therefore enabled the researcher to uncover the relationships between the systems and subsystems of the nursing education culture as they relate to nursing informatics curriculum development endeavours; a relationship which within nursing education had previously not been explicated. Data collection strategies focused on understanding the culture of the collaborative nursing program in relation to each of these systems (culture, human infrastructure, and resources) as well as identifying additional systems which impact the integration of nursing informatics competencies within the curriculum (For a description of data collected in relation to culture, human infrastructure, and resources see Appendix G). An understanding of systems theory and those systems which appeared to impact the phenomena under investigation provided structure and guidance to focus this study.

Systems theory also complemented the data collection strategies as it directed the development of the interview questionnaires. In preparing for participant interviews, the three subsystems identified within the available literature served as a guide for the development of the semi-structured interview guides. Concentrating the discussion on culture, human infrastructure, and resources provided a beginning focus for the interview questions, and yet allowed the questions to be open-ended such that systems and issues outside of those suggested within the literature could be discussed and explored. This open and semi-structured approach allowed participants to identify issues they believed to be unique to their experience of integrating nursing informatics content into the collaborative program curriculum.

Finally, systems theory also guided the data analysis procedures. Employing a systems theory perspective offered an effective lens to deconstruct the two schools of nursing into smaller systems and subsystems. This allowed the researcher to determine which components comprise the systems of each of the schools of nursing and the collaborative nursing program, and provided an opportunity to study the interaction amongst these systems. Using a systems perspective focused the analysis beyond the schools' systems to promote consideration of those systems that are present within the environment in which the schools and program are situated. In this way, the important influence that external system cultures have on the schools of nursing and collaborative nursing program were identified. In summary, systems theory was an effective lens to guide the theoretical conceptualization of the study, the research questions, and the data collection and analysis strategies used. Using systems theory assisted to divide the schools of nursing and collaborative nursing program into manageable sections to make evident how these systems and subsystems interact and are shaped by the social structures present within the nursing education environment.

Focused Ethnography

Employing a focused ethnography was an effective methodology to examine the culture of a collaborative nursing program. This approach allowed for a focused analysis of aspects of the nursing education culture which impact the curriculum development process, specifically in relation to including nursing informatics within it. Having a thorough understanding of the study field as one does in a focused ethnography (Morse & Richards, 2002), allowed the researcher to more easily navigate within this culture. Prior to collecting data, in-depth knowledge of available literature in this area provided direction and guidance to the data collection procedures. Through reviewing the literature, the researcher identified systems of culture, human infrastructure, and resources as areas which impact nursing informatics curriculum development efforts.

Consequently, interview questionnaires could be structured to include questions which explored these areas. In addition, having a predetermined research aim further allowed for purposeful data collection. Data collection commenced in an efficient manner and specifically focused on interviewing, observing, and collecting documents which provided information which contributed to answering the research questions.

In addition to having knowledge about the available research in the area of study, the researcher also had a thorough understanding of the study setting. Having a close relationship with faculty and staff at both schools of nursing provided the researcher with an awareness of the roles of faculty and staff within the educational units. The researcher was then able to identify important contacts for collecting documents which were related to the study aims. As well, a close relationship with faculty and staff provided opportunity for the researcher to begin to identify individuals who were important to include within in the interview process. Lastly, the researcher's familiarity and relationship with faculty members presented many important observation opportunities.

Employing a focused ethnography characterized by short field visits in collaboration with intensive data-collection through interviews, documents analysis, and observation (Knoblauch, 2005) was an asset to this study. The collaborative program curriculum is outlined in written documents and it is presented to students through the unique teaching and learning practices of faculty members. Having multiple data collection strategies provided a realistic understanding of how the curriculum is actually enacted and taught to students. Additionally, findings derived from data analysis could be further authenticated through data triangulation.

Combining a focused ethnography with systems theory further enhanced the research process. The use of systems theory to guide this focused ethnography assisted in the process of discovery as well as validated the principles of systems theory within a nursing education environment. This combined deductive and inductive study approach assisted the researcher to consider the theoretical tenets of systems theory to derive new research knowledge about nursing informatics educational initiatives based on the data uncovered (Wilson & Chaddha, 2009). In other words, the researcher was able to utilize knowledge derived from systems theory to provide direction and guidance in developing research questions related to the functioning of the nursing education culture. Consequently, systems theory was an effective theoretical perspective to pair with a focused ethnography as nursing education culture is a complex and dynamic aspect of a school of nursing. Utilizing systems theory provided an opportunity to further examine and divide the culture under study into manageable systems of analysis. The researcher was then able to observe and reflect on the interaction and impact that each of these systems had on one another through the use of the three data collection procedures (interviews, observations, and document review) employed in a focused ethnography.

In addition, the researcher agrees with Wilson & Chaddha (2009) who believe that to use a theory deductively with a focused ethnography may result in a theory aided interpretation, rather than an analysis based on a true non-biased interpretation of the data. Through identifying systems theory as the theoretical perspective which guided this focused ethnography, the researcher is explicitly identifying the theoretical framework which supported the interpretation of the evidence identified in the data collection procedures. Consequently, in order to ensure that systems theory did not manipulate and impact study findings, systems theory was used during data analysis to support the researcher to make sense of the data uncovered, rather than to shape the interpretation of findings. Wilson & Chaddha (2009) describe this as a combined inductive/deductive theoretical approach to performing ethnography.

Despite a focused ethnography proving to be an effective methodology to guide this study, there were a number of challenges associated with its use. As faculty within the collaborative program are members of two larger schools of nursing with multiple nursing programs offered, at times it was difficult for interviewees to restrict the discussion of their experiences to only those which were specifically related to the collaborative program curriculum. In order to overcome this challenge, the researcher periodically reminded participants of the focus on the collaborative program as well as questioned the participants about the accuracy and application of the material presented to the program under study.

Another challenge with employing a focused ethnography was that the collaborative program was offered through a collaborative partnership between two schools of nursing. Subsequently, both of these schools of nursing and the two external academic cultures within which the schools of nursing are situated within impacted the program culture. The collaborative partnership proved challenging during the data analysis procedures as the researcher needed to extensively analyze how these two academic cultures impacted and shaped the collaborative program curriculum and inclusion of nursing informatics within it.

The nature of the academic calendar was another challenge. It was impossible to observe every class or lab session which may have included content related to nursing informatics as course scheduling in different years of the program conflicted with one another. As well, the revised curriculum was only in its first year of implementation and this prevented the researcher from observing years 2-4 of this revised curriculum. In order to overcome this challenge, all course syllabi for the collaborative program (existing and revised curriculum) were reviewed, and teaching and learning strategies and content areas were discussed with faculty throughout the interview process. The development and implementation of the revised curriculum also posed a similar challenge. During the data collection period, faculty were in the process of writing courses for years 2-4 of the revised curriculum. The lack of available curricular documents for years 2-4 of the revised curriculum may have prevented the researcher from understanding the full extent to which nursing informatics would be integrated within the revised curriculum. Alternatively, the fact that faculty were actively engaging in curriculum development activities was an asset to this study. The researcher was able to observe the curriculum and course design process. Particularly, this provided an understanding of how *technology/informatics* had been selected as a major concept within this concept-based curriculum, as well as how faculty developed a health informatics course.

The final challenge which occurred with exploring a nursing education culture through the use of a focused ethnography was recruitment of student participants. Students were contacted by email to request their participation in the study. This recruitment strategy was ineffective as the researcher received no student contacts. In order to overcome this challenge, the researcher engaged in a number of in-person recruitment sessions with students at the end of class sessions. During this time, the researcher explained the study purpose to students and offered them an opportunity to meet with the researcher to discuss their participation. This recruitment strategy resulted in obtaining two student participants.

Overall, a focused ethnography was an effective methodology to study a nursing education culture. The use of multiple data collection strategies was a means to understand and gather information about a program culture which was in the process of restructuring. Becoming immersed within the program culture allowed the researcher to learn about the culture members, examine commonly held practices and policies, as well as collect information which contributed to answering the research questions. Despite systems theory being an effective lens to guide a focused ethnography, this methodology could also be incorporated with a variety of other theoretical perspectives. Having knowledge about the study setting prior to engaging in the research process led to the choice of a theoretical perspective that fits within the context of the nursing education setting and research aims.

Within nursing education, a focused ethnography could guide a researcher who aims to understand institutional processes and practices. In addition, this methodological approach could be used to examine differences in cultural experiences amongst various members of the educational culture. A focused ethnography within nursing education is an effective methodology to employ when one wishes to focus the analysis on a smaller element of the culture or on a particular cultural trait (Knoblauch, 2005). When studying nursing curriculum, a focused ethnography can be useful to answer questions which relate to the implementation of a revised curriculum or course. Specifically, it would provide a means to conceptualize the impact that curricular changes have on the workplace as well as offer suggestions for curricular revision. In addition, it would also provide a methodology for understanding how curricular concepts are understood and applied by students in their lives and nursing practice.

Study Limitations

This study has a number of limitations. The uniqueness of this collaborative nursing program may impact the transferability of findings. As each school of nursing has a unique culture which impacts the programs offered, findings from this study may not align with the unique values and beliefs of other schools of nursing in Canada. Further, the study of a Canadian educational environment may also make the transferability of findings to schools outside of Canada difficult. Despite being an outsider to the collaborative nursing program, the researcher's familiarity with the schools of nursing and its members may have influenced the interpretations made as well as the information provided by participants throughout the interview process. Familiarity with the schools of nursing also benefited to the data collection procedures as it allowed the researcher to conduct a focused ethnography. Without an in-depth and specialized understanding of the study setting, it would have been difficult to focus the data collection procedures on aspects of the culture which impacted the research aims. Finally, a criterion sampling method as well as a limited number of participants may not have represented the full range of experiences and perceptions of the educational cultures studied. In particular, difficulty in recruiting student participants means that student perspectives are not included. Regardless of this limitation, the presence of recurrent themes immerged from the data analysis procedures.

Conclusion

Nursing education culture is complex and dynamic. Consequently, the research approach which is used to study such a setting must be reflective of the complexity of the environment. Employing a focused ethnography paired with a systems framework provided an approach to understanding the ways in which a collaborative nursing program culture impacts the integration of nursing informatics competencies within an undergraduate nursing curriculum. Combining systems theory with a focused ethnography allowed for an in-depth analysis of the collaborative program nursing education culture. This research approach facilitated the division of the nursing educational environment into manageable units. Through use of interviews, observations, and document analyses used in a focused ethnography methodology, the researcher was able to understand the interaction that systems of the nursing education culture have with one another, and ultimately how this impacted the incorporation of nursing informatics content within the curriculum. A focused ethnographic methodology would also be effective to guide the study of other aspects of nursing education culture, such as levels of power amongst culture members, how beliefs, priorities, and values are developed within the nursing education culture, how curricular changes affect the workplace, and how course concepts are understood and applied by students.

References

Ansari, S. (2004). *Systems Theory and Management Control*. Retrieved from http://faculty.darden.virginia.edu/ansaris/systems%20theory%20and%20mcs-tn.pdf

Aronson, J. (1994). A pragmatic view of thematic analysis. *The Qualitative Report*, 2, 1. Retrieved from http://www.nova.edu/ssss/QR/BackIssues/QR2-1/aronson.html/

Borycki, E., & Foster, J. (2014). A comparison of Australian and Canadian informatics competencies for undergraduate nurses. *Nursing Informatics*,201, 349-355. doi: 10.3233/978-1-61499-415-2-349

CASN. (2012a). *Nursing informatics entry-to-practice competencies for registered nurses*. Retrieved from. http://www.casn.ca/2014/12/nursing-informatics-entry-practice-competencies-registered-nurses-2/

CASN. (2012b). *Nursing informatics inventory of existing teaching and learning resources.* Retrieved from. https://www.google.com/url?q=https://www.infoway-inforoute.ca/index.php/component/docman/doc_download/2153-nursing-informatics-inventory-a-report-of-existing-teaching-and-learning-resources&sa=U&ei=Wu-qVJrSLsX_yQSEuYGgAw&ved=0CAYQFjAB&client=internal-uds-cse&usg=AFQjCNGCzjiWzRWvTLjb6gyRkbNfI-2rOQ

CASN. (2013). *Nursing informatics teaching toolkit: Supporting the integration of the CASN nursing informatics competencies into nursing curricula*. Retrieved from. https://www.google.com/url?q=https://www.infoway-inforoute.ca/index.php/component/docman/doc_download/2154-nursing-informatics-teaching-toolkit&sa=U&ei=Wu-qVJrSLsX_yQSEuYGgAw&ved=0CAgQFjAD&client=internal-uds-cse&usg=AFQjCNHJjoq47HKobqzdoR_97zvBHkNOlQ

Carrick, J. (2011). Student achievement and NCLEX-RN success: Problems that persist. *Nursing Education Perspectives*, 32, 78-83.

CHI. (2009). *EHR vision 2015: Advancing Canada's next generation of healthcare*. Retrieved from https://www.infoway-inforoute.ca/index.php?option=com_googlesearchcse&n=30&Itemid=1307&cx=0125613719232273774 03%3Ae3ijz6nmumi&cof=FORID%3A11&ie=ISO-8859-1&q=EHR+vision+2015&hl=en&cr=countryCA

Clarke, J., Baker, B., & Baker, D. (2009). Getting ehealth into basic nursing education: Report of the RCN information in nursing project. *Studies in Health Technology and Informatics*, 146, 534-539.

CNA. (2001). *What is nursing informatics and why is it so important?* Retrieved from. http://www.cnanurses.ca/cna/issues/now/default_e.aspx?y=2001

Crang, M., & Cook, I. (2007). *Doing ethnographies.* Lost Angeles: Sage Publications.

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *The Nursing Clinics of North America*, 43, 523-533. doi: 10.1016/j.cnur.2008.06.001

Deese, D., & Stein, M. (2004). The ultimate healthcare IT consumers: How nurses transform patient data into a powerful narrative of improved care. *Nursing Economics*, *22*, 336- 343.

Fauchald, S. (2008). An academic-industry partnership for advancing technology in health science education. *Computers, Informatics, Nursing*, 26, 4-8.

Fetter, M. (2009a). Collaborating to optimize nursing students' agency information technology use. *Journal of Nursing Education*, 48, 86-90. doi: 10.1098/NCN.0b013e3181bca7be

Fetter, M. (2009b). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Fetter, M. (2009c). Improving information technology competencies: Implications for psychiatric mental health nursing. *Issues in Mental Health Nursing*, 30, 3-13. doi: 10.1080/01612840802555208

Gloe, D. (2010). Selecting an academic electronic health record. *Nurse Educator*, 35, 156-161. doi: 10.1097/NNE.0b013e3181e337d3

Gormley, D., & Kennerly, S. (2010). Influence of work role and perceptions of climate on

faculty and organizational commitment. *Journal of Professional Nursing*, 26, 108-115. doi: 10.1016/j.profnurs.2009.11.001

Griffin-Sobel, J., Acee, A., Sharoff, L., Cobus-Kuo, L., Wookstock-Wallace, A., & Dornbaum, M. (2010). A transdisciplinary approach to faculty development in nursing education technology. *Nursing Education Perspectives*, 31, 41-44.

Iwasiw, C., Goldenberg, D., & Andrusyszyn, M. (2009). *Curriculum development in nursing education (2nd ed.).* Sudbury, MA: Jones and Bartlett.

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*, 1-11.

Leiker, T. (2011). *Cultural characteristics of a nursing education center of excellence: A naturalistic inquiry case study* (Doctoral dissertation). Retrieved from Proquest Dissertation & Theses database. (UMI No: 3457559)

Matthews, J. (2012). *The role of professional organizations in advocating for the nursing profession*. Retrieved from. http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-17-2012/No1-Jan-2012/Professional-Organizations-and-Advocating.html

McNeil, B., Elfrink, V., Bickford, C., Pierce, S., Beyea, S., Averill, C., & Klappenbach, C. (2003). Nursing information technology knowledge, skills, and preparation of student nurses, nursing faculty, and clinicians: A U.S. survey. *Journal of Nursing Education*, 42, 431-350.

McNish, G. (2003). *The organizational culture in successful nursing programs* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No: 3127177)

Melo, D., & Carlton, K. (2008). A collaborative model to ensure graduating nurses are ready to use electronic health records. *Computers, Informatics, Nursing*, 26, 8-12.

Morse, J., & Richards, L. (2002). *Read Me First for a User's Guide to Qualitative Methods*. Los Angeles: Sage Publications Ltd.

Nickitas, D., Nokes, K., Caroselli, C., Mahon, P., Colucci, D., & Lester, R. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Plastic Surgical Nursing*, 30, 103-107. doi: 10.1097/PSN.0b013e3181ebc709

Polit, D.F., & Beck, C.T. (2008). *Nursing research: generating and assessing evidence for nursing practice (8th ed.).* Philadelphia: Lippincott.

Schein, E (2004). *Organizational culture and leadership (3rd edition).* Retrieved from. http://books.google.ca/books?hl=en&lr=&id=xhmezDokfnYC&oi=fnd&pg=PR11&dq=organizational+culture+definition&ots=m5KV2Sk6pL&sig=7kF9ZyS1SO0xROm6xyTgzG0Yytg#v=onepage&q=organizational%20culture%20definition&f=false

Taylor, L., Hudson, K., Vazzano, J., Naumann, P., & Neal, M. (2010). The electronic health records meets baccalaureate nursing curriculum: Stories from the battlefield. *Nurse Leader,* 8, 40-44.

Vestal, V., Krautwurst, N., & Hack, R. (2008). A model for incorporating technology into student nurse clinical. *Computers, Informatics, Nursing*, 26, 2-4.

Walonick, D. (1993). *General systems theory*. Retrieve from. http://statpac.org/walonick/systems-theory.htm

Way, M., & MacNeil, M. (2007). Baccalaureate entry to practice: A systems view. *The Journal of Continuing Education in Nursing*, 38, 164-169.

Wilson, W., & Chaddha, A. (2010). The role of theory in ethnographic research. *Ethnography*, 10, 549-564. doi: 10.1177/1466138109347009

Chapter 4 – How Attributes of Nursing Education Culture Influence the Inclusion of Nursing Informatics into a Collaborative Nursing Program Curriculum

Advances in information communication technologies (ICT), such as the electronic health record (EHR) and social media, are revolutionizing the way in which nurses store, retrieve, and document patient information. As a result, competencies in information management and the use of health information technology (HIT) constitute a necessary skill set for success in healthcare practice (Canada Health Infoway [CHI], 2009; Canadian Nurses Association [CNA], 2001). As nurses are the largest practice group and spend a substantial amount of time documenting and retrieving patient information, knowledge and skill to utilize ICTs effectively is essential for quality patient care (Deese & Stein, 2004; Fauchald, 2008; Fetter, 2009a; Melo & Carlton, 2008). In addition, undergraduate nursing students' knowledge and skill in relation to nursing informatics competencies are inadequate and consequently, faculty at schools of nursing need to consider incorporating nursing informatics content into curricula (Clarke, Baker, & Baker, 2009; Cole & Kelsey, 2004). Unless nursing informatics competencies are part of curricula, and students use these technologies, nursing graduates will lack the basic skills to communicate and document patient information effectively in a technology-driven environment. Furthermore, employers will continue to expend resources to train nurses to manage patient information and utilize ICT systems (Demiris & Zierler, 2010; Fetter, 2009b; Hegarty, Walsh, Condon, & Sweeney, 2009). Therefore, to ultimately promote the development of nursing informatics competencies in nursing graduates, a study was undertaken to examine the influence of nursing education culture on the inclusion of nursing informatics competency into an undergraduate nursing curriculum. Specifically, this paper aims to provide information about attributes of a collaborative program system which influence the inclusion of nursing informatics within the program curriculum.

Literature Review

Nursing informatics is defined as a "science and practice [which] integrates nursing, its information and knowledge, and their management, with information and communication technologies to promote the health of people, families, and communities worldwide" (International Medical Informatics Association [IMIA], 2009). Information communication technologies such as the EHR, capillary blood glucose machines, and telehomecare, have become essential components of healthcare. Despite this, few schools of nursing have fully integrated nursing informatics competencies within the curriculum that prepares students for professional practice (CHI, 2013; Fetter, 2009a; Nagle & Clarke, 2004). Within the nursing education literature (including research and expository articles located within CINAHL, Scopus, Medline, & ERIC databases) published between 2000 until 2014, scholars have identified barriers and facilitators impacting curriculum development and inclusion of nursing informatics competencies within it.

Barriers

Lack of Faculty Knowledge, Skill, and 'Buy-in'

Forty-three percent of nursing faculty in Ontario are aged fifty and above (Registered Nurses Association of Ontario [RNAO], 2009). While nursing faculty generally have professional practice experience prior to their faculty appointment, many have not practiced in technology-enhanced settings with ICTs such as the EHR or social media technologies (Axley, 2008). Faculty members are not highly skilled in nursing informatics, particularly in understanding how to use ICTs to process and manage patient information within professional nursing practice (McNeil et al., 2003; Taylor, Hudson, Vazzano, Naumann, & Neal, 2010). Typically, nursing faculty were not users of computerized documentation and therefore, could not relate to it for patient safety and nurses' time management (Taylor et al., 2010). Due to the limited exposure nursing faculty have with ICTs, they lack the basic knowledge and skill to teach students about nursing informatics (Canadian Association of Schools of Nursing/Canadian Nurses Association [CASN/CAN], 2008; Melo & Carlton, 2008). Additionally, faculty are reluctant to 'buy-in' to the benefits that ICTs offer to nursing practice (Griffen-Sobel et al., 2010; Nickitas et al., 2010; Taylor et al., 2010). Faculty development is necessary to improve faculty 'buy-in' and knowledge of nursing informatics. Also, a champion or leader highly skilled in the pedagogical and technical aspects of integrating and using ICTs has been highlighted as essential to promote faculty and student learning (Curren, 2008; Griffen-Sobel et al., 2010; Johnson & Bushney, 2011; Nickitas et al., 2010).

Limited ICT Implementation and Restricted Student Access

ICT integration in clinical agencies vary. For example, some use a hybrid system that combines paper and paperless (EHR) records, while others are completely paperless with a full range of IT functions (decision support, access to tests and image, etc.) (Fetter, 2009a). In addition, although many professional practice settings have well-integrated ICTs, students are often prevented from accessing many of these ICT systems in order to preserve confidentiality and security of patient information and maintain patient safety (Fetter, 2009a; Melo & Carlton, 2008; Vestal, Krautwurst, & Hack, 2008). The wide range of integration of ICT systems, and limited student access results in inconsistent student experiences with this technology.

Facilitators

Curriculum Planning

A clear and logical curriculum development plan supports the incorporation of nursing informatics competencies into the nursing curriculum. The plan should include a decision about who should be involved, identification of appropriate resources, and an assessment of faculty and student knowledge in relation to informatics competency (Curran, 2008; Fetter, 2009a; Griffen-Sobel et al., 2010; Kushniruk et al., 2009; Nickitas et al., 2010). Additionally, Gloe (2010) identified that it is important to focus team efforts to develop a set of curriculum development goals with target completion dates.

Accreditation Standards

In November of 2013 the Canadian Association of Schools of Nursing (CASN) created an accreditation standard related to ICT use for baccalaureate nursing program. Specially, educational programs will be expected to facilitate "students' ability to use information communication technology in accordance with professional and regulatory standards and workplace policies" (CASN, 2013, p. 25). The development of this standard substantiates the importance of nursing informatics within the profession of nursing. Further, the development of this accreditation standard validates nursing informatics as an important area of student learning within the curriculum which prepares graduates for practice. The development of the *Nursing Informatics Entry-to-Practice*

Competencies for Registered Nurses by the Canadian Association of Schools of Nursing (CASN), with support from Canada Health Infoway, further serves as a guide to nurse educators implementing nursing informatics competencies within nursing curricula. These nursing informatics competencies are intended to guide undergraduate nursing education and specify the skills that nursing students require at graduation. These competencies are a guide for nurse educators implementing nursing informatics content within nursing curriculum. There are three competency areas, each of which includes key indicators that outline the requisite knowledge and skill. The first CASN (2012) competency is "using relevant information and knowledge to support the delivery of evidence-informed patient care" (p.6). Some key indicators are: performing a search and critical appraisal of online literature and resources; assisting patients and families to access, review, and evaluate sources of information; and analyzing, interpreting, and documenting pertinent nursing and patient data using standardized nursing and clinical terminologies. The second competency is "using ICTs in accordance with professional and regulatory standards" (p. 9). Key indicators include complying with legal and regulatory requirements, ethical standards, and organizational policies in relation to using ICTs, and maintaining effective nursing practices during periods of system unavailability (CASN, 2012). The last competency is "using ICTs in the delivery of patient care" (p. 10). Three key indicators for this competency are demonstrating appropriate use of a variety of ICTs; using ICTs to support the nurse-patient relationship; and describing the benefits of informatics to improve the healthcare system and patient relationship (CASN, 2012).

Funding and other Resources

Financial and human resources are essential to integrating nursing informatics content within the undergraduate curriculum. Specifically, funding to support curriculum development is required to release time for faculty members to engage in curriculum development, and for purchase of ICTs to support teaching practices (Fauchald, 2008; Fetter, 2009a). In addition, human resources in the form of a library support person, an information technology support specialist, and a nursing informatics champion or leader are crucial to successfully integrating this content in the curriculum (Fauchald, 2008; Fetter, 2009a).

Partnerships

As implementing educational ICTs can be quite costly, many schools of nursing in the United States have identified the benefits of forming a collaboration with clinical agencies or with technology vendors to provide students with access to ICT systems (Connors et al., 2002; Fauchald, 2008; Fetter, 2009a; Gloe, 2010; Hebda & Calderone, 2010; Johnson & Bushey, 2011; Melo & Carlton, 2008; Nickitas et al., 2010; Vestal, Krautwurst, & Hack, 2008). Collaboration lessens the costs associated with purchasing and maintaining the technology (Nickitas et al., 2010). Another benefit of an academic-agency partnership is that student use of these technologies no longer needs to occur primarily in the professional practice setting. With access to ICTs within the academic institution, students can cultivate ICT skill through the use of patient-care scenarios (Melo & Carlton, 2008).

In summary, available articles in relation to nursing informatics educational initiatives are primarily case studies reports (Curran, 2008; Fauchald, 2008; Fetter, 2009a; Melo & Carlton, 2008; Nickitas et al., 2010). These articles have suggested that many of the barriers and facilitators nursing faculty have identified as impacting the integration of nursing informatics content within nursing curricula are also closely aligned with the difficulties encountered when incorporating any new content (Iwasiw & Goldenberg, 2015; Iwasiw, Goldenberg, & Andrusyszyn, 2009). This may suggest that the challenges encountered when incorporating new content into the curriculum are not unique to the integration of informatics competencies alone, but experienced during all curriculum development activities. What is unique to nursing informatics curriculum development endeavours is the significant cost associated with purchasing and maintaining these technological systems. High costs of the technology place a significant burden on schools of nursing and may pose a barrier that faculty need to overcome when integrating informatics competencies within nursing curricula.

Despite the insight provided by available case studies reports about nursing informatics educational initiatives, there continue to be a number of gaps within the literature. There are a limited number of qualitative and quantitative research articles that have evaluated these curriculum development endeavours, examined student learning outcomes, or explored the facilitators and barriers to integrating nursing informatics content within the curriculum. Further understanding the barriers and facilitators to integrating nursing informatics content within undergraduate curriculum would offer insights into how policies and procedures embedded within a school structure serve to impact the curriculum development process, as well as cultivate knowledge which assists faculty at schools of nursing to develop and maintain a context relevant curriculum which prepares students to practice in technology-enabled practice settings.

Purpose

The purpose of this study was to examine how the culture of a university-college collaborative nursing program and the practices and policies that are inherent within two schools of nursing systems, influenced the inclusion of nursing informatics competencies into the undergraduate nursing curriculum. The research questions addressed in this paper include: 1) How is the incorporation of competencies related to nursing informatics in the collaborative program curriculum influenced by the systems and subsystems within the two schools of nursing? 2) How do the subsystems within the two schools of nursing interact to affect the incorporation of nursing informatics competencies in the undergraduate nursing curriculum? 3) In what ways do resources within these two schools influence the curriculum development process and incorporation of nursing informatics competencies within the curriculum?

Theoretical Framework

Systems theory was used to guide the study, the research questions, the data collection, and the interpretation of the findings during data analysis. A system is a structure that is made of interrelated and interdependent elements which influence one another to maintain a state of homeostatsis within the system. Systems theory analysis explores the complex set of interrelationship that a system has with its environment (Ansari, 2004). The goal of a system in its exchange of information with its environment is to reach and maintain a state where optimum potential can be reached. Through conducting a systems analysis, the researcher develops an in-depth and specialized understanding of the system to assess why certain decisions are made and actions are taken to evolve the system in a particular way (Ansari, 2004). Systems theory within the current study was used to understand the interaction that a collaborative nursing program had with the environment in which it was situated. This theoretical perspective was integral in dividing the schools of nursing and collaborative nursing program into manageable sections to make evident how these systems and subsystems interact and are shaped by the structures present within the nursing education environment.

Methods

Design

A focused ethnography was used to examine the culture of a university-college collaborative nursing program to understand the influence that culture had on the incorporation of nursing informatics competencies into the nursing curriculum. Unlike a traditional ethnography, in a focused ethnography the researcher examines an aspect of culture with a thorough understanding of the study field (Knoblauch, 2005). Data is collected through intensive interviews, document review, and observation (Knoblauch, 2005). A focused ethnography is particularly suited to the current study as the researcher entered two schools of nursing cultures with a predetermined aim and interest (Morse & Richards, 2002). This methodology allowed the researcher to focus on how each of the school's cultures influenced aspects of the curriculum development process and inclusion of nursing informatics within it. This study was approved by through the investigators research ethics board (Appendix B), as well as at the institutional research ethics boards of the schools under investigation.

Setting

The culture under investigation was a 4-year BScN program offered jointly through a collaborative partnership between two schools of nursing, one at a university and one at a college. The two program sites were located in the same city within Ontario. Each site has its own administrative structure, and offered other nursing programs in addition to the program under investigation. A revised BScN curriculum was being developed and implemented during the data collection period. Throughout the data collection period, new courses were being implemented in year one of the collaborative nursing program and the existing curriculum was provided for students in years 2 to 4. Faculty members from the two sites were jointly creating courses for years 2-4 of the revised curriculum. Although operationalization was not identical at both sites, faculty members had academic freedom and were encouraged to utilize their own expertise and creativity in their teaching practices. Despite there being one curriculum, there were differences between the two sites in relation to their *institutional* education mission statements, visions, and the values which guided members. Specifically, the university mission focused more on research, and other scholarship activities, while the college focused primarily on teaching and learning experiences.

There were differences in the academic ranking of faculty members between the two sites. The university had five academic ranks: Professor, Associate Professor, Assistant Professor, Lecturer, and Instructor. All ranks except the instructor were full-time positions with differences in the amount of time allocated to teaching, research, and service activities (academic workload). Faculty in the professor, associate professor, and assistant professor roles were considered tenure track positions and required PhD level education. Faculty assuming the lecturer role were required to have at minimum an MScN degree. The title of *instructor* was given to limited duties faculty who taught professional practice and theory courses on a per semester basis. Instructors were required to have a minimum of a BScN level education. At the college, there were two faculty roles, *Professors,* who were full-time faculty with no difference in rank amongst them, and *contract* faculty similar to the role of the *instructor* at the university. *Contract* faculty at the college taught professional practice courses and occasionally theory courses on a per semester basis. Professors working at the college were required to have at minimum an MScN degree, while contract faculty needed at minimum a BScN degree.

Both institutions had a commitment to providing quality education, and valued the use of educational ICTs such as email and use of an online educational platform to facilitate innovative ways of teaching and connecting. In addition, at both sites there was dedication to pursuing research; however, the university gave higher priority to the research achievement of its members. At the university site the division of faculty positions amongst tenured and non-tenured track position determined the workload time a faculty member had to devote to research. University faculty in tenure-track positions were allocated 40% or more of their workload to devote to research as compared to a 10% research workload for a non-tenured track position. At the college professors primarily engaged in teaching and service activities. Research workload was determined based on the faculty members active pursue of research and determined on an individual basis. In an effort to build research capacity within the college site, a research lab was developed to promote faculty engagement in research and innovation.

Data Collection Procedures and Data Sources

Semi-structured interviews, observations, and documents were the data sources. Data collection occurred until there was the presence of data saturation (Polit & Beck, 2008).

Interviews.

Recruitment of participants was facilitated by the academic leader of the university school and academic leader of the college school who identified key informants or personnel who had specialized knowledge about the phenomena of interest (Appendix C). Potential faculty and staff participants were then contacted by email to request their participation in the study and to provide them with the letter of information (Appendix C). A criterion sampling method was chosen to obtain a perspective from individuals across all levels of the program as well as from a variety of academic ranks that had expertise which contributed to answering the research questions. Criterion sampling involves the selection of study participants that meet a predetermined set of criteria (Polit & Beck, 2008). Inclusion criteria for participation required that individuals be involved with the collaborative nursing program and have specialized knowledge about the program, curriculum and course development procedures, or nursing informatics as a topic area in the curriculum. Throughout the interview process, participants also identified additional individuals who might have relevant information and these people were contacted by email inviting their participation. Student participants were recruited by emailing the letter of information about the study to students in all years four of the program (Appendix C). A presentation about the study was also made in three classroom sessions at the university. Students contacted the researcher by email if they chose to participate.

Interviews were conducted using semi-structured interview guides (Appendix E). Separate interview guides were developed for interviews with the academic leaders, faculty, students, and support staff. Interview questionnaires for the faculty and academic leaders focused on understanding: 1) the culture of the schools of nursing in relation to nursing informatics and ICT use, 2) knowledge and skill in relation to using NI technologies, 3) student learning in the area of nursing informatics, 4) the curriculum development process in general and in relation to nursing informatics and 5) the decision making process within the collaborative program. Student semi-structured questionnaires focused on their perception of the academic culture in relation to nursing informatics, their learning experiences which promoted the development of nursing informatics competencies, and lastly, the value students had developed towards using NI technologies for practice. Support staff were asked about the academic culture in relation to nursing informatics, how decisions were made within the collaborative program, and how they were involved in integrating ICTs within the schools. As data collection and analysis occurred concurrently, interview questions evolved requesting more specificity and elaboration on topics emerging from the data analysis procedures (Patton, 2015).

Twenty-six individual interviews were conducted with faculty (n=21), staff (n=3), and students (n=2). Nineteen interviews were conducted with university personnel and seven with college personnel. University faculty (n=14) had an average age of 49.7 years, an average of 27.6 years of nursing experience, and an average of 14 years (Range: 3.5-38 years) of teaching experience. College faculty had an average age of 45.8 years, an average of 25.3 years of nursing experiences, and an average of 14.7 years (Range: 5-37 years) of teaching experience. Teaching expertise of faculty at both sites was representative of content areas across the curriculum. Only three staff from within the schools of nursing met the inclusion criteria for participation in this study. Staff had an average age of 55 years. Involving student participants was challenging, resulting in recruitment of two student volunteers. This in part may have resulted from students having multiple commitments and assignments due through the data collection period. The mean age of student participants was 22.5 years and the two students represented enrollment from year 1 of the revised curriculum and year 4 of the existing curriculum. Interviews lasted approximately 1 hour, were tape-recorded, and guided by a semi-structured interview guide.

Observations.

Fifteen observations were conducted consisting of 15 hours in classes, 15 hours in committee and course development meetings, and 4 hours in research presentations. Inclusion criteria for observations were that they be associated with the collaborative nursing program and fit within the aims of the research questions. Observations were made in courses where informatics-related content was described in the syllabus. Course observations were also made at random to identify whether informatics competencies were incorporated into the teaching and learning strategies used, or in the content taught to students. Committee and course development meetings were observed to understand the curriculum development process for the collaborative baccalaureate nursing program. In addition, course development meetings for a health informatics course were also observed to understand the process of integrating this content into the revised curriculum.

Observations of research presentations consisted of an overview of all faculty research areas, as well as specific observations of research presentations that related to informatics in general. During the observation sessions, the researcher was a silent observer. Field notes were taken and contained data about the content of the observation session, the facilities in which it took place, student responses to teaching strategies, and informatics specific curricular content. All field notes were transcribed for data analysis purposes.

Documents.

Communication with faculty, examination of the web sites for each school of nursing, and consultation with administrative staff were methods used to obtain documents incorporated in the analysis. Inclusion criteria required that documents focus on the study goals and impact the collaborative nursing program. Documents included: the College and University mission and vision statements, mission and vision statements of the schools of nursing, curriculum and course development committee meeting minutes, documents outlining resources and physical space available, additional content available on college and university school of nursing web pages, and curricular documents such as program and year goals, a curriculum overview, and course syllabi.

Data Analysis

Data collection and analysis occurred concurrently to enhance the integrity of study findings (Polit & Beck, 2008). Interview and field notes were transcribed verbatim and NVivo qualitative software (QSR International, 2014) was used to store and analyze all data including the documents. Thematic analysis of all three data sources was conducted simultaneously (Aronson, 1994). Analysis began with reading and rereading of all documents in NVivo to identify patterns. Patterns were then combined into categories and their accompanying themes (Aronson, 1994). Once major categories had been identified, the researcher further examined each to consider how it related to other categories to further develop an understanding of the schools of nursing and collaborative program system (Aronson, 1994). Categories and themes were again compared and contrasted and this resulted in the collapsing of categories and the exploration of new themes (Aronson, 1994). Major categories were then analyzed to determine if there was triangulation amongst the data sources. In particular, the researcher assessed whether identified categories were supported by all three sources of data collected. Conducting this analysis provided a holistic understanding of the study findings and the interaction between identified categories. During the interpretation of findings, the researcher did not have an apriori coding scheme. Rather the names of categories, which were later refered to as the systems and subsystems, came from the data analysis procedures and were informed only by the study findings. The interaction amongst the systems and subsystems which emerged from the analysis resulted in the development of a diagram (Figure 2).

Throughout the coding phase of data analysis, practices or patterns that appeared to be unique to the college or university schools of nursing were separated to determine if there were important differences between the two sites. Due to the numerous commonalities between the two locations (e.g., same courses, joint curriculum development, similar administrative processes and decision-making procedures, etc.), data from both sites were combined and analyzed together. There was nothing to warrant a separate analysis or the development of a pattern that was completely unique to one site. In addition, all course syllabi were analyzed according to the fit of the course content with the Canadian Association of Schools of Nursing (CASN) *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012). This framework was used to provide a picture of the nursing informatics competencies faculty within the collaborative program had identified as important and had incorporated within the nursing curriculum. In addition, this coding provided an opportunity to identify important documents, observation experiences, and potential participants to include in the data collection process.

Rigour

Credibility and trustworthiness of the data was established by intensive listening during interviews and careful probing to obtain rich and comprehensive data. Multiple data collection methods (face-to-face interviews, field notes, document collection, and observations) preserved credibility as this provided multiple constructions of the data, enhancing the richness of the interpretation (Ajjawi & Higgs, 2007). Data collection and analysis occurred concurrently allowing the researcher to confirm study findings with participants, in an effort to co-construct a mutual understanding (Guba & Lincoln, 1989).

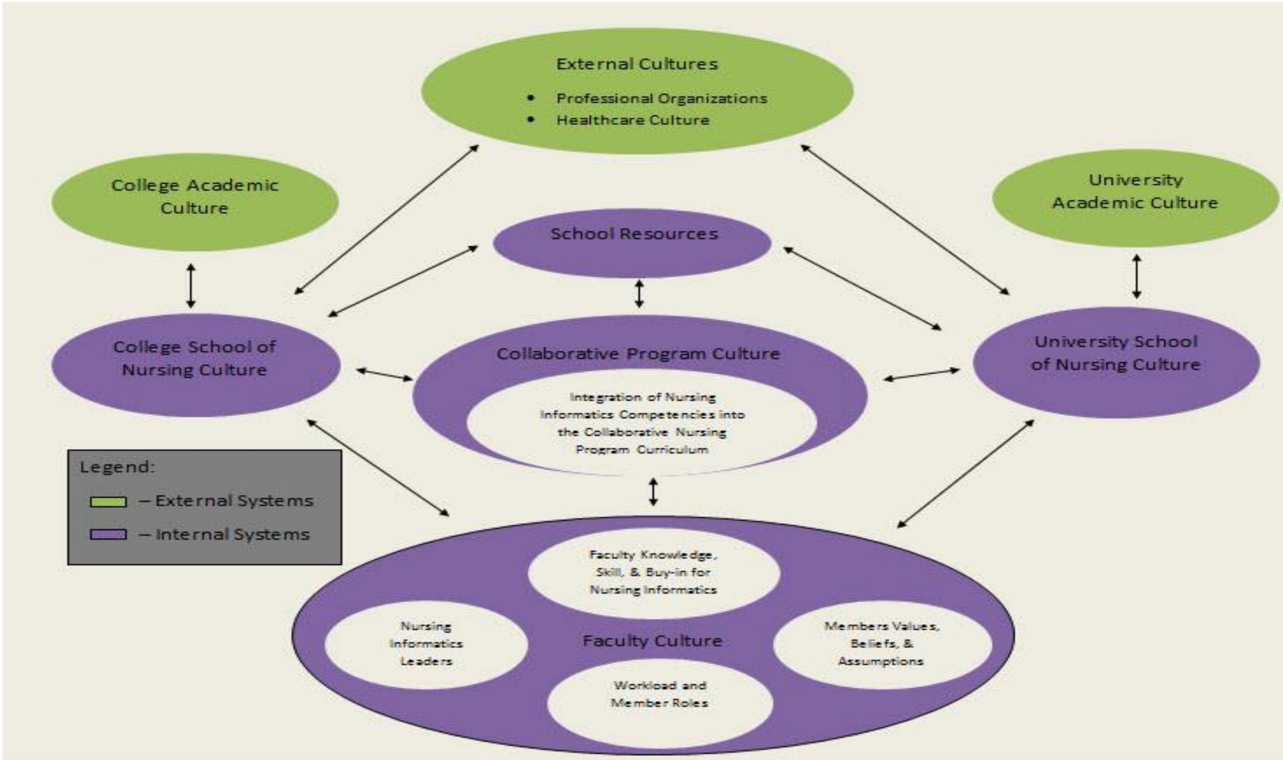
Authenticity of findings was enhanced through maintaining an audit trail of key decisions used to inform interpretations (Polit & Beck, 2008). The use of multiple interviews provided a range of interpretations of the nursing education culture, the curriculum development process, and nursing informatics as a topic area in the curriculum. In addition, participants were selected such that they had a variety of academic ranks and experiences within the schools. Discussion with participants about the meaning of information available in academic documents also enhanced the researcher's understanding and interpretation of these data sources (Polit & Beck, 2008).

Transcription of all data and use of NVivo qualitative software promoted organized data management. Finally, the use of participant narratives in the dissemination of research findings reveals the authenticity of findings, ensuring that participants' voices were evident in the findings (Guba & Lincoln, 1989).

Findings

Systems external and internal to the two schools of nursing and collaborative nursing program influenced the curriculum development process and inclusion of nursing informatics content within the curriculum. External systems included the healthcare culture, cultures of nursing professional organizations [College of Nurses of Ontario (CNO), Registered Nurses Association of Ontario (RNAO), Canadian Nurses Association (CNA) and CASN], as well as the university and college cultures. In addition, the cultures of the two schools of nursing, the faculty culture, and school resources were subsystems from within the schools, and these also influenced the integration of nursing informatics competencies in the curriculum. Figure 2 illustrates the interactions of the systems and subsystems and their influence on the curriculum development process.

Figure 2.



The two schools of nursing were each impacted by the external systems of professional organizations, the healthcare culture, and the academic cultures. Each of these external systems interacted to affect the culture of the schools. As the collaborative program was offered jointly by these two schools of nursing, the collaborative program culture was derived from the interaction of these two schools of nursing. In addition, the two school cultures, the faculty culture, and school resources also interacted to affect the collaborative program culture. Specifically within the faculty culture, the availability of nursing informatics leaders, faculty workload and member roles, faculty knowledge and skill in relation to nursing informatics, and members' values, beliefs, and assumptions in relation to nursing informatics impacted the value and priority developed for nursing informatics within the collaborative program culture. Resources were allocated from members at the two schools of nursing to support the collaborative program; therefore, the availability of resources which supported curriculum development and faculty development endeavours influenced what was taught within the curriculum. Consequently, the collaborative program curriculum was derived from the interactions of these systems. As the purpose of this paper is to provide direction about what influences successful integration of nursing informatics content within nursing curricula, a description of findings will focus on the external cultures, the two schools of nursing cultures, and the faculty culture. In particular, discussion about the faculty culture will focus on faculty knowledge, skill, and use of ICT, nursing informatics leaders, and buy-in from faculty.

External Cultures

The healthcare system, professional organizations, as well as the University and College had a large impact on the curriculum development process. The external cultures influenced decisions about important learning areas within the curriculum. Additionally, faculty members within the collaborative program culture wanted the two schools to be recognized as leaders of nursing education within the profession of nursing as well as within the larger college and university educational institutions.

Healthcare and Professional Organizations. Priority areas articulated by the healthcare system and professional organizations (CNO, RNAO, CAN, and CASN) strongly influenced the selection of curricular content. Nurses in these cultures served as leaders within the nursing profession communicating nursing values, practice standards, and social policies (Matthews, 2012). These systems had a wealth of knowledge and influence over determining healthcare trends as well as providing guidelines for nursing care best practice. Nurses working within the external systems were viewed as experts of the nursing profession, and as such, priority areas highlighted by these organizations were more likely to be given emphasis within the curriculum. This was evident in the following comment:

> Well I think the Ministry [of Health] expects us to include this in our curriculum, and the hospital thinks it's 'going live' [with an electronic record], by 2014, so I think we should be starting to teach that (informatics and use of the electronic record).

Although the collaborative program curriculum course concepts and goals were determined from an extensive review of internal and external contextual factors as well as faculty expertise, a significant amount of course content was also derived from published Canadian National Competencies and Standards. Members of the two school systems supported the priorities of the nursing professional bodies because student preparation in the areas dictated by these organizations promoted student success on the licensure exam. Consequently, topic areas suggested by the regulatory bodies were likely to be addressed within the undergraduate curriculum. When asked about how content for the curriculum was selected, a faculty member responded:

> [In] the first stages we looked at what's out there, and what we're doing so a self-assessed need but also looking at the expectations of the professional bodies as well.

These external systems influenced the priorities set in the collaborative nursing program. The emphasis given to conform to external system priorities may have prevented nursing faculty from exploring concepts such as nursing informatics. Faculty valued the availability of 'best practice' standards and guidelines as they provided a prescriptive outline for curricular content to support curriculum development endeavours. The availability of these guidelines made faculty comfortable with the selection of some content for the curriculum. In contrast, up until recently, the lack of guidelines specifically related to nursing informatics, led to difficulty for some to understand how this topic could be and should be integrated within the vision for the revised curriculum. The importance of the CASN Nursing Informatics Entry-to-Practice Competencies to direct curriculum development in the area of nursing informatics was evident in the follow comment:

> Now we have the CASN informatics nursing competencies, they just came out …. So we had lots of talk about how we have to integrate informatics across the curriculum, and …so one way we did that here was with [names an electronic record software]. Now that those competencies are out we need to really get those out to our course teams so that when they're looking at their course revisions they integrate those competencies.

University and College Systems.

The University and College cultures also had a strong influence on the collaborative nursing program culture. The schools of nursing at each site were situated within larger academic systems and therefore the beliefs, values, and assumptions held by the university and college systems impacted the schools and programs that were contained within them. In both institutions, and particularly at the University, research and knowledge advancement were valued highly. The university had an international reputation for research success, achieving annual research funding in excess of $220 million (University Website). The value given to research achievement within the university was evident through the: display of faculty research accomplishments on the nursing website, workload time provided to faculty researchers; and promotion and tenure of faculty highly engaged in research activities. Similarly, the college demonstrated a commitment to research through: development of a center for research and innovation, appointment of a research advisor to assist nursing faculty to build programs of research, and allocation of workload time for research. It was apparent that the college and university priority of developing knowledge through research had been incorporated into the value system at each of the schools of nursing as well as within the collaborative program culture. Faculty members commented:

> There's a strong culture of research, research achievements are highly valued.

> There's a value differential in how peoples' contributions are perceived, and so the culture is divided. It's multi-factorial you know how people are valued. (…) that's what the university's gold standard is: research productivity … and the hard core researchers bring in big dollars and are really achieving what the university sees as the gold standard. In contrast some [faculty members] feel it diminishes their contribution as a teacher, ... so it sets up a differential value.

A strong value for research achievements supported the two schools being recognized as leaders; promoting these institutions to a higher level of status within the profession of nursing and academic cultures. The result, however, of attaching such value to research achievements was that less emphasis and prestige was placed on activities relating to curriculum development and teaching. A strong devotion to research productivity impacted the amount of faculty time and resources that were committed to curriculum development and faculty development initiatives aimed at expanding understanding of nursing informatics concepts. Nursing informatics as a topic area was lost amongst the competing demands for resources and faculty time. As knowledge and skill in this area did not contribute to heightening the status of faculty or the two schools within their social environments, activities promoting development or attention to the use of these technologies for nursing practice were not given priority. This is evident in the following faculty comment:

> It's [integrating nursing informatics within the curriculum] always been a resource issue so again it's not a priority.

Cultures of the Schools of Nursing

The systems of the schools of nursing reflected an overarching set of values, beliefs, and priorities which guided decision-making and the allocation of resources to the collaborative program. Within the two schools of nursing, faculty described that the setting of priorities was an open and collaborative process. Decisions about the program were suggested and considered during faculty retreats and program committee meetings. These actions created a vision and direction for the schools that recognized members' values and work preferences. For example, in response to being asked how decisions were made in relation to online course implementation, one individual responded:

> For us it's a dialogue basically, we just talk about whether anybody can see the program or the courses being online

Another faculty member further validated an open and team-orientated approach to decision making by stating: "At the (names site) we're very team oriented". Although the decision making process was seen as collaborative, faculty members also described that high level academic leaders in collaboration with the school council and other school committees were required to approve curricular changes and resource allocation to support the revisions to the curriculum proposed by faculty.

Values, beliefs, and social practices used within the collaborative program were further reinforced through the hiring process. Faculty hired into full-time positions were chosen on the basis of their expertise and fit with the espoused values and needs of the schools. The purposeful selection of individuals into faculty positions with expertise in nursing informatics was evident within members of the two schools of nursing. These individuals acted as leaders during the curriculum development process and emphasized the importance of considering nursing informatics as a key concept within the revised curriculum.

The allocation of resources was directly related to the program goals, values, and priorities. A goal of both schools of nursing was to be recognized as cutting edge and innovative through the development and dissemination of research and knowledge. Furthermore, the promotion of quality education was another goal of these academic settings. The nursing cultures at the college and university strived to provide a quality learning environment by creating a learning community that met students' needs and facilitated a close student-teacher relationship. Informatics technologies contributed to reaching the schools goals as ICTs were considered a way to enhance communication amongst students and faculty, as well as meet the demand for student professional practice experience through the use of high fidelity mannequins. Resources in the form of training and monies for purchasing of ICT were allocated to promote the use of these technologies for education purposes. The main uses for ICTs were for communicating with students and faculty, posting of course material, electronic submission of assignments, searching for online journal articles and literature, course delivery, and providing a simulated learning environment.

Financial resources to support the purchase of an academic electronic medical record (AEMR) for educational purposes were not a priority for the schools. In addition, faculty stated they were not experts about which AEMR would best suit learners' needs. A faculty member discussed why there was not an AEMR available to faculty and students.

> So it's [acquiring an academic electronic record] been a resource issue in terms of we can't afford it, we can't pay for it, and we can't have it.

The curriculum development process is an important factor which provided the opportunity for faculty to consider a current perspective on nursing education while simultaneously impacting the culture of the two schools through the development of new priorities and curricular focus. This opportunity allowed faculty to gain a current perspective on the trends of healthcare and to prioritize subject areas that may not have been previously considered. In addition, during the curriculum development process, resources were assessed and reallocated based on the changes made to the curriculum. In relation to nursing informatics, faculty teaching time and environmental space were allocated to provide smaller class sizes for the nursing informatics course implemented in year two of the nursing curriculum.

Prior to the implementation of the new nursing informatics course in year two of the revised curriculum, many nursing informatics related competencies such as literature searching and information literacy had not been labeled as contributing to student development in area of nursing informatics. There were however a number of nursing informatics competencies that were taught to students which aligned with the *CASN Nursing Informatics Entry-to-Practice Competencies* (CASN, 2012). In relation to the "information and knowledge management" competency (CASN, 2012, p. 6), students performed literature searches and critically evaluated sources of evidence to inform their nursing judgment as well as assisted patients to evaluate information to make informed care decisions. Content relevant to the "professional and regulatory accountability" competency (CASN, 2012, p. 8) included the ethical, legal, and regulatory requirements that facilitated the protection of health information and patient privacy and security. Student participants reported that it was important to be able to maintain effective nursing practice during periods of technology (e.g., electronic blood pressure machines) or electronic record system unavailability. The final CASN entry-to-practice nursing informatics competency of using information and communication technologies in the delivery of patient care (CASN, 2013), aligned with course requirements which facilitated student learning of the benefits and functions of ICTs within the healthcare environment. Student participants described that they learned to utilize ICTs that were available within their professional practice setting experiences (e.g., powerchart [electronic information retrieval], glucometers, electronic blood pressure machines, and online databases).

Faculty Culture

The faculty culture was an important system which impacted the integration of nursing informatics competencies within the curriculum. Specifically, faculty knowledge, skill, and use of ICT, the availability of nursing informatics leaders, and faculty 'buy-in' of the importance of this topic to the profession had a profound impact on the integration of nursing informatics competencies within the curriculum.

Knowledge, Skill, and Use of ICTs by Faculty.

Low levels of knowledge and skill among faculty in relation to nursing informatics negatively impacted how, and the extent to which nursing informatics content was integrated within the undergraduate nursing curriculum. Without knowledge and skill in the area of nursing informatics, faculty were unable to recognize the competencies of informatics within their existing curriculum as well as select additional competencies and teaching strategies to more fully facilitate student development in the area of nursing informatics. Many individuals did not have a clear conceptualization of the scope of nursing informatics concepts, viewing it primarily as information literacy and the use of computers in nursing. It appeared that low levels of knowledge and skill in relation to nursing informatics was related to a lack of value about this content area as well as insufficient time to commit to learning about this topic due to the competing demands of the faculty role. Lack of a comprehensive understanding of what nursing informatics fully encompassed was evidenced in the following comment:

> Well I looked it up a few weeks ago just for this interview, it's a little bit more broad because I understood it to be up until recently, more about how you, new nurses find and use information, so especially using the databases, or using electronic media to find ways to support their practice, but then because I looked it up online it talked about information technology and computer technology, and databases even for clients, so I hadn't really thought about that as informatics. I would have just thought of that as electronic record keeping, but not really thinking of that as part of informatics

Limited exposure to the direct professional practice environment also impacted many full-time faculty members' ability to understand the uses for many ICTs within healthcare settings. As many of the faculty members involved in the curriculum development process were employed full-time at the schools and were primarily teaching theoretical courses, few were champions and experts of this content area. Those who had a comprehensive understanding about the benefits of incorporating these technologies within professional practice had a vested interest in developing student learning in this area and in taking ownership for teaching this content within the curriculum. The influence that knowledge, skill, and buy-in had on the incorporation of nursing informatics content within the nursing curriculum was exemplified in the following comments:

> The comfort level that faculty have with information technology in general impacts the extent to which they will embrace it …. How it (informatics) gets covered in courses varies with the comfort of the faculty in terms of discussing it.

> Faculty that are technology savvy, who maybe have links to clinical practice where they have already been using documentation technology, are much more capable of talking about it and contextualizing it in the courses, whether it's a focus of the course or it's just sort of a part of talking about clinical practice.

> It's (what is taught in courses and the curriculum) going to depend on people's passions, interests, and skills. … So there's some that spoke up for informatics. ... It's going to come down to the course writing teams because they're small teams that have certain skill sets, so if you had a course in first year which introduces informatics as part of their course work, and then second year writing team you get three or four faculty members none of who really think about it, and they just kind of happen to miss writing it into the learning activities, then in third year there could be gaps.

Nursing Informatics Leaders.

Leaders were individuals with a specialized in-depth knowledge of nursing informatics. These individuals had identified the importance of this topic within the nursing curriculum and had developed a strong value for the use of ICTs within nursing practice. Having in-depth knowledge about nursing informatics gave leaders a level of influence. These leaders were considered experts by nursing faculty and had influence over which informatics competencies were selected and where within the curriculum they were taught to students. Leaders were able to negotiate and secure a voice for nursing informatics as well as assist in protecting available resources to support the teaching of this content area. The importance of having leaders to push a nursing informatics agenda forward was evident in the following comments:

> I don't think it would be as present in the new curriculum without the presence of some champions. We have two people on faculty who are gung-ho and they're going to be helpful in getting us further than we are [in relation to integrating nursing informatics within the curriculum].

> So unless you've got a particular champion at that course design table, the concept itself will not really and truly come alive. It is just because they need to bring the knowledge about the concept in order to integrate it because it's the lack of, I guess feeling appropriate enough or knowledgeable enough to really do it [integrate NI in the curriculum].

Buy-in from faculty.

When faculty did not believe in, or 'buy-in' to, the benefits that nursing informatics offered to the profession, there was passive resistance to incorporating this topic within the faculty working role and ultimately within the nursing curriculum. 'Buy-in' was linked to faculty members' knowledge and skill about nursing informatics and use of ICTs. A lack of buy-in was further perpetuated by issues related to professional and academic status. As there was no incentive in the form of promotion or heightening of academic status to further one's knowledge in nursing informatics, professional development in this area became lost within the competing demands of the faculty position. Faculty described that in many cases appreciation for the uses of ICTs was only developed when the external academic system and the schools of nursing system leaders dictated the use of educational ICTs, such as the online learning platforms, a priority and requirement of the educator role. Mandating these knowledge requirements as an essential aspect of the faculty role promoted IT use and valuing of the benefits of these educational ICTs. This is evident in the following faculty comment:

> At first some people were excited about it and some people did not appreciate that it was happening [moving to a new electronic learning platform]. They saw themselves as [being] forced into using this medium, … and once they got a sense of how rich the discussion could be and the flexibility of it and how students could access it after practice at one in the morning if they had to, then it became this great tool …[They saw] the value in the use of it.

It took time to understand and develop a level of 'buy-in' as to why new ways of working and communicating were being integrated within the schools before faculty fully embraced the use of these technologies. Unfortunately valuing of ICT focused on the use of these technologies in the delivery of the educational program and not specifically in the practice of nursing.

Discussion

Findings from this study give rise to implications for nursing education, nurse educators, and future research. The significant impact that external cultures such as the professional organizations, healthcare culture, and academic cultures have on the development of values, beliefs, and priorities within these two schools of nursing was evident in study findings. These external systems dictated areas of priority for the profession of nursing and academic culture, and thus emphasis within the curriculum was given to the areas highlighted by these external systems. The influence that external cultures such as the governing bodies have over nursing education can be identified when considering how the CNO has established requirements for entry-to-practice within Ontario. The CNO is responsible for administering the NCLEX-RN exam. Passing of this licensure exam is a requirement for any nurse who wishes to practice. Student pass rates on the licensure exam are considered an indicator of curricular success. Consequently, it was evident that nursing education looked to these professional organizations to support the development and enactment of their nursing culture and curriculum.

Accordingly, nursing education cannot be separated from the professional organizations concerned with nursing. To segregate nursing education from the larger profession may result in educational programs which do not which do not align with the goals, missions, and aims of the profession of nursing. Consideration however, needs to be given to ensure that nursing faculty are cognizant of student learning areas that are outside of those highlighted in documents developed by these external cultures. Failing to do so may result in important areas of learning being overlooked from the nursing curriculum simply because external cultures have not deemed them as a priority. For example the limited availability of practice standards and nursing informatics competencies provided by key nursing organizations may have contributed to the limited integration of nursing informatics within the previous nursing curriculum. The CASN *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* document provided an impetus for faculty to consider incorporating nursing informatics within the revised curriculum. This document, in addition to the attention provided to nursing informatics by other professional organizations (CNA, RNAO, etc), warranted credibility and priority to nursing informatics as an important area of student learning.

In order to facilitate the development of a curriculum which adequately prepares students to practice within technology-enabled practice settings, critique and reorganization of the values, beliefs, and priorities developed within schools of nursing may be needed. Study findings have drawn attention to the limited value, priority, and prestige attached to engaging in activities such as curriculum development or faculty development in the area of nursing informatics. Until value for the topic of nursing informatics is also developed within schools of nursing, faculty will continue to lack the knowledge and skill to teach nursing informatics content, as well, faculty will continue to not 'buy-in' to the benefits that these technologies offer to the practicing nurse. Consequently, nursing informatics competencies will continue to be overlooked during curriculum development efforts and faculty development in this area will remain lost within the competing demands of the faculty role.

Because the incorporation of nursing informatics within cultures of the schools of nursing and undergraduate curriculum requires a shift in understanding of how nurses function and use information, the decision to engage in curriculum development provided an opportunity to consider nursing informatics as a new and innovative topic within the curriculum. During the curriculum development process, the existing curriculum was scrutinized and reorganized. The values, beliefs, and priorities of the schools and curriculum were examined and modified such that they fit within the revised vision of the undergraduate curriculum. This provided the opportunity for informatics leaders to bring the topic of nursing informatics forward and highlight it as an important area for student learning.

As described by Latta (2009) in the organizational change in cultural context (OC^3) model, organizational change and culture have a significant impact on one another. She asserts that a thorough understanding of the cultural dynamics of an organization is essential when generating support for the change process. Connecting the proposed change to the current institutional culture or that of the espoused culture is a means to create member commitment to the planned change being implemented (Iwasiw & Goldenberg, 2015; Latta, 2009). Faculty working to change the culture of a school of nursing must understand how an innovative and technology enabled healthcare setting aligns with the current and treasured aspects of the existing educational culture. This knowledge would provide direction and insight to assist change agents to align the proposed change in cultural values within the treasured aspects of the existing and espoused school of nursing culture (Latta, 2009). Developing a culture which is supportive of the curriculum development process and knowledge development in the area of nursing informatics will foster a curriculum which ensures that students are able to meet the demands of the current and future healthcare environment. In addition, the curriculum development process needs to involve individuals who are key decision makers within the school. Involving individuals in positions of power such as the academic leaders would ensure that these decision makers have a clear understanding of the way in which the curriculum has been developed to function as well as what resources are required to support faculty to implement the curriculum.

Lastly, this study supports that nurse educators must have a broad knowledge and skill base to identify nursing competencies essential for novice nursing graduates. Faculty development and professional practice opportunities are essential to cultivate faculty knowledge requirements such that they can make informed decisions in relation to developing a context-relevant curriculum which adequately prepares nurses for practice (Iwasiw & Goldenberg, 2015; Iwasiw, Goldenberg, & Andrusyszyn, 2009). Other researchers have also cited that faculty knowledge and skill in the area of nursing informatics is essential to support the integration of nursing informatics content within the curriculum (Curran, 2008; Nagle & Clarke, 2004). Similarly, faculty leaders or champions highly skilled in the use of ICT are also described as an important contribution to the curriculum development team (Griffen-Sobel et al., 2010; Nickitas et al., 2010; Johnson & Bushney, 2011). Faculty with a broad scope of understanding of the competencies required of practicing nurses through involvement in professional practice opportunities may support collaboration between nurses within the realms of practice, education, and research. These partnerships may support faculty to make informed decisions in relation to what curricular content is essential to prepare nursing graduates for practice.

Systems theory proved a useful framework for studying the culture of a collaborative nursing program. The educational organization could be viewed in a manageable way as systems and subsystems with the use of systems theory. Further research is needed to develop knowledge which supports an in-depth understanding of the curriculum development process and integration of nursing informatics content within it. Research is needed to explore how the structure of a school of nursing system influences the written and enacted curriculum. In addition, an understanding of how to positively influence faculty 'buy-in' to the importance of nursing informatics as a topic area would provide direction for individuals working to foster faculty development initiatives in the area of nursing informatics. Research which evaluates curriculum development strategies as well as teaching and learning strategies used to develop student competency in nursing would also be valuable. This research would provide insight into which informatics competencies Canadian nurse graduates are achieving upon graduation, and offer insight about how to foster the development of future nursing professionals who can effectively function within a technology-enabled healthcare setting. Research focused within a Canadian educational context is also needed as majority of the published literature originates from American schools of nursing and is not easily generalizable to a Canadian educational context.

Limitations

Findings from this study may lack transferability because each school of nursing has a unique culture which impacts the programs offered. In addition, despite being an outsider to the collaborative nursing program, the researcher's familiarity with the schools of nursing and their members may have influenced the interpretations made as well as the information provided by participants throughout the interview process. However, familiarity with the two schools of nursing benefited to the data collection procedures as it allowed the researcher to conduct a focused ethnography. Without an in-depth and specialized understanding of the study setting, it would have been difficult to focus the data collection procedures on aspects of the culture which impact the research aims. Finally, the participants interviewed may not have represented the full range of experiences and perceptions of the educational culture studied. In particular, difficulty in recruiting student participants may also limit understanding from the student perspective.

Conclusion

External cultures, the cultures of the two schools of nursing, and the faculty culture impacted the collaborative nursing program culture and ultimately whether nursing informatics competencies were included within the nursing curriculum. Within the nursing education culture, value and priority must be developed for the use of ICTs to support the practice of nursing. Until priority is given to nursing informatics as a topic area, this area of student learning will continue to be over looked during curriculum development endeavours. In addition, reorganizing the priority and prestige attached to research and teaching activities within schools of nursing is needed. Teaching activities such as faculty development in the area of nursing informatics need to be valued and recognized as an important part of the faculty role. Until nursing informatics faculty development activities are considered important contributions to the faculty role, these activities will continue to be undervalued and lost within the competing faculty role demands. Developing value and priority for nursing informatics as a topic within the nursing education culture may be achieved by allocating resources which support the integration of nursing informatics content within the curriculum. This may include hiring a nursing informatics leader, providing opportunity and incentive for nursing faculty to engage in faculty development in the area of nursing informatics, as well as giving greater recognition to faculty engaging curriculum development activities. Faculty must be empowered to make informed decisions about what nursing informatics competencies are essential for nursing students to obtain upon graduation. Unless nursing informatics competencies are embraced, valued, and considered an essential faculty knowledge and skill requirement, nursing faculty will continue not to 'buy-in' to the benefits that these technologies offer to the practicing nurse, resulting in a nursing curriculum which does not prepare graduates to practice within technology-enabled practice settings.

References

Ajjawi, R., & Higgs, J. (2007). Using hermeneutic phenomenology to investigate how experienced practitioners learn to communicate clinical reasoning. *The Qualitative Report*, 12, 612-638.

Ansari, S. (2004). *Systems Theory and Management Control*. Retrieved from http://faculty.darden.virginia.edu/ansaris/systems%20theory%20and%20mcs-tn.pdf

Aronson, J. (1994). A pragmatic view of thematic analysis. *The Qualitative Report*, 2, 1,

Axley, L. (2008). The integration of technology into nursing curricula: Supporting faculty via the technology fellowship program. *The Online Journal of Issues in Nursing*, 13, 3.

Carter-Templeton, H., Patterson, R., & Russell, C. (2009). An analysis of published nursing informatics competencies. *Studies in Health Technology and Informatics*, 146, 50-545.

CASN. (2012). *Nursing informatics entry-to-practice competencies for registered nurses*. Retrieved from http://www.casn.ca/2014/12/nursing-informatics-entry-practice-competencies-registered-nurses-2/

CASN. (2013). CASN Accreditation Standards. Retrieved from http://www.casn.ca/accreditation/casn-accreditation-standards/

CASN/CNA. (2008). *Nursing Education in Canada Statistics 2006-2007*. Retrieved from http://www.casn.ca/en/Reports_113/items/2.html

CHI. (2009). EHR vision 2015: Advancing Canada's next generation of healthcare.

Retrieved from https://www2.infoway-inforoute.ca/Documents/Vision_Summary_EN.pdf

CHI. (2013). What we do. Retrieved from https://www.infoway-inforoute.ca/index.php/about-infoway/what-we-do

Clarke, J., Baker, B., & Baker, D. (2009). Getting ehealth into basics nursing education: Report of the RCN information in nursing project. *Studies in health technology and informatics*, 146, 534-539.

CNA, (2001). What is nursing informatics and why is it so important? Retrieved from http://www.cna-nurses.ca/cna/issues/now/default_e.aspx?y=2001

Cole, I.J., & Kelsey, A. (2004). Computer and information literacy in post-qualifying education. *Nurse Education in Practice*, *4*,190-199. doi: 10.1016/S1471-5953(03)00065-9

Connors, H., Weaver, C., Warren, J., & Miler, K. (2002). An academic-business partnership for advancing clinical informatics. *Nursing Education Perspectives*, 23, 228-234.

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *The Nursing Clinics of North America*, 43, 523-533. doi: 10.1016/j.cnur.2008.06.001

Deese, D., & Stein, M. (2004). The ultimate healthcare IT consumers: How nurses transform patient data into a powerful narrative of improved care. *Nursing Economics*, *22*, 336-343.

Demiris, G., & Zierler, B. (2010). Integrating problem-based learning in a nursing informatics curriculum. *Nurse Education Today*, 30, 175-179. doi: 10.1016/j.nedt.2009.07.008

Fauchald, S. (2008). An academic-industry partnership for advancing technology in health science education. *Computers, Informatics, Nursing*, 26, 4-8.

Fetter, M. (2009a). Collaborating to optimize nursing students' agency information technology use. *Computers, Informatics, Nursing*, 27, 6, 354–362. doi: 0.1097/NCN.0b013e3181bca7be

Fetter, M. (2009b). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Fetter, M. (2009c). Improving information technology competencies: Implications for psychiatric mental health nursing. *Issues in Mental Health Nursing*, 30, 3-13. doi: 10.1080/01612840802555208

Gloe, D. (2010). Selecting an academic electronic health record. *Nurse Educator*, 35, 156-161. doi: 10.1097/NNE.0b013e3181e337d3.

Griffin-Sobel, J., Acee, A., Sharoff, L., Cobus-Kuo, L., Wookstock-Wallace, A., & Dornbaum, M. (2010). A transdisciplinary approach to faculty development in nursing education technology. *Nursing Education Perspectives*, 31, 41-44.

Guba, E., & Lincoln, Y. (1989). *Fourth generation evaluation*. Newbury Park: Sage Publications

Hebda, T., & Calderone, T. (2010). What nurse educators need to know about the TIGER initiative. *Nurse Educator*, 35, 56-60. doi: 10.1097/NNE.0b013e3181ced83d

Hegarty, J., Walsh, E., Condon, C., & Sweeney, J. (2009). The undergraduate education of nurses: Looking to the future. *International Journal of Nursing Education*

Scholarship, 6, 1-10. doi: 10.2202/1548-923X.1684

International Medical Informatics Association. (2009) *The nursing informatics special interest group – definition*. Retrieved from http:www.imiani.orgindex.phpoption=com_content&task=view&id=27&Itemid=5

Iwasiw, C., & Goldenberg, D. (2015). *Curriculum development in nursing education (3rd ed.).* Burlington, M.A.: Jones and Bartlett Learning.

Iwasiw, C., Goldenberg, D., & Andrusyszyn, M. (2009). *Curriculum development in nursing education (2nd ed.).* Sudbury, MA: Jones and Bartlett.

Johnson, D., & Bushney, T. (2011). Integrating the Academic Electronic Health Record into Nursing Curriculum: Preparing Student Nurses for Practice. *Computers, Informatics, Nursing*, 29, 133-137. doi: 10.1097/NCN.0b013e3182121ed8

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*, 1-11.

Kushniruk, A., Borycki, E., Armstrong, B., Joe, R., & Otto, T. (2009). Bring electronic patient records into health professional education: Towards an integrative framework. *Medical Informatics in a United and Healthy Europe*, 150, 883-887.

Latta, G. (2009). A process model of organizational change in cultural context (OC3 model): The impact of organizational culture on leading change. *Journal of Leadership and Organizational Studies*, 16, 19-37. doi: 10.1177/1548051809334197

Matthews, J. (2012). The role of professional organizations in advocating for the nursing profession. Retrieved from. http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-17-2012/No1-Jan-2012/Professional-Organizations-and-Advocating.html

McNeil, B., Elfrink, V., Bickford, C., Pierce, S., Beyea, S., Averill, C., & Klappenbach, C. (2003). Nursing information technology knowledge, skills, and preparation of student nurses, nursing faculty and clinicians: A U.S. survey. *Journal of Nursing Education*, 42, 341-347.

Melo, D., & Carlton, K. (2008). A collaborative model to ensure graduating nurses are ready to use electronic health records. *Computers, Informatics, Nursing*, 26, 8-12.

Morse, J., & Richards, L. (2002). *Read Me First for a Users Guide to Qualitative Methods*. Thousands Oaks: Sage.

Nagle, L., & Clarke, H. (2004). Assessing Informatics in Canadian Schools of Nursing. Retrieved from http://cmbi.bjmu.edu.cn/news/report/2004/medinfo2004/pdffiles/papers/4284Nagle.pdf

Nickitas, D., Nokes, K., Caroselli, C., Mahon, P., Colucci, D., & Lester, R. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Plastic Surgical Nursing*, 30, 103-107. doi: 10.1097/PSN.0b013e3181ebc709

Patton, M. (2015). *Qualitative Research & Evaluation Methods (4th Edition)*. United States of America: Sage Publications Inc.

Polit, D.F., & Beck, C.T. (2008). *Nursing research: generating and assessing evidence* *for nursing practice (8th ed.).* Philadelphia: Lippincott.

QRS International. (2014). *Nvivo 10 for windows*. Retrieved from. http://www.qsrinternational.com/products_nvivo.aspx

RNAO. (2009). Briefing note: Investing in nursing education. Retrieved from http://rnao.ca/policy/briefing-notes/investing-nursing-education

Taylor, L., Hudson, K., Vazzano, J., Naumann, P., & Neal, M. (2010). The electronic health records meets baccalaureate nursing curriculum: Stories from the battlefield. *Nurse Leader*, 8, 40-44.

Vestal, V., Krautwurst, N., & Hack, R. (2008). A model for incorporating technology into student nurse clinical. *Computers, Informatics, Nursing*, 26, 2-4.

Chapter 5 – How Aspects of Nursing Education Culture Impact the Integration of Nursing Informatics Competencies into a Collaborative Nursing Program Curriculum

Knowledge and skill in nursing informatics are important for novice nurses as they need to utilize health-related information to critically evaluate care decisions. Accordingly, nursing students must gain these skills so that they are able to effectively meet the needs of patients. Despite the development of nursing informatics entry-to-practice competencies for registered nurses (Canadian Association of Schools of Nursing [CASN], 2012), nursing informatics remains a topic that has been overlooked within undergraduate nursing curricula (Fetter, 2008, 2009a). Graduates of baccalaureate nursing programs enter into the practice setting with limited or no knowledge as to the use of information and communication technologies (ICT) to document patient care within electronic applications (e.g. Electronic Health Records (EHRs)), create electronic nursing care plans, and perform data entry (Fetter, 2009a, 2009b; Nagle & Clarke, 2004). Until nursing informatics is valued within the culture of schools of nursing, it will remain inadequately addressed within nursing curricula and graduates will continue to have low levels of knowledge and skill in this area. An examination of how the cultural attributes of a school of nursing influence the curriculum development process is needed. This may provide insight into how faculty at schools of nursing can foster a culture which supports the integration of nursing informatics into undergraduate curricula. Therefore, the purpose of this study was to understand how a collaborative program culture and the policies and procedures inherent within two schools of nursing impact the integration of nursing informatics content within an undergraduate nursing curriculum. This paper will focus on providing an understanding of findings which relate specifically to how aspects of culture impact the curriculum development process and inclusion of nursing informatics within it.

Literature Review

Assessment of Nursing Education Culture

A school of nursing is defined by its culture. Culture can be described as the "shared values, assumptions, and behaviours that are taught either implicitly or explicitly to new members" (Iwasiw, Goldenberg, & Andrusyszyn, 2009). Each school of nursing has a unique culture that drives decision-making and organization. Within the existing literature, there are few articles in which the culture of a school of nursing has been assessed, and in none of these articles have researchers examined culture in relation to nursing informatics. The main focus of research which has examined a nursing education culture has been to 1) determine the effect of organizational culture on the attributes of members, and 2) assess the culture of successful nursing programs.

Researchers who have conducted studies to examine nursing education organizational culture and member attributes have examined how culture influences: student and faculty empowerment (Bosley, 2005; Johnson, 2009), faculty position, role ambiguity and role conflict (Gormley & Kennerly, 2010), and the transition into a faculty position (Schriner, 2004). Findings from these studies suggest that a school's culture significantly impacts student and faculty empowerment, organizational commitment, and the experience of cultural dissonance (Bosley, 2005; Gormley & Kennerly, 2010; Johnson, 2009; Schriner, 2004). Researchers suggest that it is important to develop an academic environment that fosters positive working and social relationships and behaviours that maintain organizational welfare (trust, open communication, friendly social relationships, and work role balance), as this will promote a culture which supports faculty retention and a sense of organizational commitment (Gormley & Kennerly, 2010). Faculty role socialization through mentorship was also identified as important to assist new faculty members to transition into the academic culture (Schriner, 2004).

Researchers who have examined the culture of successful nursing programs have proposed that schools of nursing require a "solid and stable structure that is resilient over time" upon which to grow and innovate (Leiker, 2011, p. 780). This may be cultivated through strong leadership, effective management processes, and well-defined professional and internal values (Leiker, 2011). Furthermore, a successful school of nursing culture is one which integrates values such as trust, respect, collegiality, integrity, and open communication into its guiding principles and supports strong relations between the academic and practice areas of nursing (Leiker, 2011; McNish, 2003). Despite the limited research in the area of nursing education culture, findings support that the cultural values of a school of nursing are important to the success of its program and members. Missing from the literature is research that examines the influence of culture on the organizational structure and the process of curriculum development.

Curriculum and Course Development and the Incorporation of Nursing Informatics Content

Literature in the area of nursing informatics and curriculum and course development is comprised primarily of case study reports. These reports focus primarily on describing faculty members' experiences when integrating informatics content into nursing curricula. Successful implementation efforts require curricular planning which incorporates curriculum mapping, faculty development, and a set of guiding competencies (Barton & Skiba, 2009; Curran, 2008; Fetter, 2009). Faculty commitment to the curriculum development process and fostering faculty knowledge and skill specific to nursing informatics were also identified as integral to project success (Curran, 2008; Meyer, Sternberger, & Toscos, 2011; Weber, 2004). In addition, a partnership between academia and a vendor or clinical partner has been suggested as supporting integration of an academic electronic health record (AEHR) within the curriculum (Connors, Warren, & Weaver, 2007; Fauchald, 2008, 2007; Weber, 2004). AEHR are very costly, and a partnership was described as assisting a school to secure the financial resources required to develop and maintain the AEHR. Further research is needed to examine the effect of curriculum development efforts on student acquisition of nursing informatics competencies. In addition, teaching and learning strategies to develop student knowledge in the area of nursing informatics need to be explored and evaluated.

No research was found about a conceptual link between nursing education culture and the incorporation of nursing informatics competencies in an undergraduate nursing curriculum. Although culture has been described as significantly affecting a school of nursing and its members, linking aspects of the culture of a school directly to curriculum development endeavours that occur in relation to nursing informatics remains unstudied. Research that conceptually links nursing culture to the curriculum development process could not only improve the curriculum development process, but assist in developing and maintaining a culture which ensures that a curriculum remains context-relevant and adequately prepares nurses for practice in the area of nursing informatics.

Theoretical Framework

Systems theory was the framework used to guide this study, and to inform the research questions, the data collection strategies and the interpretation of findings during analysis. A system is a structure that is made of interrelated and interdependent elements which influence one another to maintain a state of homeostatsis within the system. Systems theory is used to study the interaction of a system with its environment (Walonick, 1993). A systems analysis explores the complex set of interrelationship amongst subsystems, as a system is constantly exchanging information with its environment in an effort to maintain a state where optimum potential can be reached (Ansari, 2004). Within the current study, systems theory was used to examine the interaction that two schools of nursing, sharing a collaborative nursing program, have with their environment. In particular, a number of subsystems within the nursing education culture explored were: culture, human infrastructure, and resources (See Appendix G), as available literature demonstrated that these systems had a significant impact on the position of a school of nursing within the larger academic system and social world.

Study Purpose

The purpose of this study was to examine how a collaborative nursing program culture, and the practices and policies that are inherent within two schools of nursing systems, influence the inclusion of nursing informatics competencies into an undergraduate nursing curriculum. Conducting a focused ethnography of the collaborative nursing program culture and subsystems embedded within the larger schools of nursing systems, assisted the researcher to answer the following research question in relation to culture:

1. In what ways does a nursing education culture (the shared values, assumptions and behaviours of two schools of nursing) and the practices and policies within the two schools of nursing affect the incorporation of nursing informatics competencies in a collaborative nursing program curriculum?

Methods

Study Design

A focused ethnography was used to examine how the values, assumptions and behaviours embedded within the culture of one collaborative nursing program impact the curriculum development process and the incorporation of competencies specific to developing student knowledge and skill in nursing informatics. A focused ethnography is characterized by short field visits in collaboration with intensive data-collection through interviews, documents analysis, and observation (Knoblauch, 2005). When conducting a focused ethnography, the researcher enters into the study setting with a thorough understanding of the study field, in order to focus the analysis on aspects of the culture which relate directly to the research questions and aims of the study (Morse & Richards, 2002). This methodology was chosen to focus the analysis on aspects of the culture related to nursing informatics and curriculum development.

Setting

The culture of a collaborative nursing program was the unit of analysis for this study. This collaborative program was offered as a 4-year BScN degree through a partnership between a university and college. The two program sites (two Schools) were located in the same city in Ontario, had their own administrative structure, and offered other nursing programs in addition to the program under investigation. The collaborative BScN curriculum offered was undergoing curriculum development during the data collection period. New courses were being implemented in the first year of the program and course design and development for years 2-4 of the revised curriculum were ongoing. The curriculum development process involved collaboration between faculty members at the two sites. The existing and revised curricula each have one shared mission, vision, and philosophy. Operationalization of the curriculum is not identical at the two site because faculty are encouraged to utilize their own expertise and creativity in their teaching practices.

The most notable difference between the two sites was the academic ranking of faculty. At the university site, faculty fell within five different levels of academic rank: *Professor, Associate Professor, Assistant Professor, Lecturer,* and *Instructor*. The first four ranks were full-time positions with some differences in the amount of time devoted to each of teaching and research. Faculty at the University assuming the role of *Assistant Professor*, *Associate Professor*, and *Professor* required a PhD level education. Instructors are part-time, limited duties faculty who teach professional practice and theory courses on a per semester basis and have no research or service responsibilities. At the college site, there were two faculty roles: *Professors,* who are the full-time faculty with no difference in ranks amongst them, and *contract* faculty similar to the role of the *instructor* at the university. *Contract* faculty at the college teach professional practice and occasionally theory courses on a per semester basis. PhD level education is not a requirement for faculty to assume the role of *Professor* at the College site.

Procedures and Data Sources

Data were obtained through semi-structured interviews, document review, and observations. Following institutional ethics approval (Appendix B), data collection occurred. Recruitment of interview participants was facilitated by the academic leaders of the two sites who identified key informants or personnel with a specialized knowledge about the phenomena of interest (Appendix C). Potential faculty and staff participants were then contacted by email to request their participation in the study and provided with the letter of information (Appendix C). A criterion sampling method was chosen to obtain a perspective from individuals across all levels of the program and academic ranks that had expertise which contributed to answering the research questions. Criterion sampling involves the selection of study participants who meet a predetermined set of criteria (Polit & Beck, 2008). Inclusion criteria for participation required that individuals be involved with the collaborative nursing program and have specialized knowledge about the program, curriculum and course development procedures, or nursing informatics as a topic area in the curriculum. During the interview process, faculty and staff identified additional potential participants who were also contacted by email and invited to participate. Students were recruited through email and during three in-class sessions where the study was explained and a letter of information distributed (Appendix C). If students chose to participate, they contacted the researcher by email.

Interviews.

Twenty-six in-depth individual interviews were conducted with faculty members, support staff, and students from the collaborative nursing program. Interviews lasted approximately one hour, took place at a convenient location for the participant, and were guided by a semi-structured, researcher-developed interview guide (Appendix E). Interview participants also completed a demographics questionnaire (Appendix F).

Nineteen participants were from the university site and seven from the college site. University faculty (n=14) had an average age of 49.7 years; an average of 27.6 years of nursing experience, and an average of 14 years of teaching experience. Faculty at the college (n= 7) site had an average age of 45.8 years, an average of 25.3 years of nursing experience, and an average of 14.7 years of teaching experience. Teaching expertise of faculty was representative of content areas across the curriculum. Only three staff from within the schools of nursing met the inclusion criteria for participation in this study. Support staff (n= 3) had an average age of 55 years. The researcher encountered difficulty in obtaining student interviewees, resulting in recruitment of only two participants. This in part may have resulted from students having multiple commitments and assignments due through the data collection period. Student participants (n=2) had an average age of 22.5 years and were enrolled in year 1 of the revised curriculum and year 4 of the existing BScN nursing curriculum. Interviews lasted approximately one hour and were tape recorded.

Documents.

Documents were obtained through communication with faculty at both sites, and in consultation with administrative staff. Inclusion criteria required that documents focus on the study goals and impact the collaborative nursing program. Documents included: the college and university mission and vision statements, the nursing mission and vision statements, curriculum and course development committee meeting minutes, reports outlining resources and physical space, and curricular documents such as: program year goals, a curriculum overview, course syllabi, and course descriptions. Additionally, information from both of the schools of nursing web sites was acquired. Each section of the schools of nursing webpages were reviewed to identify information relevant to the study aims.

Observations.

Fifteen observations were completed. Observations were conducted during classes (15 hours), committee and course development meetings (15 hours), and research presentations (4 hours). Inclusion criteria for observations were that they be associated with the collaborative nursing program and fit within the aims of the research questions. Observations were made in courses where informatics-related content was described in the syllabus. Course observations of were also made at random to identify whether informatics competencies were incorporated into the teaching and learning strategies used, or in the content taught to students. Committee and course development meetings were observed to understand the curriculum development process at these two schools of nursing. In addition, course development meetings for a health informatics course were also observed to understand the process of integrating this content into the revised curriculum. Observations of research presentations provided an overview of all faculty research areas and specific information about research presentations related to informatics. During the observation sessions, the researcher was a silent observer. Field notes were taken and contained data such as the content of the observation session, the facilities in which the observation took place, student responses to teaching strategies, and informatics specific curricular content. All field notes were transcribed for data analysis purposes.

Data Analysis

All data from interviews and field notes were transcribed. The researcher conducted an in-depth analysis focusing on aspects of the culture of the collaborative program which were within the aims of the identified research questions. A thematic analysis of the interview transcripts, observation data, and documents was conducted concurrently. Data collection and analysis occurred simultaneously to enhance the integrity of study findings (Polit & Beck, 2008). All data from interviews, observations, and documents were collected and organized within NVivo Version 10 software (QSR International, 2014).

Data analysis was an inductive process consisting of iterative review of all three sources of data. Analysis began with reading and rereading all data to identify patterns (Aronson, 1994). Patterns were then combined and organized into categories with accompanying themes (Aronson, 1994). Once major categories had been identified, the researcher further examined each to consider how it related to other categories to further develop an understanding of the schools of nursing and collaborative program system (Aronson, 1994). Categories and themes were again compared and contrasted and this resulted in the collapsing of categories and the exploration of new themes (Aronson, 1994). Major categories were then analyzed to determine if there was triangulation amongst the data sources. In particular, the researcher assessed whether identified categories were supported by all three sources of data collected. Conducting this analysis provided a holistic understanding of the study findings and the interaction between identified categories. The names of categories, which were later refered to as the systems and subsystems, came from the data analysis procedures and were informed only by the study findings.

As two sites were explored as part of this analysis, careful consideration was given to understanding whether there were unique cultural attributes which influenced the integration of nursing informatics competencies within the collaborative program curriculum at each of the program locations. As there were so many commonalities between the two locations (i.e., same courses, collaborative curriculum development, administrative processes, and decision-making procedures) the data from both sites was combined and analyzed together. In addition to conducting a thematic analysis, data was also coded for its alignment with the *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses*, developed by the Canadian Association Schools of Nursing (2012). This provided a description of what nursing informatics competencies students were obtaining within of the collaborative program. In addition, this coding provided an opportunity to identify important documents, observation experiences, and potential participants to include in the data collection process.

Rigour

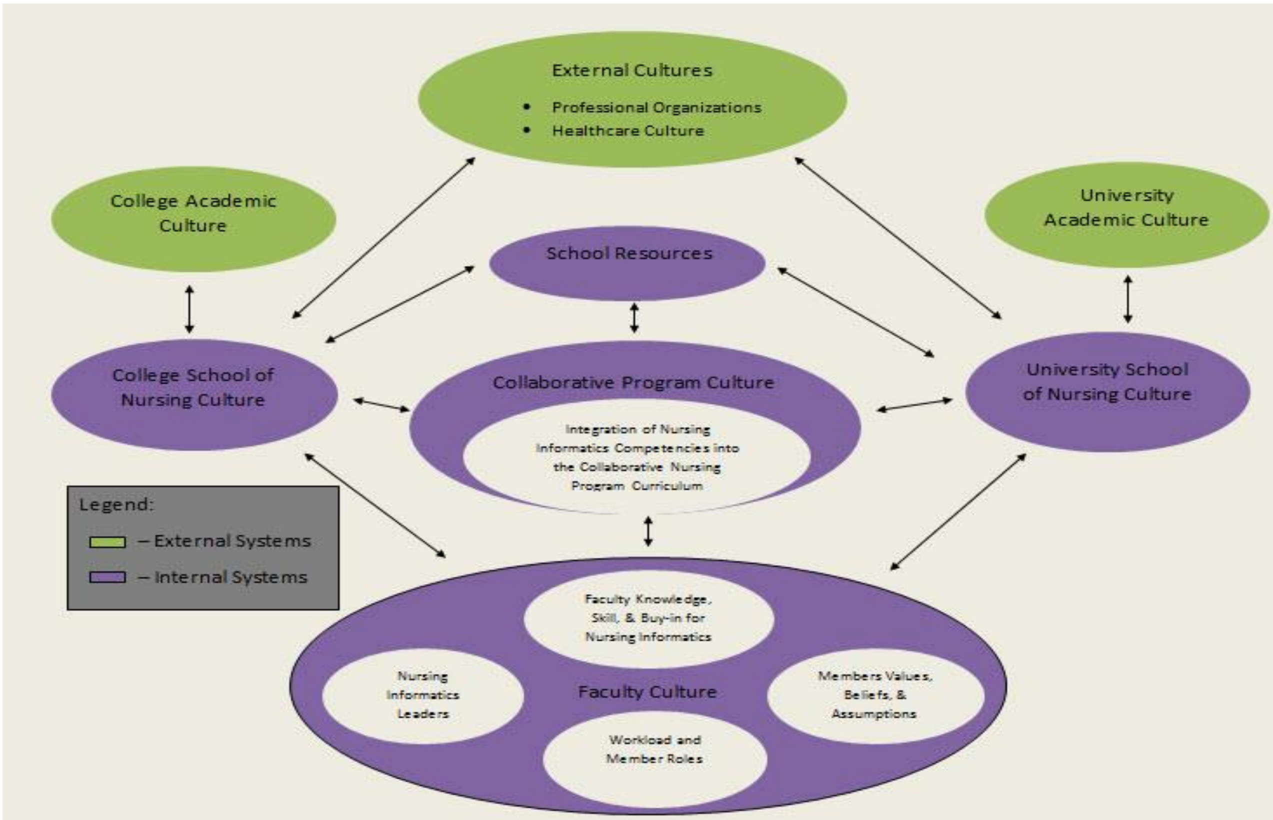
Credibility and trustworthiness of the data was established by intensive listening during interviews, and with careful probing to obtain rich and comprehensive data. Multiple data collection methods (face-to-face interviews, field notes, document collection, and observations) preserved credibility as this provided multiple constructions of the data, enhancing the richness of the interpretation (Ajjawi & Higgs, 2007). Data collection and analysis occurred concurrently allowing the researcher to confirm study findings with participants, in an effort to co-construct a mutual understanding (Guba & Lincoln, 1989).

Authenticity of findings was enhanced through maintaining an audit trail of key decision used to inform interpretations (Polit & Beck, 2008). The use of multiple interviews provided a range of interpretations of the nursing education culture, the curriculum development process, and nursing informatics as a topic area. In addition, participants were selected such that they had a variety of academic positions within the schools, and unique experiences. Discussion with participants about the meaning of information available in academic documents also enhanced the researcher's understanding and interpretation of these data sources (Polit & Beck, 2008). Transcription of all data and management within NVivo qualitative software promoted organized data management. Finally, the use of participant narratives in the dissemination of research findings reveals the authenticity of findings, ensuring that participant's voices are evident in the findings (Guba & Lincoln, 1989).

Findings

There were external and internal systems to the nursing education culture which impacted the incorporation of nursing informatics competencies within the collaborative nursing program curriculum. The parent institutions (university and college), the healthcare system, and professional organizations were external system cultures which influenced curriculum development. Internal systems which impacted the curriculum development process were the culture of the two schools of nursing, the faculty culture, and school resources. The interaction amongst the systems and subsystems are illustrated in Figure 2.

Figure 2.



Within the diagram there are two schools of nursing with each being impacted by the external systems of professional organizations, the healthcare culture, and the academic cultures. Each of these external systems interacts to affect the schools of nursing cultures. As the collaborative program is offered jointly by two schools of nursing, the culture of the collaborative program is derived from the interactions of these two school cultures. In addition, the cultures of the two schools, the faculty culture, and school resources also affect the collaborative program culture. Specifically within the faculty culture, the availability of nursing informatics leaders, faculty workload and member roles, faculty knowledge and skill in relation to nursing informatics, and members' values, beliefs, and assumptions in relation to nursing informatics impacted the value and priority developed for nursing informatics within the collaborative program culture. Resources were allocated from members at the two schools of nursing to support the collaborative program; therefore, the availability of resources which supported curriculum and faculty development endeavours influenced what was taught within the curriculum. Consequently, the collaborative program curriculum was derived from the interactions of these systems. As the purpose of this paper is to provide direction in relation to how aspects of nursing education culture influence the integration of nursing informatics competencies within an undergraduate nursing curriculum, the findings section will focus on describing how the school of nursing cultures, external cultures, faculty culture, and school resources impact the integration of nursing informatics within the collaborative program curriculum. Particularly, in relation to the faculty culture, the focus will be on findings which pertain to faculty workload and members' roles, and members' values, beliefs, and assumptions about nursing informatics.

Culture of the Schools of Nursing

Each school of nursing reflected an overarching set of values, beliefs, and priorities which shaped the collaborative program culture and guided decision-making and the allocation of resources to support teaching and learning. The extent to which the cultures of the two schools embraced and valued nursing informatics appeared to impact whether nursing informatics was integrated within the collaborative program curriculum. Informatics technologies within both of these schools of nursing were considered a way to enhance communication amongst students and faculty, as well as meet the demand for student professional practice experiences through the use of high fidelity mannequins. Resources in the form of training and monies for purchasing of ICT were allocated to promote the use of these technologies for education purposes. The main uses for ICTs were for communicating with students and faculty, posting of course material, electronic submission of assignments, searching for online journal articles and literature, course delivery, and providing a simulated learning environment. The value placed on ICTs for educational purposes can be seen in the following comment:

> [Due to the emphasis on use of ICT for facilitating education] The faculty of health sciences has invested by actually setting funding aside to hire an information technology specialist, a pedagogical expert because that's part of what I have seen as the bigger issue [faculty requiring support to offer their courses or aspects of their courses in an online format].

Although the nursing education culture at both schools and within the collaborative nursing program had developed a value and priority for the use of ICTs to support teaching and learning practices, there was less priority given to the use of ICTs to support the practice of nursing. Many of the nursing faculty were not aware of the importance of developing student knowledge and skill in nursing informatics competencies. Many faculty did not see nursing informatics technologies as an integral aspect within the professional practice setting, and prior to the curricular revision, many had not even considered nursing informatics as a topic for inclusion within the curriculum.

> Well I looked it up a few weeks ago just for this interview, it's a little bit more broad because I understood it to be up until recently, more about how you, new nurses find and use information, so especially using the databases, or using electronic media to find ways to support their practice, but then because I looked it up online it talked about information technology and computer technology, and databases even for clients, so I hadn't really thought about that as informatics. I would have just thought of that as electronic record keeping, but not really thinking of that as part of informatics.

In addition, resources were assessed throughout the curriculum development process and reallocated based on the changes made to the curriculum. In relation to nursing informatics, faculty teaching time and environmental space were allocated to provide small class sizes for the nursing informatics course implemented in year two of the nursing curriculum. Until a value towards nursing informatics as a topic was developed and established across the two schools of nursing cultures and collaborative program culture, nursing informatics as a topic was not considered as an essential requirement for student learning.

External Cultures

External cultures had an important influence on the collaborative program curriculum because they articulated a set of values, beliefs, and priorities which guided nursing and education which were encompassed within the cultures of the two schools of nursing and collaborative program culture. External cultures had a significant impact on the nursing education culture within the two schools of nursing and collaborative program. The cultures of the healthcare system and professional organizations (College of Nurses of Ontario (CNO), Registered Nurses Association of Ontario (RNAO), Canadian Nurses Association (CNA) and CASN) articulated values and priorities for the profession and these were incorporated into each of the schools' value and belief system. Similarly, the cultures of the university and college articulated values and priorities for the educational system, and these were part of the culture of the respective school of nursing.

Nurses within the healthcare and professional organization cultures were seen as leaders in the profession, articulating nursing values, practice standards, and social policies (Matthews, 2012). Members of these external cultures had knowledge, and influence over establishing current and future healthcare trends and for developing practice standards which were considered the gold standard for providing nursing care. Although the collaborative program curriculum course concepts and goals were determined from an extensive review of internal and external contextual factors relevant to the healthcare culture, as well as from the expertise of nursing faculty, course content was also derived from published Canadian National Competencies and Standards. The importance of looking to professional organizations and the healthcare cultures to support curriculum development endeavours was apparent in the collaborative program goal of "Meeting the educational and professional requirements as outlined in the College of Nurses of Ontario (CNO) Professional Standards of Practice for Registered Nurses; CNO Ethical Values; and the Canadian Nurses Association Code of Ethics for Registered Nurses". In addition, "keeping up with" the fast-paced environment of the healthcare system was also a challenge. The following faculty comments exemplify the influence that external cultures had over curriculum development and the selection of curricular content:

> The other thing we really used [during curriculum development] is the standards, the [names regulatory body] national competencies.

> Now that those competencies [CASN Nursing Informatics Competencies] are out we need to really get those out to our course teams so that when they're looking at their course revisions they integrate those competencies …We need to really take a good look at those competencies and make sure that they're embedded.… It's easier to just do what you've done for a long time, the way we've done it so I'm glad to have the competencies.

Less attention was given to the acquisition of nursing competencies that were outside of those prescribed by professional organizations or not prevalent within the healthcare setting. As there were no published nursing informatics competencies or standards until the time of data collection, nurse educators at these two schools of nursing lacked guidance and knowledge about incorporating nursing informatics within undergraduate curricula. Faculty relied heavily on following healthcare trends in relation to implementing ICTs within the nursing curriculum; preferring to wait until ICT systems had been fully integrated into the healthcare agencies prior to choosing an electronic record to develop student competency at the University site. The College site however, was beginning to explore the option of integrating a student funded EHR system into one of their year-1 courses. However, full implementation of this system at the time of data collection had not yet been realized. This limited and slow adoption of ICTs into the nursing curriculum suggested that faculty did not consider themselves as leaders in developing and cultivating students who were educated to function within technology-enabled healthcare environments. The external cultures had a significant impact on specifying and directing content selection for the BScN curriculum:

> The school of nursing belongs to a larger culture. One being the healthcare culture and the other being the educational culture which is saying…. this [use of technology] is our goal. They're almost pushing it [use of technology for providing care and providing education].

> We had conversations with the hospital a few years back [about acquiring an AEHR]....We determined we needed something a little more generic that we could say to the students, you know, learn the basics and then you can learn the specifics of your agency when you get there, but then the hospital never did get up and running the way they wanted to so we thought it [purchasing an AEHR for training purposes] wasn't a wise investment.

The cultures of the college and university also had influence on the development of values and priorities selected by the two schools of nursing. Because the schools were situated within larger academic environments, the values and priorities of these institutions influenced the cultures of each of the schools and consequently the collaborative program culture. Aligning with the goals of the larger academic institutions supported the acquisition of funding, resources, and recognition within the academic community. The academic institutions provided resources and support for the integration of informatics technologies for teaching purposes; however, no incentives or resources to support the development of informatics skills specific to nursing practice were provided. This resulted in faculty at each of the schools valuing ICT for teaching, while giving less attention to ICT used within nursing practice.

Faculty Culture

Faculty Workload and Members' Roles

Selection of faculty members to join the schools of nursing was based on their values, beliefs, and the alignment of teaching and research interests with those defined by the schools of nursing. New members had to be compatible with the schools' cultures and assist the nursing systems to achieve their vision, mission, and program goals. Members' expertise influenced workload allocation. University faculty (those in *Associate Professor, Assistant Professor, Lecturer* role) workload is divided among research, teaching, and service activities (generally 40% research, 40% teaching, and 20% service research for tenured and tenure-track faculty; and 10% research, 70% teaching, and 20% service for lecturers). Workload for *Professors* at the college was determined individually based on the assigned number of teaching hours, and whether faculty members were engaged in research or service activities. Workload allocations determine the proportion of time faculty members had available to engage in research, implement new teaching and learning strategies, and participate in curriculum and faculty development activities. Members frequently spoke about the large number of role expectations. They described that their daily workload responsibilities did not leave time for pursuing personal interests or activities above and beyond their faculty duties of teaching, research, and service. This resulted in limited time for engaging in faculty development in the area of nursing informatics, or engaging in direct client care where one would come into contact with ICTs. Consequently, few faculty members fully embraced the topic of nursing informatics, while others saw professional development in this area as adding to an already busy faculty schedule. The following illustrates this finding:

> There are those [faculty] that really seem to embrace it [ICT], seem to really see the uses and push in that direction versus … the laggers, are still picking it up, but it's much slower and they see it as something that… [is] a major time commitment and something else they have to add to their day.

Engaging in curriculum development was another task that faculty found difficult to incorporate into their daily schedules. As no release time was provided to many faculty involved in curriculum development activities, there was limited time for faculty to seek the necessary resources and support to comprehensively include nursing informatics content within their course design efforts.

> We do have some problems with our curriculum revision moving forward, frankly I'm not sure that we have been as explicit as we should be about how technology should be integrated into all of the courses (…) It's not clearly documented in terms of what does this concept look like, how does it thread through. We all have sort of our ideas and we're all pushing for it, but it's not explicit. So I think education of faculty, I think a much more explicit vision, document of what ICT would look like in terms of curriculum and pedagogy is needed.

Activities such as curriculum development and faculty development in the area of nursing informatics were not priority areas for faculty and the two schools, and as a result this impacted the amount of time that faculty allocated to engage in these activities. Duties such as research which promoted the development of prestige for the faculty member as well as the schools were given precedence. Lack of precedence given to nursing informatics influenced the time faculty committed to engage and learn about nursing informatics, and focus on incorporating this topic within their teaching and learning practices.

The incorporation of ICTs for educational purposes were recognized as a priority area for the schools, and this assisted in establishing faculty value and appreciation for the benefits that ICTs offered to nursing education. Often new ICTs were integrated into the work role of faculty and developing knowledge and skill in the use of these technologies was regarded as a faculty responsibility. The 'get on board or get left behind' mentality towards the use of many ICTs applied pressure to members of the schools to keep up-to-date in their knowledge and skill in the use of educational ICT. This responsibility was even written into faculty contracts which were signed upon hiring.

> It's an expectation [speaking about faculty needing to post course material on the online learning platform]. This is the way it's done. We don't sell course packages anymore, we don't.

> I don't see how anyone, whether it's private business, big business, education, health care, cannot function in today's world without technology. It just isn't

going to happen. So it's either embrace or be left behind and right now. I've got a job so I need to stay current.

Members' Beliefs, Values, and Assumptions

Members within the two schools of nursing had their own beliefs, values, and assumptions about the world as well as the profession of nursing. These values, beliefs, and assumptions not only shaped that individual member, but also influenced how they made decisions and contributed to the schools of nursing systems. Consequently, members' involvement within the schools of nursing systems resulted in their individual values, beliefs, and assumptions being encompassed within the culture of the schools of nursing as well as in the written and enacted collaborative program curriculum. Faculty members' vested interests were identified through the areas they choose to pursue in relation to research as well as in the content that they advocated for within the curriculum and taught to their students. Those areas that a faculty member determined to be 'most important' were given precedence over other topics that were perceived as less integral to the way nurses practice. Faculty could therefore be described as gate keepers who shaped their students' perception of the profession of nursing and the values, beliefs, and assumptions that were developed. The following comments exemplify this:

So if they (faculty) see the value of this (a topic within the curriculum) as actually in the end leading to better practice then they're happy to spend the time on it [during class sessions].

> So [inclusion of informatics] is going to come down to the course writing teams because they're small teams with certain skill sets. If your course writing doesn't have members who really thinks about it [informatics], informatics content may just not get written into the learning activities and then there could be gaps.

Although each faculty member had his/her own set of values and beliefs, there were a number of faculty members within the two schools of nursing who had a vested interest in the area of informatics. Some identified themselves as dedicated to the topic of nursing informatics and they demonstrated this through engaging in informatics research as well as considering how ICTs could enhance the teaching and learning environment within the collaborative program. These faculty members were advocates for the topic of nursing informatics and recognized that in order for the schools to meet the goal of being a leader in nursing education and research, nursing informatics was a topic that needed to be included within the curricular revision. Having faculty with a vested interest in informatics was integral to creating support for this topic in the revised curriculum. These ideas were supported in the following faculty comment that addressed how integrating informatics content in the curriculum was a way of moving the university school of nursing towards achieving its mission and vision.

> It's all about whatever we can do to improve our practice,... There's no way that it [nursing informatics] doesn't support everything, everything else, our mission, our values, and our curriculum. It absolutely does because anything that's going to improve our knowledge and our practice is going to support what our vision is for the school.

School Resources

The availability of financial, physical, and human resources had a profound impact on how the two schools of nursing and their programs functioned. Resources were allocated in an effort to achieve the schools' mission, vision, philosophy, and program goals. As external cultures consistently shaped and defined the cultures of the schools of nursing and the development of priorities, values, and beliefs, these external cultures had an indirect influence over how resources were allocated within the two school systems. In addition, within the two schools, allocation of available resources were distributed by those individuals in positions of power, such as the academic leaders as well as by higher level decision-makers who were external to the schools of nursing system (e.g., Dean makes many decisions; Government controls allocation of money to be used only for certain purposes). In order for the schools of nursing members to secure resources to support their work processes, they were required to submit formal applications with rationale for the resource they were requesting. These requests were then reviewed by the academic leaders of the nursing programs and with higher-level decision makers at their respective sites to determine the feasibility of providing the resources requested. This process was described:

> Well you always have to have a rationale to support the expenses; that always has to be there, especially when it's big money that you're putting out. You really have to think of, 'yeah this is a great idea, but is it going to be used?' In theory it could be wonderful; in practice is it really practical? You have to involve the people who are going to use it. Would they find it useful, will they use it? It's

> talking to them, letting them see what it is, what it can do for them, what the potential is.

The multiple priorities held by the two schools of nursing created environments where there were competitions for resources. Resources were distributed throughout the two schools' systems to support the daily functioning of the schools and nursing programs offered. As a result, content topics and nursing interests which aligned with the cultural values, beliefs, and priorities of the academic institutions were more likely to be resourced and funded. Because nursing informatics had not been identified as a priority area within either of the two nursing cultures, or within the larger academic culture of the college and university, there were limited resources available to support the incorporation of nursing informatics competencies within the undergraduate curriculum. The lack of priority given to the topic of nursing informatics as well as the competition for available resources were identified in the following faculty comment:

> There are certainly competing interests. There are all kinds of important issues, and this informatics, I think because of how it's been stereotyped and understood, hasn't been an area of priority.

The low priority and value given to nursing informatics competencies were further emphasized in the lack of resources provided to support the integration of this content within the collaborative nursing program curriculum. There were no faculty development initiatives to assist faculty in preparing to teach nursing informatics content, as well as few resources to support training, implementing, maintaining, and purchasing of ICTs which were specific to the practice of nursing. The main informatics technologies of value to the two schools of nursing and its members were those used for educational purposes (i.e., email, educational delivery platform, simulation technologies). Resources to support purchasing of informatics technology and to hire technological support personnel were provided to facilitate the use of ICT for communication and course delivery. Faculty spoke about the use of educational ICTs (i.e., educational support platforms, email) as an essential part of their role, a skill they kept current in order to fulfill their work duties. This resulted from the academic leaders mandating the use of educational ICTs as a faculty role requirement. One faculty member commented "It's always been a resource issue, so again, [nursing informatics is] not a priority right". Other comments included:

> So it's been a resource issue in terms of 'we can't afford it, we can't pay for it, and we can't have it', although, we found money to buy the robots and the robotic mannequins, … but it was not with the intent of enhancing informatics, but it was with the intent of we don't have enough [professional] practice settings.

> There are lots of people who are self-declared Luddites and who would say, "Oh but do I have to [use technologies such as the educational platform for teaching purposes]?" Yes you do; you know we're moving in this direction; get on board. Now we're making sure that we included statements in contracts about the requirement to take advantage of the teaching support centre, and IT courses to get them up to speed before they start.

Financial resources to specifically support purchasing of nursing informatics technologies such as an academic electronic medical record, were lost within the competing demands of other necessary resources required within the schools. In addition, no external financial assistance from professional practice partners, or software vendors was provided to support implementation efforts.

Discussion

The cultures of the two schools of nursing, external system cultures, the faculty culture, and school resources influenced the inclusion of nursing informatics content within the nursing curriculum. External systems exerted influence over the collaborative program culture by articulating areas of priority for the profession of nursing and academic cultures. Consequently, emphasis within the curriculum was given to the areas highlighted by these external systems. As nursing informatics educational strategies and competencies have been slow to develop within professional organizations, this combined with the lack of faculty knowledge, skill, and value for nursing informatics may have resulted in this topic being over looked during curriculum development endeavours (Fetter, 2009a). The influence that external cultures exert over the nursing curriculum can be identified when considering how the College of Nurses of Ontario (CNO) establishes requirements for entry-to-practice within Ontario. The CNO is responsible for administering the NCLEX-RN exam. Passing of this licensure exam is a requirement for any nurse who wishes to practice within the province of Ontario. Consequently, student pass rates are considered an indicator of curricular success (Iwasiw & Goldenberg, 2015).

Within the faculty culture, busy workload allocations and role expectations limited the time available for faculty to engage in activities that did not contribute to fulfilling the faculty role or increasing ones status within the schools. Consequently, curriculum development and faculty development activities were lost within the competing demands of the faculty role. Attention within schools of nursing needs to be given to re-evaluating and organizing priorities such that they encompass a value for curriculum and faculty development activities. As the changes to the curriculum will impact all members of the schools teaching in that program, changes to the curriculum cannot occur without wide spread faculty support and commitment (Iwasiw & Goldenberg, 2015). Organizational change which encompasses a valuing for curriculum and faculty development activities would provide faculty with recognition and time for engaging in these important initiatives.

In order to incorporate value for curriculum development and nursing informatics within the nursing education culture, organizational change within schools of nursing is necessary. As described by Latta (2009) organizational change and culture have a significant impact on one another. Therefore, to make changes to the organizational culture, she asserts that a thorough understanding of the cultural dynamics is essential to generating support for the change process. To create member commitment, faculty within the schools of nursing need to align a value for curriculum development activities to the current institutional culture or that of the espoused culture (Iwasiw & Goldenberg, 2015; Latta, 2009). Understanding how the current school of nursing culture supports an innovative technology-enabled healthcare setting and context-relevant curriculum will provide direction to assist change agents to align these important values into the treasured aspects of the existing and espoused culture (Iwasiw & Goldenberg, 2015; Latta, 2009). Incorporating a greater value for curriculum and faculty development activities within the schools' cultures will advance students' ability to meet the demands of current and future healthcare environments.

In addition to reorganizing the value and priorities of the schools culture, faculty must be supported and encouraged to broaden their own professional knowledge and expertise such that they are effectively positioned to recognize important student learning areas not identified by professional governing bodies (such as in the CNO Professional Standards of Practice for Registered Nurses; CNO Ethical Values; and the Canadian Nurses Association Code of Ethics for Registered Nurses). Protecting time for faculty to engage in professional practice opportunities will expose faculty to new and innovative concepts which impact nurses within the practice setting. In addition, professional practice experience will create an opportunity for nursing faculty to engage with their practice partners, creating synergy and a reciprocal relationship where they can collaborate to understand the knowledge and skill requirements for nursing graduates.

Other researchers who have examined integrating nursing informatics content within nursing curricula have suggested that faculty development is necessary (Curran, 2008; Nagle & Clarke, 2004). These researchers recommend that faculty require an opportunity to learn about and develop skills in the use of ICTs in order to prepare themselves to integrate this content within the curriculum and courses they teach. Integration of a faculty leader or champion highly skilled in the use of ICT has also been described as an important contribution to the curriculum development team (Griffen-Sobel et al., 2010; Johnson & Bushney, 2011; Nickitas et al., 2010). Therefore, consideration to hiring nursing faculty members who value curriculum development and nursing informatics topics is necessary as these individuals act as advocates for these topics within the nursing culture, and may assist others to see the value in prioritizing these activities within the faculty role.

Nursing faculty must also consider how their own values, beliefs, and assumptions about nursing shape the nursing education culture and the derived nursing curriculum. Faculty values and beliefs had a significant impact on the culture at the two schools as well as the enacted nursing curriculum (Iwasiw & Goldenberg, 2015). Faculty knowledge, skill, and topic preference were identified as influencing what content areas within the curriculum were given preference. Through the course concepts that faculty give priority to, they shape students' understanding of the role of the nurse. Faculty development in areas such as nursing informatics can assist faculty to make informed decisions about nursing informatics as it impacts the profession as well as how teaching and learning strategies can be integrated within the curriculum to assist students to understand this concept as integral to the way in which nurses' function and provide care.

Lastly, as resources within the schools were limited, multiple priorities and values created competition for resources. Incorporating curriculum development activities related to nursing informatics into the schools values would ensure that appropriate resources are available to support curriculum development opportunities in this area. It was evident that when a value was tied to a strategic goal, resources were allocated to support achievement of the goal. For example, strategic goals within academic institutions promoted the use of ICTs for facilitating course and academic communications. Furthermore, resources were made available to support the purchasing of technology and training for these purposes. Incorporating a value for nursing informatics competencies into the strategic goals of each of the schools would enhance the availability of resources to support student learning in this area.

This study has a number of limitations. The findings from this study may lack transferability because each school of nursing has a unique culture which impacts the programs offered. In addition, despite being an outsider to the collaborative nursing program, the researcher's familiarity with the schools of nursing and their members may have influenced the interpretations made as well as the information provided by participants throughout the interview process. However, familiarity with the two schools of nursing benefited to the data collection procedures as it allowed the researcher to conduct a focused ethnography. Without an in-depth and specialized understanding of the study setting, it would have been difficult to focus the data collection procedures on aspects of the culture which impact the research aims. Finally, the participants interviewed may not have represented the full range of experiences and perceptions of the educational culture studied. In particular, difficulty in recruiting student participants may limit understanding from the student perspective.

Conclusion

Nursing informatics is an important concept to include within curriculum in order to prepare new graduates for practice. Knowledge and skill in nursing informatics will prepare nurses to effectively communicate and manage health-related information such that they can best meet the needs of their patients. Since nursing graduates are currently entering the practice setting with limited knowledge and skill in this area, attention to how the culture of a school of nursing is impacting the selection of curricular content is essential to ensure that graduates are prepared with the necessary competencies to function in the current and future healthcare arena. This is the first study to the researcher's knowledge that has examined the influence of culture on the inclusion of nursing informatics within an undergraduate nursing curriculum. External system cultures, the two schools of nursing systems, the faculty culture subsystem, and the resources subsystem had an important influence on the curriculum development process, the inclusion of nursing informatics into undergraduate curriculum, as well as the developed and enacted culture of the collaborative program. Faculty need to consider what drives the derived values and priorities established within the schools of nursing cultures. In addition, attention needs to be given to developing commitment and priority to curriculum development and the topic of nursing informatics within the nursing education culture and in the values system members. This may be facilitated through providing opportunity and incentive for faculty to engage in faculty development in nursing informatics, engaging faculty in professional practice opportunities, and committing the financial resources to support curricular integration. As faculty are the leaders in curriculum development, they must feel empowered to make informed decisions about which nursing informatics competencies are essential skills required for the new graduate nurse.

References

Ajjawi, R., & Higgs, J. (2007). Using hermeneutic phenomenology to investigate how experienced practitioners learn to communicate clinical reasoning. *The Qualitative Report*, 12, 612-638.

Ansari, S. (2004). *Systems Theory and Management Control.* Retrieved from http://faculty.darden.virginia.edu/ansaris/systems%20theory%20and%20mcs-tn.pdf

Aronson, J. (1994). A pragmatic view of thematic analysis. *The Qualitative Report*, 2, 1, 1.

Barton, A., & Skiba, D. (2009). Informatics curriculum integration for quality and safety education for nurses. *Studies in Health Technology & Informatics.*146, 593-597.

Bosley, C. (2005). Organizational culture and student empowerment in baccalaureate nursing programs (Doctoral dissertation). Retrieved from Dissertation and Theses database (UMI Number: 3197067)

CASN. (2012). *Nursing informatics entry-to-practice competencies for registered nurses*. Retrieved from http://www.casn.ca/vm/newvisual/attachments/856/Media/NursingInformaticsEntryToPracticeCompetenciesFINALENG.pdf

Connors, H., Warren, J., & Weaver, C. (2007). HIT plants SEEDS in healthcare education. *Nursing Administration Quarterly.* 31, 129-133.

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *Nursing Clinics in North America.* 43, 523-533. doi: 10.1016/j.cnur.2008.06.001

Fetter, M. (2008). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Fauchald, S. (2008). An academic-industry partnership for advancing technology in health science education. *Computers, Informatics, Nursing.* 26, 4-8.

Fetter, M. (2009a). Curriculum strategies to improve baccalaureate nursing information technology outcomes. *Journal of Nursing Education*, 48, 78-85.

Fetter, M. (2009b). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Gormley, D., & Kennerly, S. (2010). Influence of work role and perceptions of climate on faculty and organizational commitment. *Journal of Professional Nursing*, 26, 108-115.

Guba, E., & Lincoln, Y. (1989). *Fourth generation evaluation*. Newbury Park: Sage Publications.

Griffin-Sobel, J., Acee, A., Sharoff, L., Cobus-Kuo, L., Wookstock-Wallace, A., & Dornbaum, M. (2010). A transdisciplinary approach to faculty development in nursing education technology. *Nursing Education Perspectives*, 31, 41-44.

Iwasiw, C., & Goldenberg, D. (2015). *Curriculum development in nursing education (3rd ed.).* Burlington, MA: Jones and Bartlett Learning.

Iwasiw, C., Goldenberg, D., & Andrusyszyn, M. (2009). *Curriculum development in nursing education* (2nd ed.). Sudbury, MA: Jones and Bartlett.

Johnson, B. (2009). Empowerment of nurse educators through organizational culture. *Nursing Education Perspectives*, 30, 8-13.

Johnson, D., & Bushney, T. (2011). Integrating the Academic Electronic Health Record into Nursing Curriculum: Preparing Student Nurses for Practice. *Computers, Informatics, Nursing*, 29, 133-137. doi: 10.1097/NCN.0b013e3182121ed8

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*, 1-11.

Latta, G. (2009). A Process Model of Organizational Change in Cultural Context (OC3 Model): The Impact of Organizational Culture on Leading Change. *Journal of Leadership and Organizational Studies*, 16, 19-37. doi: 10.1177/1548051809334197

Leiker, T. (2011). Cultural characteristics of a nursing education center of excellence: A naturalistic inquiry case study (Doctoral dissertation). Retrieved from *Dissertation & Theses database* (UMI Number: 3457559)

Matthews, J. (2012). *The role of professional organizations in advocating for the nursing profession*. Retrieved from. http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-17-2012/No1-Jan-2012/Professional-Organizations-and-Advocating.html

McNish, G. (2003). The organizational culture in successful nursing programs (Doctoral dissertation). Retrieved from *Dissertations and Theses* (UMI Number: 3127177)

Meyer, L., Sternberger, C., & Toscos, T. (2011). How to implement the electronic health record in undergraduate nursing education. *American Nurse Today*, 6, 40-44. doi: 10.1111/inr.12141

Morse, J., & Richards, L. (2002). *Read Me First for a Users Guide to Qualitative Methods*. Thousands Oaks: Sage.

Nagle, L., & Clarke, H. (2004). Assessing Informatics in Canadian Schools of Nursing. *Studies in Health Technology & Informatics.* 107, 912-916.

Nickitas, D., Nokes, K., Caroselli, C., Mahon, P., Colucci, D., & Lester, R. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Plastic Surgical Nursing*, 30, 103-107. doi: 10.1097/PSN.0b013e3181ebc709

Polit, D.F., & Beck, C.T. (2008). *Nursing research: generating and assessing evidence for nursing practice (8th ed.).* Philadelphia: Lippincott.

QRS International (2014). *NVivo 10 for windows*. Retrieved from. http://www.qsrinternational.com/products_nvivo.aspx

Schriner, C. (2004). Clinical nurses transitioning into a faculty role: A cultural analysis of the nursing profession, the academic discipline of nursing, and the academic professorate (Doctoral dissertation). Retrieved from *Dissertation and Theses* (UMI Number: 3160368)

Walonick, D. (1993). *General systems theory*. Retrieve from. http://statpac.org/walonick/systems-theory.htm

Weber, D. (2004). Transforming the student nurse experience: A university integrates e-health technology into the nursing curriculum. *Patient care staffing report.* 4, 1-3.

Chapter 6 - Discussion and Conclusions

This chapter will address the conclusions of a study which used a focused ethnography guided by systems theory to explore the influence of nursing education culture on the integration of nursing informatics competencies within a collaborative nursing program curriculum. In this chapter, provided are a: summary of the study, review and discussion of study findings, examination of the implications of findings for professional practice, nurse educators, nursing education, and nursing research, review of study recommendations, and description of study limitations.

Summary of the Study

Study Purpose

The aim of this study was to understand how a collaborative program culture and the policies and procedures inherent within two schools of nursing impact the integration of nursing informatics content into an undergraduate nursing curriculum. The research questions guiding this study were:

1. In what ways does a nursing education culture (the shared values, assumptions and behaviours of two schools of nursing) and the practices and policies within the two schools of nursing affect the incorporation of nursing informatics competencies in a collaborative nursing program curriculum?
2. How is the incorporation of competencies related to nursing informatics in the collaborative program curriculum influenced by the systems and subsystems within the two schools of nursing?

3. How do the subsystems within the two schools of nursing interact to affect the incorporation of nursing informatics competencies in the undergraduate nursing curriculum?
4. In what ways do resources within these two schools influence the curriculum development process and incorporation of nursing informatics competencies within the curriculum?

Theoretical Framework

Systems theory was used as a guide to frame the study, and to inform the research questions, the data collection strategies and the interpretation of findings during data analysis. Use of systems theory allowed the two schools of nursing and collaborative nursing program to be divided into smaller systems and subsystems of study. The researcher was then able to identify how these systems and subsystems interacted and were shaped by social structures present within the nursing education environment.

Methods

A focused ethnography was employed to study the culture of a collaborative nursing program. This methodology was utilized to examine how the practices, values, and beliefs embedded within two Schools of Nursing impact and the curriculum development process and incorporation of nursing informatics competencies within it. The program under investigation was a 4-year BScN degree offered through a collaborative partnership between a university and college. Both sites were located in the same city within Ontario, had their own administrative structures, and offered other nursing programs in addition to the program under investigation.

Data was collected through participant interviews, observations, and document analysis. Interviews were conducted with faculty, support staff, and students from the collaborative nursing program. Interviews lasted approximately one hour and were guided by semi-structured interview guides (Appendix E). Observations of course content, teaching practices, student/instructor behavior, and use of ICTs occurred during class sessions, committee and course development meetings, and research presentations. Documents were obtained through communication with faculty at both sites and included: the College and University mission and vision statements, the nursing mission and vision statements, curriculum and course development committee meeting minutes, documents outlining resources and physical space available, additional content available on college and university school of nursing web pages, and curricular documents such as: program year goals, a curriculum overview, course syllabi, and course descriptions.

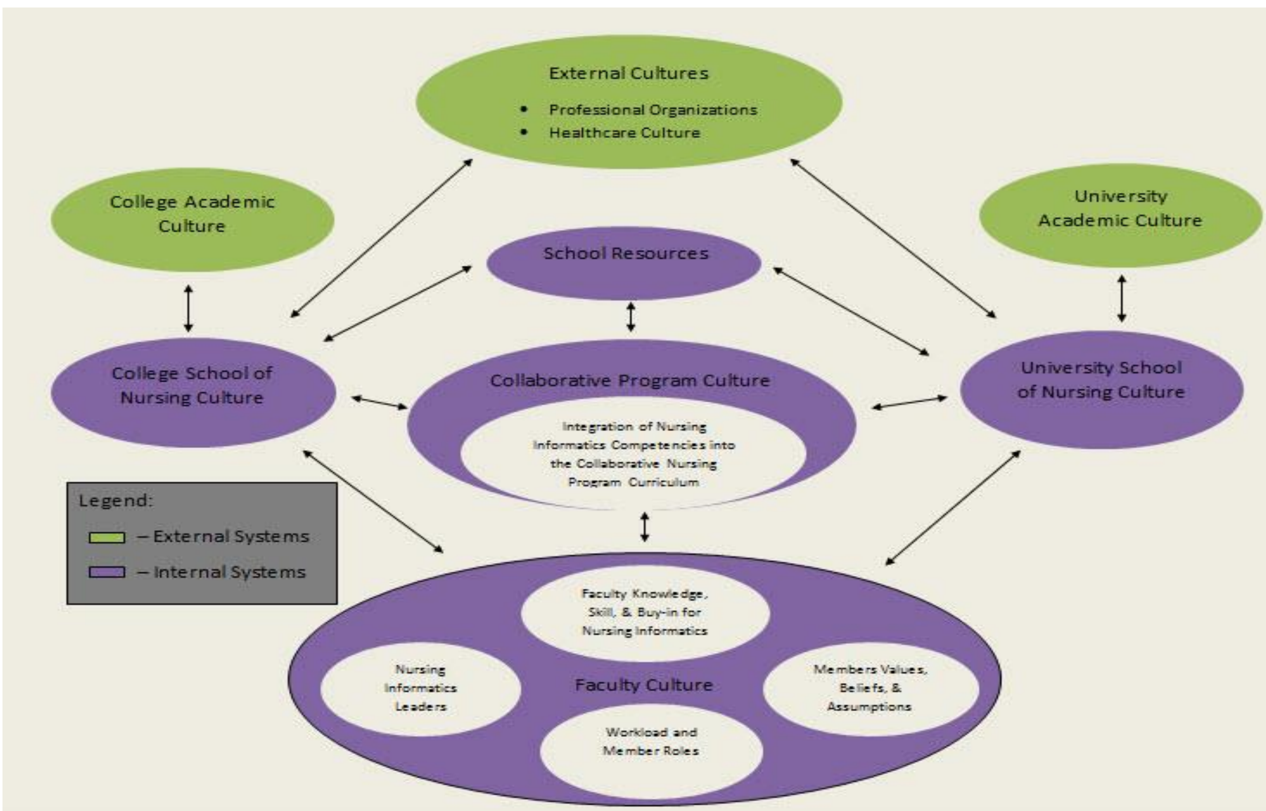
Data Analysis

All data from interviews and field notes were transcribed. All of the data obtained during data collection procedures was collected and organized in NVivo version 10 software. A thematic analysis of data from interviews, observations, and documents was conducted. Based on the interpretation of findings, a diagram was developed to describe the relationship between and amongst the systems and subsystems of the educational environment and collaborative nursing program in relation to integrating nursing informatics content within the curriculum (Figure 2).

Findings and Discussion

There is a complex set of relationships that the collaborative nursing program had with the external environments and with the two schools of nursing in which it is situated. These external and internal systems and subsystems had a significant influence on how values, beliefs, and priorities within the collaborative program were determined and this ultimately influenced the selection of curricular content. Figure 2 illustrates how the systems and subsystems interacted to influence the collaborative program curriculum.

Figure 2



External Cultures

This was the first study to researcher's knowledge to conceptualize how each of the two schools of nursing was impacted by the external systems of professional organizations, the healthcare culture, and the academic culture. Members of the healthcare and professional organizations, external system cultures serve as leaders within the nursing profession as they articulate nursing values, practice standards, and social policies (Matthews, 2012). These external systems had a wealth of knowledge and influence over determining healthcare trends as well as developing guidelines for nursing care best practices. Priority content areas suggested by these two external systems, such as in best practice guidelines, were frequently examined to support curriculum development efforts.

Similarly, the external system cultures of the College and University also had an influence over the development of values, beliefs, and priorities within these two schools of nursing and the collaborative nursing program. As each school site was situated within a larger academic system, the beliefs, values, and assumptions held by the university and college systems impacted the schools and programs that were contained within them. Activities within the academic environment which were identified as promoting external recognition and enhancing the status of the schools and faculty members within the academic community were given priority within the faculty role. Consequently, less emphasis and prestige was placed on activities related to curriculum development and teaching.

No research literature was found which examined the relationship between nursing education and its external environments of the healthcare culture, professional organizations, or the academic culture. However, one unique finding of this study was that nursing education looked to these organizations to support the development and enactment of their nursing culture and curriculum. A reason why nurse educators look to professional organizations for support with determining values, beliefs, and priorities for their schools as well as for the selection of curricular content may be the inextricable link between the mission and objectives of these professional organizations and those of the undergraduate collaborative nursing program. Specifically, the College of Nurses of Ontario (CNO), the Registered Nurses Association of Ontario (RNAO), and the Canadian Nurses Association (CNA) aim to promote excellence in nursing practice, facilitate enhanced health outcomes for the public, as well as advocate for the public and the healthcare system (CNA, 2014; CNO, 2012; RNAO, *N.D.*). Similarly, the Canadian Association of Schools of Nursing (CASN) aims to lead nursing education and scholarship through establishing standards of excellence for nursing education, promoting the advancement of nursing knowledge, facilitating the integration of theory, research, and practice, as well as contributing to public policy (CASN, 2014). These organizations have specifically been developed to provide guidance and direction to the profession of nursing. They serve to advocate for nurses and the public in an effort to maintain high quality nursing care.

The authority that these governing bodies have in influencing nursing education can be identified when considering how the CNO has established requirements for entry-to-practice within Ontario. The CNO is responsible for administering the NCLEX-RN exam. Passing of this licensure exam is a requirement for any nurse who wishes to practice within the province of Ontario. Consequently, pass rates on the licensure exam are considered an indicator within nursing education that education programs are adequately preparing graduates for the Ontario healthcare environment. Accordingly, nursing education cannot be separated from the professional organizations concerned with nursing. To segregate nursing education from the larger profession may result in educational programs which do not align with the goals, missions, and aims of the profession of nursing for which they are preparing graduates.

Similarly, schools of nursing align with the vision and missions of their academic institutions in addition to professional governing bodies, as schools of nursing aim to develop high quality nursing professionals through providing exceptional learning experiences (School of Nursing Websites at the College and University). Accordingly, in order to achieve a high quality educational environment, schools of nursing cannot be separated from their respective academic institution. The school of nursing can be viewed as a subsystem within the greater academic culture. Therefore, aligning with the academic institutional values and priorities ensures faculty within the schools of nursing are able to preserve the vision and mission of the university or college in which they function, and maintain a quality educational environment within their school for the students in which they serve. Aligning with the larger academic institution may also contribute to securing resources from the College or University which are necessary and required to run the nursing programs offered.

Internal Cultures

In addition to the external cultures, internal systems of the two schools of nursing, the faculty culture, and school resources affected the collaborative program culture and curriculum.

Cultures of the Schools of Nursing.

The cultures of the two schools of nursing reflected an overarching set of values, beliefs, and priorities which guided decision-making and the allocation of resources to the collaborative program. It was evident that the use of information communication technologies (ICT) to support the practice of nursing was not a priority within the existing nursing curriculum. Although this content was being incorporated and considered during the development of the revised curriculum, the existing curriculum primarily focused on informatics competencies which related to information literacy. Collaborative program courses and learning activities required student to learn how to: perform literature searches and critically evaluate sources of evidence, assist patients to evaluate sources of health-related information, understand the benefits and functions of ICTs within our healthcare environment, and utilize ICTs available within the professional practice setting (electronic information retrieval systems, electronic blood pressure machines, online databases, and information retrieval systems).

The curriculum development process was an important factor in creating awareness for the topic of nursing informatics. The curriculum development process facilitated reevaluation of the culture of the two schools of nursing and collaborative program and the development of new priorities and curricular focus. Engaging in curriculum development provided an opportune time for faculty to gain a current perspective on the trends in healthcare and to prioritize subject areas that may not have been previously considered, such as a stronger emphasis on nursing informatics. Faculty members' recommendations for including nursing informatics within the revised curriculum were also supported by the publication of the *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* by the CASN (2012). This document developed by the Canadian Accrediting body, advocated for the inclusion of nursing informatics competencies within undergraduate nursing curricula and supported nurse educators in the selection of nursing informatics competencies. As part of the curriculum development process, resources were also negotiated to support the revised curriculum priorities; in relation to nursing informatics, faculty teaching time and environmental space were allocated for the development and implementation of small class sizes for a standalone health informatics course within nursing.

The limited nursing informatics educational strategies within the existing collaborative program curriculum is similar to findings available in the literature where researchers have identified that graduate nurses in Canada and the United States are entering the workforce without the knowledge and skill to effectively use informatics competencies in the delivery of patient care (Fetter, 2008, 2009b; Nagle & Clarke, 2004; Thompson & Skiba, 2008). The lack of planned nursing informatics educational initiatives within these schools of nursing may in part be contributed to the lack of nursing informatics guidelines available to support nurse educators as they plan and integrate this content into their curricula. The development of the *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* (CASN, 2012) may have supported faculty throughout the curriculum development process. This document not only described nursing informatics learning needs for novice nurse graduates but also made evident the importance that CASN, an accrediting organization, had placed on this area of student learning.

It is not surprising that engaging in the curriculum development process provided faculty within these two schools of nursing an opportunity to reflect on current and future trends within the healthcare environment and consider the importance of integrating nursing informatics as a major concept within the collaborative nursing program curriculum. This finding is supported by literature in which experts have suggested that engaging in curriculum development facilitates reevaluation of the culture of a school of nursing to consider the development of new priorities and curricular focus (Iwasiw & Goldenberg, 2015; Uys & Gwele, 2005). The activity of reevaluating the existing culture and curriculum and constructing new priorities and curricular focus aligns with the Organizational Change in Cultural Context Model (OC^3).

The OC^3 model is a model for change which suggests that organizational change and culture have a significant impact on one another (Latta, 2009). To create member commitment to a proposed change, faculty within schools of nursing needed to align the change with the current and espoused institutional culture (Iwasiw & Goldenberg, 2015; Latta, 2009). It would appear that through engaging in the process of curriculum development, faculty were able to develop commitment for nursing informatics as a topic by aligning this topic to the achievement of the schools of nursing missions and program goals, as well as to the profession by considering how nursing informatics technology enhances the quality of care provided. Through advocating for the topic of nursing informatics by key nursing faculty and aligning it within the visions, mission, and program goals of the schools and collaborative program curriculum, nursing informatics was incorporated as a major concept within this concept-based curriculum.

Faculty Culture.

Within the faculty culture, faculty knowledge and skill in relation to nursing informatics (NI), members' values, beliefs, and assumptions in relation to NI, faculty workload and member roles, and the availability of NI leaders, impacted the value and priority developed for NI within the collaborative program culture. Faculty knowledge and skill in relation to nursing informatics was limited. Many individuals did not have a clear conceptualization of the scope of nursing informatics concepts, viewing nursing informatics competencies primarily as information literacy skills and the use of computers in nursing.

Members at the schools of nursing had their own beliefs, values, and assumptions about the world as well as the profession of nursing and these became encompassed within the two schools cultures as well as in the written and enacted collaborative program curriculum. The presence of faculty with a vested interest in informatics was integral to creating support for this topic in the revised curriculum. In addition, the presence of nursing informatics leaders was also an essential part of integrating nursing informatics competencies within the undergraduate curriculum. Nursing informatics leaders were considered experts and had influence over which informatics competencies were selected and where within the curriculum they were taught to students. Nursing informatics leaders were also able to negotiate and secure a voice for this topic as well as assist in protecting available resources to support the teaching of this content area.

These findings align with those published in the literature. Other researchers have also identified that lack of faculty knowledge and skill in the area of nursing informatics as well as the presence of a nursing informatics leader were important factors impacting whether nursing informatics competencies were integrated within a nursing curriculum (Curran, 2008; Griffen-Sobel et al., 2010; Johnson & Bushney, 2011; Meyers, Sternberger, & Toscos, 2011; Nickitas et al., 2010; Weber, 2004). It may be that the presence of individuals with a vested interest in nursing informatics served as leaders to move this agenda forward. These nursing informatics champions provided the advocacy and support necessary for faculty to consider and understand the importance of integrating nursing informatics as a topic within the revised curriculum. In addition, these champions provided support for the development and teaching of an informatics course.

School Resources.

The availability of resources significantly impacted how the two schools of nursing and their nursing programs functioned. Allocation of resources was in the control of individuals in positions of power within the school and done in an effort to achieve the schools' mission, vision, philosophy, and program goals. As external cultures shaped the cultures of the schools of nursing and the development of priorities, values, and beliefs, these external cultures had an indirect influence on how resources were allocated within the two school systems. As each school of nursing and program offered had multiple priorities, there was competition for resources.

There is no known literature which has examined a link between nursing education culture, school resources, and nursing informatics educational initiatives. A reason why external cultures may influence school resources are that many of these external cultures (e.g. ministry of health, professional governing bodies) allocate funding in support of causes that they feel are crucial to our healthcare system and to the profession of nursing. Allocating money to support the development and education of a particular area of nursing (ex. allocation of funds for purchasing of simulation equipment) may cause schools of nursing to feel an obligation to align with these external cultures in an effort to be granted the funding they offer.

Study Implications

The findings from this study advance the field of nursing education and have implications for nurse educators and nursing education, professional practice, as well as nursing research.

Nurse Educators and Nursing Education

Study findings have important implications for nurse educators and nursing education. Release time is necessary for faculty to engage in educational development in the area of nursing informatics. Unless nursing faculty have opportunities to develop nursing informatics competencies they will lack knowledge and skills to teach students about this area of nursing practice. In addition, lack of knowledge and skill in nursing informatics may lead faculty to undervalue the benefits that ICTs provide to the professional practice setting. As faculty are key players in developing students' values, beliefs, and assumptions about the profession, lack of value for nursing informatics may also result in students undervaluing nursing informatics as a topic area.

This study also has important implications for nursing administrators to consider in the development of faculty workload. Curriculum development activities need to be given higher priority and recognition within the workload of faculty and within schools of nursing and the larger academic institution. Curriculum development activities are an important scholarly contribution to the school. Faculty members need to regularly survey the healthcare environment for changes to the healthcare system and ways in which nurses' practice. Organized and planned frameworks for assessing the current healthcare context and determining necessary changes required to the nursing curriculum are needed. Implementing such a framework may facilitate a thorough understanding of the context in which nurses' practice, such that curricular revisions can be made to incorporate new and emerging trends, including the competencies required to practice nursing with the use of ICTs. Academic leaders ought to give recognition to faculty engaging in these activities so that nursing faculty give full attention and effort to engaging in curriculum development activities. Unless this happens, curriculum and faculty development activities will continue to be overshadowed by activities that bring more public recognition to the school.

Professional Practice

Schools of nursing need to recognize the importance of curriculum development activities which contribute to preparing graduates to understand and develop nursing informatics competencies. If nursing informatics competencies are not incorporated within nursing curricula, technology use within the practice environment will continue to surpass that of academia (Nagle & Clarke, 2004). Informatics technologies are continuing to evolve and become a customary component to the way in which nurses' access, manage, and communicate health related information (CNA, 2006; Canada Health Infoway, 2009). Therefore, a curriculum which does not promote the development of nursing informatics competencies will not adequately prepare graduates for the practice environment of today and in the future.

Graduates need to enter into the professional practice setting with at least a beginning understanding and capability to utilize ICTs available within agency settings. If students are not introduced to nursing informatics competencies, they may experience a sense of professional dissonance as they are required to alter the view of their practice to incorporate and value informatics technologies as a way of working and communicating

(Tsiknakis & Kouroubali, 2009; Zandieh et al., 2008). This may impact a nurse's ability to document and retrieve patient information, negatively impacting the quality of care provided to clients. In addition, because use of ICT requires an alternation in the practice workflow of the nurse, lack of knowledge and skill in nursing informatics may result in graduates having difficulty associating the use of information technologies within their role as nurses and they may not understand and value the benefits these systems offer to practice (Tsiknakis & Kouroubali, 2009).

Within the current healthcare environment, many nurse managers and healthcare agency personnel expect that students will possess ICT competency and skill when they enter the nursing workforce (Demiris & Zierler, 2010; Fetter, 2009; Hegarty et al., 2009). If students continue to be inadequately prepared in the area of nursing informatics, professional practice agencies will be required to expend additional resources and training to prepare new graduate hires to utilize nursing informatics technologies (Jones & Donelle, 2011). This will contribute to slowing the adoption and uptake of information communication technologies within professional practice as nurses may undervalue the use of these systems and the contribution they have to enhancing the quality of care provided (Latta, 2009).

Nursing Research

Opportunities to develop further knowledge and understanding through research in relation to nursing informatics curriculum development activities are needed. Firstly, research is needed which examines the Canadian nursing education context in relation to nursing education culture and curriculum. Most literature pertaining to nursing education culture and nursing informatics curriculum development strategies has been within the

American educational and healthcare context. Research in a Canadian educational context is needed to provide insight into the functioning of Canadian Schools of Nursing and to offer a description of the nursing informatics competencies being taught within Canada.

Specifically within a Canadian nursing education environment, research which builds an understanding of the institutional processes, practices, and structures within a school of nursing culture is needed. Understanding the systems of a school of nursing and how this impacts the culture and functioning of the school would provide valuable information to educators and change agents working in a nursing education environment. Additionally, research in the area of nursing education culture is needed to understand the experience of culture amongst various members of the educational unit, as well as to focus on how a particular cultural trait impacts the functioning of the school and the content taught to nursing students.

In relation to nursing informatics, research is needed to determine how to develop faculty 'buy-in' and value for the topic of nursing informatics. Research which offers a description and evaluation of faculty development initiatives is needed to provide insight for nursing informatics leaders working to prepare faculty to teach nursing informatics content. In addition, research is also required to understand the values, beliefs, and assumptions about nursing informatics that nurse graduates develop upon graduation from a nursing program which has incorporated nursing informatics competencies within the nursing curriculum. Examining the impact that integrating nursing informatics within nursing curriculum has on the culture of the professional practice setting would also provide valuable feedback about the effectiveness of provincial and undergraduate nursing informatics educational initiatives.

An exploration of what nursing informatics competencies are being taught to students in Canadian nursing education programs would be valuable, particularly now that the *Nursing Informatics Entry-to-Practice Competencies for Registered Nurses* are available to provide a guideline for this determination. Finally, qualitative and quantitative research studies are needed to evaluate nursing informatics teaching and learning strategies. Understanding student learning outcomes resulting from the use of a particular teaching and learning strategies will serve as a guide to nurse educators engaging in curriculum development activities aimed at supporting nursing informatics competencies.

Recommendations

Study findings, study implications, and the literature review give rise to recommendations for nursing education and professional practice. The recommendations are as follows:

1. Incorporate representatives from practice agencies on curriculum development teams. These individuals can work with nursing faculty to ensure that the curriculum is truly reflective of the realities of the healthcare environment.
2. Ensure inclusion of faculty on key nursing groups within professional organizations and healthcare sectors. This will provide faculty with enhanced opportunities to stay engaged in the practice of nursing. Faculty members will gain greater insight into realities of the healthcare environment and be able to advocate for curriculum revisions when appropriate.

3. Foster collaboration and communication between education and practice through joint teaching and practice appointments.
4. Ensure that the academic leaders of schools of nursing have a thorough understanding of the nursing curriculum. This will ensure that decisions in relation to resource allocation are made with considerations of the effect that resource allocation or lack of allocation will have on faculty members' ability to enact the planned curriculum.
5. Include curriculum development team leaders as key players in the decision making process in relation to resource allocation within the school. These individuals can provide important information to the academic leader of the nursing program in relation to how resource allocation will positively or negatively impact the written and enacted nursing curriculum.
6. Allocate resources to support faculty at schools of nursing to purchase the ICTs necessary to cultivate student knowledge in nursing informatics.
7. Establish a nursing informatics leader who can support curriculum and course development efforts aimed in the area of nursing informatics. The leader can advocate for nursing informatics throughout the curriculum development process as well as offer knowledge and support to faculty such that they can be adequately prepared to teach this content to students.
8. Provide funding to support release time for faculty to learn about nursing informatics. In addition, provide recognition to those who engage in faculty development in this area.

9. Establish accreditation standards which include a focus on nursing informatics competencies.
10. Advocate for government policies which grant supervised student access to ICTs within the professional practice settings, equal to nurses practicing in those settings.
11. Establish workload allocation for faculty to engage in curriculum and faculty development activities. This would support faculty to have the necessary time to consider integrating new and innovative nursing content within the nursing curriculum as well as to advance their knowledge and skill in emerging healthcare topics.
12. Cultivate a culture which values and provides recognition equally for the contributions faculty make to research, teaching, and service. Equal recognition for each of these activities will prevent faculty and curriculum development activities from becoming lost within the demands of the faculty role. This may be achieved through providing recognition and prestige to those engaging in teaching and service activities. Providing release time for faculty to engage in teaching and service activities may also demonstrate a valuing of faculty commitments to these activities.

Limitations

Findings from this study may lack transferability because each school of nursing has a unique culture which impacts the programs offered. Further, the study of a Canadian educational environment may also make the transferability of findings to schools outside of Canada difficult. Familiarity with the two schools of nursing also benefited to the data collection procedures as it allowed the researcher to conduct a focused ethnography. Without an in-depth and specialized understanding of the study setting, it would have been difficult to focus the data collection procedures on aspects of the culture which impact the research aims. Finally, the participants interviewed may not have represented the full range of experiences and perceptions of the educational culture studied, particularly in relation to the student perspective as only two students agreed to participate in interviews for this study.

Conclusion

To further understand the process of integrating nursing informatics competencies within nursing curricula, this study examined the impact that nursing education culture had on the integration of nursing informatics competencies within a collaborative nursing program curriculum. Findings from this study identified that external cultures, the school of nursing culture, the faculty culture, and resources were systems which influence the developed and enacted school and collaborative program cultures and thus ultimately influenced the extent to which nursing informatics was integrated within the nursing curriculum. Integrating nursing informatics competencies within nursing curriculum is a complex process which requires a culture which values the benefits that ICTs offer to nurses in their practice. The availability of faculty with a vested interest in and knowledge of nursing informatics concepts is integral to identifying this important area of student learning and advocating for resources to support student acquisition of these skills. Consequently, findings from this study offer suggestions to nursing faculty which can promote the development of a culture which values and supports student acquisition of nursing informatics competencies. Although nursing faculty are key agents in creating a curriculum which supports student development in the area of nursing informatics, members of the external cultures of the healthcare culture, professional organizations, as well as the academic culture are also important players in creating an environment which fosters devotion to this nursing topic. Through creating an environment which values nursing informatics competencies, nurse educators can foster the development of graduates who can effectively function within technology enabled practice settings.

References

Canada Health Infoway. (2009). *EHR vision 2015: Advancing Canada's next generation of healthcare*. Retrieved from https://www2.infoway-inforoute.ca/Documents/Vision_Summary_EN.pdf

CASN. (2012). *Nursing informatics entry-to-practice competencies for registered nurses*. Retrieved from. http://www.casn.ca/vm/newvisual/attachments/856/Media/NursingInformaticsEntryToPracticeCompetenciesFINALENG.pdf

CASN. (2014). *About CASN*. Retrieved from. http://www.casn.ca/en/CASNACESIMission_20/

CNA. (2006). *Position statement: Nursing information and knowledge management.* Retrieved from http://www.cnaaiic.ca/CNA/documents/pdf/publications/PS87-Nursing-info-knowledge-e.pdf

CNA. (2014). *About CNA*. Retrieved from. http://www.cna-aiic.ca/en/about-cna

CNO. (2012). *About the College of Nurses of Ontario*. Retrieved from. http://www.cno.org/what-is-cno/

Curran, C. (2008). Faculty development initiatives for the integration of informatics competencies and point-of-care technologies in undergraduate nursing education. *Nursing Clinics in North America*, 43, 523-533. doi:10.1016/j.cnur.2008.06.001

Demiris, G., & Zierler, B. (2010). Integrating problem-based learning in a nursing informatics curriculum. *Nurse Education Today*, 30, 175-179.

Fetter, M. (2008). *Graduating nurses' self-evaluation of information technology competencies*. *Journal of Nursing Education*, 48, 86-90.

Fetter, M. (2009). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48, 86-90.

Fetter, M. (2009b). Improving information technology competencies: Implications for psychiatric mental health nursing. *Issues in Mental Health Nursing*, 30, 3-13. doi: 10.1080/01612840802555208

Griffin-Sobel, J., Acee, A., Sharoff, L., Cobus-Kuo, L., Wookstock-Wallace, A., & Dornbaum, M. (2010). A transdisciplinary approach to faculty development in nursing education technology. *Nursing Education Perspectives*, 31, 41-44.

Hegarty, J., Walsh, E., Condon, C., & Sweeney, J. (2009). The undergraduate education of nurses: Looking to the future. *International Journal of Nursing Education Scholarship*, 6, 1-10.

Iwasiw, C., Goldenberg, D., & Andrusyszyn, M. (2009). *Curriculum development in nursing education (2nd ed.).* Sudbury, MA: Jones and Bartlett.

Johnson, D., & Bushney, T. (2011). Integrating the academic electronic health record into nursing curriculum: Preparing student nurses for practice. *Computers, Informatics, Nursing*, 29, 133-137. doi: 10.1097/NCN.0b013e3182121ed8

Jones, S., & Donelle, L. (2011). Assessment of electronic health record usability with undergraduate nursing students. *International Journal of Nursing Education Scholarship*.8, 1-18. doi: 10.2202/1548-923X.2123

Matthews, J. (2012). *The role of professional organizations in advocating for the nursing profession*. Retrieved from. http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-17-2012/No1-Jan-2012/Professional-Organizations-and-Advocating.html

Nagle, L., & Clarke, H. (2004). Assessing Informatics in Canadian Schools of Nursing. *Studies in Health Technology & Informatics.* 107, 912-916.

Nickitas, D., Nokes, K., Caroselli, C., Mahon, P., Colucci, D., & Lester, R. (2010). Increasing nursing student communication skills through electronic health record system documentation. *Plastic Surgical Nursing*, 30, 103-107. doi: 10.1097/PSN.0b013e3181ebc709

Latta, G. (2009). A process model of organizational change in cultural context (OC3 model): The impact of organizational culture on leading change. *Journal of Leadership and Organizational Studies*, 16, 19-37. doi: 10.1177/1548051809334197

Meyer, L., Sternberger, C., & Toscos, T. (2011) How to implement the electronic health record in undergraduate nursing education. *American Nurse Today*, 6, 40-44. doi: 10.1111/inr.12141

RNAO. (*n.d.*). *About RNAO*. Retrieved from. http://rnao.ca/about

Tsiknakis, M., & Kouroubali, A. (2009). Organizational factors affecting successful adoption of innovative ehealth services: A case study employing the FITT framework. *International Journal of Medical Informatics*, 78, 39-52.

Thompson B., & Skiba D. (2008). Informatics in the nursing curriculum: A national survey of nursing informatics requirements in nursing curricula. *Nursing Education Perspectives*, 29, 312-317.

Uys, L., & Gwele, N. (2005). *Curriculum development in nursing process and innovation.* New York: Routledge Taylor & Francis Group.

Weber, D. (2004). Transforming the student nurse experience: A university integrates ehealth technology into the nursing curriculum. *Patient care staffing report.* 4, 1-3.

Zandieh, S., Flannery, K., Kuperman, G., Daniel, J., Langsam, B., Hyman, D., & Kaushal, R. (2008). Challenges to HER implementation in electronic- versus paper-based office practices. *Journal of General Internal Medicine*, 23, 755-761. doi: 10.1007/s11606-008-0573-5

Appendices

Appendix A

Nursing Informatics Entry-To-Practice Competencies for Registered Nurses

http://www.casn.ca/2014/12/nursing-informatics-entry-practice-competencies-registered-nurses-2/

CASN. (2012). Nursing informatics entry-to-practice competencies for registered nurses. Retrieved from http://www.casn.ca/2014/12/nursing-informatics-entry-practice-competencies-registered-nurses-2/

Appendix B

Ethics Approval

Research Western

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Carroll Iwasiw
File Number:102670
Review Level: Delegated
Approved Local Adult Participants:0
Approved Local Minor Participants:0
Protocol Title: An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies
Department & Institution: Health Sciences\Nursing,Western University
Sponsor:
Ethics Approval Date: July 17, 2012 **Expiry Date:**December 31, 2013
Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Western University Protocol		
Letter of Information	To the Director	
Letter of Information	To Faculty	
Letter of Information	To Information Technology Personnel	
Letter of Information	To Students	
Other	Semi-Structured Interview Guide for Nursing Students	
Other	Semi-Structured Interview Guide for Information Technology Personnel	
Other	Consent Form	
Other	Telephone Contact of Participants to Recruit	

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The HSREB is registered with the U.S. Department of Health & Human [redacted]umber IRB 00000940.

Ethics Officer to Contact for Further Information

___ Janice Sutherland (jsutherl@uwo.ca)	✓ Grace Kelly (grace.kelly@uwo.ca)	___ Shantel Walcott (swalcot@uwo.ca)

This is an official document. Please retain the original in your files.

The University of Western Ontario
Office of Research Ethics
Support Services Building Room 5150 • London, Ontario • CANADA - N6G 1G9
PH: 519-661-3036 • F: 519-850-2466 • ethics@uwo.ca • www.uwo.ca/research/ethics

Appendix C

Letters of Information (Academic Leader)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

Dear (Administrative Leader),

I am a PhD student at the Arthur Labatt Family School of Nursing at Western University. I am writing to request your approval to conduct my PhD dissertation research about the incorporation of nursing informatics within the four-year baccalaureate undergraduate nursing curriculum at your School of Nursing. The purpose of this research is to analyze the School of Nursing as a whole to identify how various aspects of the school interact to shape the curriculum development process and how nursing informatics has been embedded and used within the nursing curriculum. Through an integrated analysis of the school of nursing, facilitators and constraints that impact this issue will be uncovered. I am being supervised in this research by Dr. Carroll Iwasiw and Dr. Lorie Donelle from Western University.

My research will specifically focus on the four-year baccalaureate nursing program. In order to conduct my study, I am requesting permission to observe classroom experiences where content pertaining to nursing informatics is taught, ask BScN faculty, students, and staff to participate in interviews, and have access to curricular documents (program philosophy, mission and year goals, course syllabi, course content, and school policies and procedures). This study may identify school policies, practices, and procedures that act as either barriers or facilitators to incorporating informatics technology within the undergraduate nursing curriculum. Therefore, site visits to school computer and simulation labs will be necessary to identify the infrastructure required to promote student learning of this content. Document analysis and interviews with students, faculty, and staff will identify policies, practices, values, and beliefs that hinder or facilitate the incorporation of this content into the curriculum.

Additionally, I am asking you as the academic leader to participate in an individual, tape-recorded interview. If you participate in this interview, you will be asked about how nursing informatics has been incorporated into the nursing curriculum. I will ask you about the culture of the school of nursing and how this impacts the written and enacted nursing curriculum. The interview will last approximately one hour and will be held at a time convenient for you and in a private location at your academic institution, or alternatively, on the telephone. A follow-up interview may also be necessary to discuss the research findings, and assist in the interpretation of results.

You will indicate your consent to participate in the study by completing a consent form at the time of the interview. I am attaching the letters of information to faculty, students, and information technology staff. In the letters, the study purpose, benefits and risks, and the voluntary nature of participation are explained. If you agree to my interviewing these people, I will request that you identify potential individuals who meet my inclusion criteria, and provide me with permission to obtain these individuals' email addresses and, where available, campus telephone numbers. Additionally, I would request that you provide me with permission for your administrative assistant or designate to circulate the letter of information about the study to students in their 4th year in the BScN program at your school.

Participation in this study is voluntary. All data will be reported as grouped data with no disclosure of the name of the academic institution or any identifying information. All data will be destroyed after five years. There are no known risks or benefits associated with this study. Anytime during the study, you can contact the primary investigator, Stephanie Jones, or one of the research supervisors to answer any questions or concerns you have about the study. You can also contact the Western University Office of Research Ethics at (phone number) or by email at (email address) if you have any questions about your rights as a research participant or the conduct of the research. Representatives of the Western University Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Thank you in advance for your consideration of this request. Should you require further information, please do not hesitate to contact me. Please retain a copy of this letter for your records.

Sincerely,

Stephanie Jones	**Dr. Carroll Iwasiw**	**Dr. Lorie Donelle**
RN, BScN	EdD, RN	PhD, RN
PhD Candidate	Professor,	Assistant Professor
Western University	Western University	Western University

Letter of Information (Academic Leader)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

Dear (Academic Leader),

I am a PhD student at the Arthur Labatt Family School of Nursing at Western University. I am writing to request your approval to conduct my PhD dissertation research about the incorporation of nursing informatics within the four-year baccalaureate undergraduate nursing curriculum at your School of Nursing. The purpose of this research is to analyze the School of Nursing as a whole to identify how various aspects of the school interact to shape the curriculum development process and how nursing informatics has been embedded and used within the nursing curriculum. Through an integrated analysis of the school of nursing both at (names institutions), facilitators and constraints that impact this issue will be uncovered. I am being supervised in this research by Dr. Carroll Iwasiw and Dr. Lorie Donelle from Western University.

My research will specifically focus on the four-year baccalaureate nursing program. In order to conduct my study, I am requesting permission to ask BScN faculty to participate in interviews, and have access to curricular documents (program philosophy, mission and year goals, course syllabi, course content, and school policies and procedures). This study may identify school policies, practices, and procedures that act as either barriers or facilitators to incorporating informatics technology within the undergraduate nursing curriculum. Document analysis and interviews with faculty will identify policies, practices, values, and beliefs that hinder or facilitate the incorporation of this content into the curriculum.

Interviews will ask faculty about how nursing informatics has been incorporated into the nursing curriculum. They will also be asked about the culture of the school of nursing and how this impacts the written and enacted nursing curriculum. The interview will last approximately one hour and will be held at a convenient time and in a private location at your academic institution, or alternatively, on the telephone. A follow-up interview with some faculty may also be necessary to discuss the research findings, and assist in the interpretation of results.

I am attaching the letters of information to faculty. In the letters, the study purpose, benefits and risks, and the voluntary nature of participation are explained. If you agree to my interviewing these people, I will request that you identify potential individuals who meet my inclusion criteria, and provide me with permission to obtain these individuals' email addresses and, where available, campus telephone numbers.

Participation in this study is voluntary. All data will be reported as grouped data with no disclosure of the name of the academic institution or any identifying information. All data will be destroyed after five years. There are no known risks or benefits associated with this study. Anytime during the study, you can contact the primary investigator, Stephanie Jones, or one of the research supervisors to answer any questions or concerns you have about the study. You can also contact the Western University Office of Research Ethics at (phone number) or by email at (email address) if you have any questions about your rights as a research participant or the conduct of the research. Representatives of the Western University Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Thank you in advance for your consideration of this request. Should you require further information, please do not hesitate to contact me. Please retain a copy of this letter for your records.

Sincerely,

Stephanie Jones
RN, BScN
PhD Candidate
Western University

Dr. Carroll Iwasiw
EdD, RN
Professor
Western University

Dr. Lorie Donelle
PhD, RN
Assistant Professor,
Western University

Letter of Information (Faculty)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

I am a PhD student at the Arthur Labatt Family School of Nursing at Western University, under the supervision of Dr. Carroll Iwasiw and Dr. Lorie Donelle. I am requesting your participation in a study entitled: *An Exploration of the Influence of Cultural Practices within the School of Nursing on Student Acquisition Nursing Informatics Competencies.* The purpose of this research is to analyze the School of Nursing as a whole to identify how various aspects of the school interact to shape the curriculum development process and how nursing informatics has been embedded and used within the four-year baccalaureate undergraduate nursing curriculum. Through an integrated analysis of the school of nursing, facilitators and constraints that impact this issue will be uncovered.

I am asking you to participate in this study because the incorporation of nursing informatics competencies within the undergraduate nursing curriculum is not prominent in schools of nursing in Canada. As a faculty member within a Canadian school of nursing, you may provide insight into the curriculum development process and describe how nursing informatics has become incorporated within your school of nursing curriculum. Through conducting an analysis of how your school of nursing has incorporated and facilitated student development in this area may provide direction to other schools of nursing in Canada about how to best facilitate this curriculum development endeavour.

If you volunteer to participate in this study, you will be asked to participate in an individual in-depth interview. In the tape-recorded interview, you will be asked about how nursing informatics has been incorporated into the undergraduate nursing curriculum. Additionally, you will be asked about the culture at the school of nursing as it relates to nursing informatics, and how this impacts the nursing curriculum and the curriculum enacted. The interview will last approximately one hour and will be held at a time and private location, convenient to you, at your academic institution, or alternatively, on the telephone. A follow-up interview may also be necessary discuss the research findings, and assist in the interpretation of results.

Participation in this study is voluntary and no one will be informed of participation or non-participation. You may refuse to participate, as well as refuse to answer any questions. Participation or non-participation in this study will have no effect on your employment. Only the research team will have access to the data. All data will be reported as grouped data with no disclosure of your identity or place of employment. All data will be destroyed after five years. There are no known risks or benefits associated with this study. You will indicate your consent to participate in the study by completing a consent form at the time of the interview.

At anytime during the study, you can contact the primary investigator, Stephanie Atthill, or one of the research supervisors, to answer any questions or concerns you have about the study. You can also contact the Western University Ontario Office of Research Ethics at (phone number) or by email at (email address) if you have any questions about your rights as a research participant or the conduct of the research. Representatives of the Western University Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Should you wish to participate in this study, please contact Stephanie Atthill at (email address) or (telephone number). Please keep a copy of this letter for your records.

Sincerely

Stephanie Jones
RN, BScN
PhD Candidate
Western University

Dr. Carroll Iwasiw
EdD, RN
Professor
Western University

Dr. Lorie Donelle
PhD, RN
Assistant Professor,
Western University

Letter of Information (Information Technology Staff)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

I am a PhD student at the Arthur Labatt Family School of Nursing. I am requesting your participation in a study entitled: *An Exploration of the Influence of Cultural Practices within the School of Nursing on Student Acquisition Nursing Informatics Competencies.* The purpose of this research is to analyze the School of Nursing as a whole to identify how various aspects of the school interact to shape the curriculum development process and how nursing informatics has been embedded and used within the four-year baccalaureate undergraduate nursing curriculum. Through an integrated analysis of the school of nursing, facilitators and constraints that impact this issue will be uncovered. This study involves in-depth interviews, class and laboratory observations and document analysis.

If you volunteer to participate in this study, you will be asked to participate in an individual in-depth interview. In the individual, tape-recorded interview, you will be asked how you have worked with the school of nursing to incorporate information communication technology (ICT) into school computer laboratories. Additionally, you will be asked about the culture at the school of nursing in relation to using this technology. I will be interested in any experiences where you have assisted faculty to prepare to utilize this technology The interview will last approximately one hour and will be held at a convenient time and private location at your academic institution or alternatively on the telephone. A follow-up interview may also be necessary to interpret and discuss the research findings, and assist in the interpretation of results.

Participation in this study is voluntary and no one will be informed of whether or not you have participated in this study. You may refuse to participate, as well as refuse to answer any questions. Your employer and the school of nursing academic leader will not know whether or not you have participated. Participation or non-participation in this study will have no effect on your employment. Only the research team will have access to the data. All data will be reported as grouped data with no disclosure of your identity or place of employment. All data will be destroyed after five years. There are no known risks or benefits associated with this study. You will indicate your consent to participate in the study by completing a consent form at the time of the interview.

At anytime during the study, you can contact the primary investigator, Stephanie Jones, or one of the research supervisors, to answer any questions or concerns you have about the study. You can also contact the Western University Ontario Office of Research Ethics at (phone number) or by email at (email address) if you have any questions about your rights as a research participant or the conduct of the research. Representatives of the Western University Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Should you wish to participate in this study, please contact Stephanie Jones at (email address) or (telephone number). Please keep a copy of this letter for your records.

Sincerely

Stephanie Jones
RN, BScN
PhD Candidate
Western University

Dr. Carroll Iwasiw
EdD, RN
Professor
Western University

Dr. Lorie Donelle
PhD, RN
Assistant Professor
Western University

Letter of Information (Students)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

I am a PhD student at the Arthur Labatt Family School of Nursing under the supervision of Dr. Carroll Iwasiw and Dr. Lorie Donelle. I am requesting your participation in a study entitled: *An Exploration of the Influence of Cultural Practices within the School of Nursing on Student Acquisition Nursing Informatics Competencies.* The purpose of this research is to analyze the School of Nursing as a whole to identify how various aspects of the school interact to shape the curriculum development process and how nursing informatics has been embedded and used within the four-year baccalaureate undergraduate nursing curriculum. Specifically, you are being asked to participate because as a student progressing through the program, you will provide valuable insight into how technology and nursing informatics has been taught. Through an integrated analysis of the school of nursing, facilitators and constraints that impact this issue will be uncovered. This study involves in-depth interviews, class and laboratory observations and document analysis.

If you volunteer to participate in this study, you will be asked to participate in an individual in-depth interview, or a field visit observation, or both. If you are asked to participate in an individual, tape-recorded interview, you will be asked about your perspective of how nursing informatics has been incorporated into the undergraduate nursing curriculum. Additionally, you will be asked about the culture at the school of nursing in relation to using these technologies. Your perceptions about your knowledge and skill level in relation to using this technology will also be explored. The interview will last approximately one hour and will be held at a convenient time convenient to you and in a private location at your academic institution, or alternatively, on the telephone. A follow-up interview may also be necessary to interpret and discuss the research findings, and assist in the interpretation of results.

You may also be asked to give consent to field visit observations by the researcher. This means the researcher will be present during a nursing classroom, computer or simulation laboratory learning experience. Observations will focus on identifying how competency about nursing informatics are integrated into the curriculum and taught to students. Informal interviews during the observations will be recorded for data analysis purposes.

Participation in this study is voluntary and no one will be informed of whether or not you have participated in this study. You may refuse to participate, as well as refuse to answer any questions. The academic leader and faculty members of your academic institution will not know whether or not you have participated. Participation or non-participation in this study will have no effect on your student status or grades. Only the research team will have access to the data. All data will be reported as grouped data with no disclosure of your identity. All data will be destroyed after five years. There are no known risks or benefits associated with this study. You will indicate your consent to participate in the study by completing a consent form at the time of the interview or clinical observation.

At anytime during the study, you can contact the primary investigator, Stephanie Atthill, or one of the research supervisors, to answer any questions or concerns you have about the study. You can also contact the Western University Ontario Office of Research Ethics at (phone number) or by email at (email address) if you have any questions about your rights as a research participant or the conduct of the research. Representatives of the Western University Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Should you wish to participate in this study, please contact Stephanie Atthill at (email address) or (telephone number). Please keep a copy of this letter for your records.
Sincerely

Stephanie Jones	**Dr. Carroll Iwasiw**	**Dr. Lorie Donelle**
RN, BScN	EdD, RN	PhD, RN
PhD Candidate	Professor	Assistant Professor,
Western University	Western University	Western University

Appendix D

CONSENT FORM

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Name (please print):

Signature: Date:

Name of Person Obtaining Informed Consent:

Signature of Person Obtaining Informed Consent:

Date:

Appendix E

Semi-Structured Interview Guide (Academic Leaders)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

Nursing informatics is defined as a “science and practice [which] integrates nursing, its information and knowledge, and their management, with information and communication technologies to promote the health of people, families and communities worldwide” (IMIA, 2010).

1. How would you describe the value that faculty and students give to ICT (health information systems) use in the clinical practice settings?
   a. Can you give me a couple of examples that lead you to say that?
   b. What are your thoughts about where these values come from?
   c. How receptive or resistant are faculty about incorporating ICT within the nursing curriculum?
   d. How do the school of nursing mission, vision and philosophy related to this area? How are they supportive of facilitating student development in this area?
2. Where do these values stem from?
   a. Can you explain how faculty and student values towards the use of this technology may differ from one another?
   b. Can you explain how there may or may not be the presence of resistance from faculty to incorporate this content into the undergraduate curriculum?
   c. Why are some faculty resistant to incorporating this content into the curriculum?

3. How does the culture within the academic institution value the use of ICT such as the EHR?
   a. Could you describe the school of nursing culture?
   b. What practices and policies within your school demonstrate valuing or devaluing of ICT and EHR technologies?
   c. How is the school culture communicated and enacted to new faculty and students?

4. What skills in relation to utilizing basic computer systems (Personal computers, hand-held devices, tablets, workstations, library resources, EHR technology) do faculty and students have at your school?
   a. What computer skills do students enter into the nursing program with? What skills do they acquire as they progress through the program?
   b. What skills to faculty see as necessary for program success?

5. What skills do faculty and students at your academic institution have in relation to using ICT devices to communicate? (videoconferencing, email, videos, podcasts, EHR, etc.)
    a. How do faculty and students see the use of these skills as necessary in the practice of nursing?

6. What ICT devices are available for faculty and student use at your academic institution?
    a. Do you feel the availability of ICT devices is adequate to support you in your teaching role?
    b. Do you feel the availability of ICT devices is adequate to promote student acquisition of these competencies?
    c. What additional devices would enhance the student experience?
    d. When did access to these ICT devices become available to faculty and students and how was this negotiated?

7. What do faculty and students recognize as the uses for ICT in post-secondary education and within the larger health care environment?
    a. How do students demonstrate this?

8. How did the school determine what competencies in relation to ICT should be incorporated into the undergraduate curriculum?
    a. Were there constraints on what competencies could be taught based on budgetary restrictions or the availability of resources?

9. Describe the process of incorporating content about ICT, particularly the EHR within the undergraduate curriculum.
    a. What facilitated the process of successful incorporation?
    b. What barriers did faculty and the school encounter throughout the process?
    c. How were barriers overcome?

10. How are decisions about the curriculum development process made?
    a. What factors influence what decisions can be made?
    b. Who is ultimately responsible for the decisions that are made?
    c. How is formal and informal power give to those making decisions about curriculum refinement?
    d. How are decisions about the allocation of resources within the school made?

11. What facilitates or hinders the continued success of integrating and maintaining this content within the curriculum?

Semi-Structured Interview Guide (Faculty)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

Nursing informatics is defined as a "science and practice [which] integrates nursing, its information and knowledge, and their management, with information and communication technologies to promote the health of people, families and communities worldwide" (IMIA, 2010).

Information communication technology is defined as "Information and communication technologies used to handle information and facilitate communications" (Canadian Nursing Association, 2012).

1. How would you describe the value that faculty members and students give to information communication technology use in the clinical practice setting?
    a. Can you give me a couple of examples that lead you to say that?
    b. How do the school of nursing mission, vision, and philosophy encompass values in relation to informatics and the use of technology?
    c. How are the school mission, vision, and philosophy supportive of facilitating student development in this area?
2. Where do these values stem from?
    a. Can you explain how faculty member and student values towards the use of this technology may differ from one another?
    b. Can you explain how there may or may not be the presence of resistance from faculty members to incorporate this content into the undergraduate curriculum?
    c. Why are some faculty members resistant to incorporating this content into the curriculum?
    d. How have faculty members demonstrated this resistance?
3. How do the beliefs, values and assumption held by the academic institution support the use of ICT?

a. Could you describe the school of nursing culture (value, beliefs and assumptions held by the school)?
b. What practices and policies within your school demonstrate valuing or devaluing of nursing informatics?

c. How is the school culture communicated and enacted to new faculty and students?

4. What do faculty and students recognize as the uses for ICT in post-secondary education and within the larger health care environment?

    a. How do students demonstrate this?

5. What skills in relation to utilizing basic computer systems do faculty and students possess?

    a. Do they have the knowledge and skill to utilize personal computers, hand-held devices, tablets, workstations, library resources or EHR technology?

    b. With what computer skills do students enter into the nursing program?

    c. What skills do they acquire as they progress through the program?

    d. What skills do faculty members see as necessary for program success?

6. What ICT devices are available for faculty and student use at your academic institution?

    a. Do you feel the availability of ICT devices is adequate to support you in your teaching role?

    b. Do you feel the availability of ICT devices is adequate to promote student acquisition of these competencies?

    c. What additional devices would enhance the student experience?

    d. When did access to these ICT devices become available to faculty and students and how was this negotiated?

    e. Does the availability of ICT technology influence what is taught in the curriculum?

7. In your opinion what skills do faculty members and students at your academic institution have in relation to using ICT devices to communicate? (videoconferencing, email, videos, podcasts, EHR, etc.)

a. How do faculty members and students see the use of these skills as necessary in the practice of nursing?

b. Are there course requirements within the nursing curriculum that build a foundation for students to acquire higher level nursing informatics skills such as those necessary to use technologies such as the EHR? **(These may include developing skills in the area of: literature searching and using critical appraisal skills to evaluate evidence based literature, use of bedside terminals and head-held devices to provide nursing care, applying concepts of nursing ethics and confidentiality to the use of ICT technology, value for health information systems and their applicability to nursing practice, etc.)

c. What course requirements assist students to meet the CNO entry to practice competencies in relation to nursing informatics?

8. Are students required to learn about and use a variety of information and communication technologies (e.g. bedside computer terminals, hand-held devices) to effectively deliver nursing care in a variety of healthcare settings and to effectively address the needs of diverse patient populations?

    a. If yes, how is this taught to students? Where in the curriculum are these competencies located?

    b. How is student knowledge and skill in relation to this area of learning measured?

    c. What competencies or learning experiences build the foundation for students to develop these competencies?

    d. How is responsibility for teaching allocated to faculty members teaching in the program?

    e. Who is responsible for teaching this content?

    f. If no why not?

9. Are students required to use applications for recording patient information (EHR) or document in structured data entry forms?

    a. Where in the curriculum is this content taught?

    b. How is responsibility for teaching this content allocated to faculty teaching in the program?

    c. Who is responsible for teaching this content?

d. Is there shared teaching in regards to the EHR, between the academic institution and the clinical agency and how was this partnership made and negotiated?

e. How much access to the EHR do students get in clinical?
f. What access to an EHR system do students have in the clinical setting (full access, limited to only working with RN employed in the setting, no access at all, etc.)?

g. Is there a computer lab on campus that has access to an EHR or academic training EHR? If there is, what was the process that facilitated the availability of this technology to student and faculty? Also, how is access to this technology maintained and monitored by the school?

h. If no, why not?

10. How did the school determine what competencies in relation to nursing informatics should be incorporated into the undergraduate curriculum?

    a. Were there constraints on what competencies could be taught based on budgetary restrictions or the availability of resources?

    b. Have some competencies that faculty deemed important in relation to informatics not become part of the new curriculum?

    c. Why did they happen?

    d. What were these competencies?

    e. What factors directly or indirectly facilitated the incorporation of this content into the curriculum?

    f. What factors directly or indirectly acted as barriers to the successful incorporation of this content into the curriculum?

11. How do students demonstrate knowledge of nursing informatics in their nursing practice? What outcome measures do faculty members utilize to identify students competency in this area?
    a. Do students appear to understand their professional responsibility in relation to ICT use?

12. Describe the process of incorporating content about nursing informatics within the undergraduate curriculum.

a. What facilitated the process of successful incorporation?

b. What barriers did faculty and the school encounter throughout the process?

c. How were barriers overcome?

13. What facilitates or hinders the continued success of integrating and maintaining this content within the curriculum?

Semi-Structured Interview Guide (Students)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

1. What value do you and your peers give to ICT (health information systems) use in clinical practice settings? Where do these values stem from?
    a. Can you give me a couple of examples that lead you to say that?
    b. What are your thoughts about where these values come from?
    c. How do the school of nursing mission, vision and philosophy related to this area? How are they supportive of facilitating student development in this area?

2. Where do these values stem from?
    e. Can you explain how faculty and student values towards the use of this technology may differ from one another?

3. What emphasis in your courses is given to learning and developing knowledge in the area of ICT, particularly utilizing the EHR in patient care?
    a. Can you provide an example of a learning experience that facilitated your development in this area?
    b. How are some faculty members more apt to teach about this content? Why is this?
    c. Do you see the development of knowledge in this area as specific to one course or integrated in many courses throughout the curriculum? Can you please elaborate.

4. How does the culture within the academic institution value the use of ICT, such as the EHR?
    a. Could you describe the school of nursing culture?
    b. How is the school culture communicated and enacted to new students? What practices and policies within your school demonstrate valuing or devaluing of ICT and EHR technologies?

5. How do the faculty and students at your academic institution demonstrate an ability to utilize the basic components of the computer systems available at the school? (Personal computers, hand-held devices, tablets, workstations, EHR technology)
    a. How important do you see these skills to your development as a nurse?
    b. What knowledge and skill in relation to utilizing computers did you enter into your nursing program with? How were having these skills essential to your success as a student?

6. What ICT devices are available at your academic institution?

a. Do you feel the availability of ICT devices is adequate to support you in your studies?
b. How are the device available within the school similar or different from those you have had experience with in the clinical setting?
c. How difficult or easy has it been to learn to utilize these devices? What has helped to facilitate development of knowledge in this area?

7. Are you required to learn about and use a variety of information and communication technologies (e.g. bedside computer terminals, hand-held devices) to effectively deliver nursing care in a variety of healthcare settings and to effectively address the needs of diverse patient populations?

    a. If yes, how has this content been taught? Where in the curriculum are these competencies located (year)?
    b. How is student knowledge and skill in relation to this area of learning measured?
    c. Who teaches this content?

8. Are you required to use applications for recording patient information (EHR) or document in structured data entry forms? Where in the curriculum is this content taught (classroom, clinical)?

    a. Where in the curriculum is this content taught?
    b. Is this taught in the classroom, simulated or clinical learning environment?
    c. How much access to the EHR do you have in clinical?
    d. What access to an EHR system do you have in the clinical setting (full access, limited to only working with RN employed in the setting, no access at all, etc.)?
    e. Is there a computer lab on campus that has access to an EHR or academic training EHR? How have you used this lab?

9. How do you demonstrate knowledge of ICT in their nursing practice? What outcome measures do faculty utilize to identify your competency in this area?

Semi-Structured Interview Guide (Information Technology Staff)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

1. How involved are you in integrating ICT within the school?
   a. What has your role been?
   b. Can you describe your involvement?

2. How often does the school of nursing often require assistance with utilizing these technologies and what generally are the technological problems encountered?

3. Where you involved or consulted in the curriculum development process and decisions in relation to incorporating ICT within the curriculum and school?
   a. Can you describe you involvement?

4. Where there any difficulties encountered when faculty requested access to this technology within school computer labs?
   a. How were the difficulties overcome?

5. In your opinion, do faculty at the school of nursing value the use of this technology?
   a. What has impacted you to this judgement?
   b. How does student value for this technology differ from faculty? Or is it the same?

6. Describe the process and your role in preparing the school of nursing to integrate this content into the curriculum.

Appendix F

Demographic Questionnaire (Faculty)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

1. Age: ________
2. Academic Rank: ____________________
3. Years of Nursing Experience: _________
4. Years of Teaching experience:_________
5. Teaching Focus: ____________________
6. If you have been involved in the curriculum development process, would you describe your involvement?

   ____
   ____
   ____
   ____
   ____

7. What is the nature of your involvement with ICT and the EHR within your clinical practice?:

   ____
   ____
   ____

8. What is the nature of your involvement with ICT and the EHR within your teaching?:

   ____
   ____
   ____
   ____

9. If you use ICT outside of the work place, what do you use? (eg. iPad, email, skype, etc.)

   ____
   ____
   ____
   ____

Demographic Questionnaire (Information Technology Staff)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

1. Age: ________

2. Employment position and description:
   ____
   ____
   ____
   ____

3. How many years have you been working with the school of nursing within your position?: _________
4. What are you main responsibilities to the school of nursing?:-
   ____
   ____
   ____

5. Do you provide instructional support to faculty within the school of nursing on the use of ICT or other technological programs? If yes, please describe:
   ____
   ____
   ____
6. What is the focus of your technological expertise: ____________________
7. Were you involved in the curriculum development process, within the school of nursing?:
8. ____
   ____
   ____

9. Do you use ICT outside of the work place? (eg. iPad, email, skype, etc.):
   ____
   ____
   ____

Demographic Questionnaire (Students)

An Exploration of the Influence of Cultural Practices within a School of Nursing on Undergraduate Student Acquisition of Nursing Informatics Competencies

1. Age: ________
2. Student Status (part-time/full-time): ____________________
3. What program are you currently enrolled in?:_______________
4. What year in the program are you currently enrolled in?: __________________
5. Do you have involvement in a health care setting outside of your nursing clinical rotations? If so, please elaborate:
   ____
   ____
   ____
6. Were you involvement in the curriculum development process? If so, how did you contribute to the development of the curriculum?:
   ____
   ____
   ____
7. What is the nature of your involvement with ICT and the EHR within your clinical practice placements: -
   ____
   ____
   ____
8. What is the nature of your involvement with ICT and the EHR within your classroom and lab learning environment:
   ____
   ____
   ____
9. Do you use ICT outside of the school? (eg. iPad, email, skype, etc.):
   ____

Appendix G

Description of Systems of Culture, Human Infrastructure, and Resources

Preliminary analysis of the literature identified a number systems and subsystems which researchers have suggested impact on the inclusion of nursing informatics content within undergraduate nursing curricula. These systems and subsystems were determined to be aspects of the nursing education program culture and included: culture, human infrastructure, and resources. Data collection procedures were guided by this knowledge, and focused on understanding how these systems, impacted the curriculum development process in relation to nursing informatics. The following will provide a brief description of what data was collected about culture, human infrastructure, and resource during the data collection procedures.

Culture

An examination of culture included understanding the values, beliefs, and assumptions of the two schools of nursing and how culture shapes decision making processes in relation to curriculum development. In addition, the examination of culture included a review of the missions, visions, program philosophy, curriculum goals, and school policies as they relate to nursing informatics. Further, the researcher explored student and faculty knowledge and perceptions as to the uses of informatics technologies to shape the practice of nursing. Finally, attention was given to determining who the nursing faculty members were, understanding their teaching expertise and nursing background, as well as considering the value, beliefs, and assumptions that they bring with them which influence the nursing education culture.

Infrastructure

Infrastructure referred to elements which were foundational to the successful functioning of the academic institution and schools of nursing. Human infrastructure within the literature was identified as the most important resource and referred specifically to the human resources (personnel) who form the two nursing school systems. Within the infrastructure subsystem, understanding the role that administrative personnel, faculty, and students play during the curriculum development process and in teaching of nursing informatics concepts was the focus during this inquiry.

Resources

The final system identified by researchers as impacting nursing informatics curriculum development endeavours was resources. Resources for this study referred to physical resources (e.g. computers, software, etc.) which provide the tools necessary for learning to occur. Physical resources which were of particular interest during this study were those that specifically related to the curriculum development process and inclusion of nursing informatics content within it. Many of these included: ICTs available in the clinical practice setting, teaching and learning resources, financial resources which support curricular integration of nursing informatics topics, and ICT resources and teaching aids available on campus.

Figure

Figure 1: Integrative Review Search Strategy

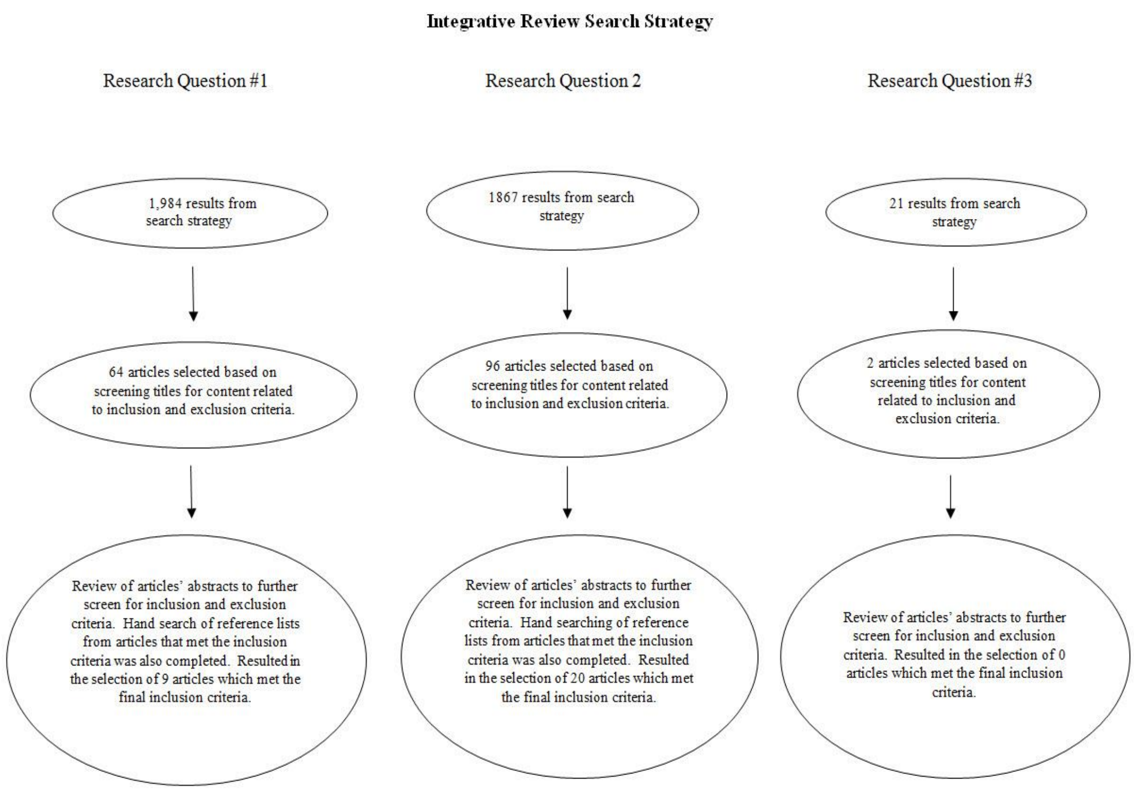
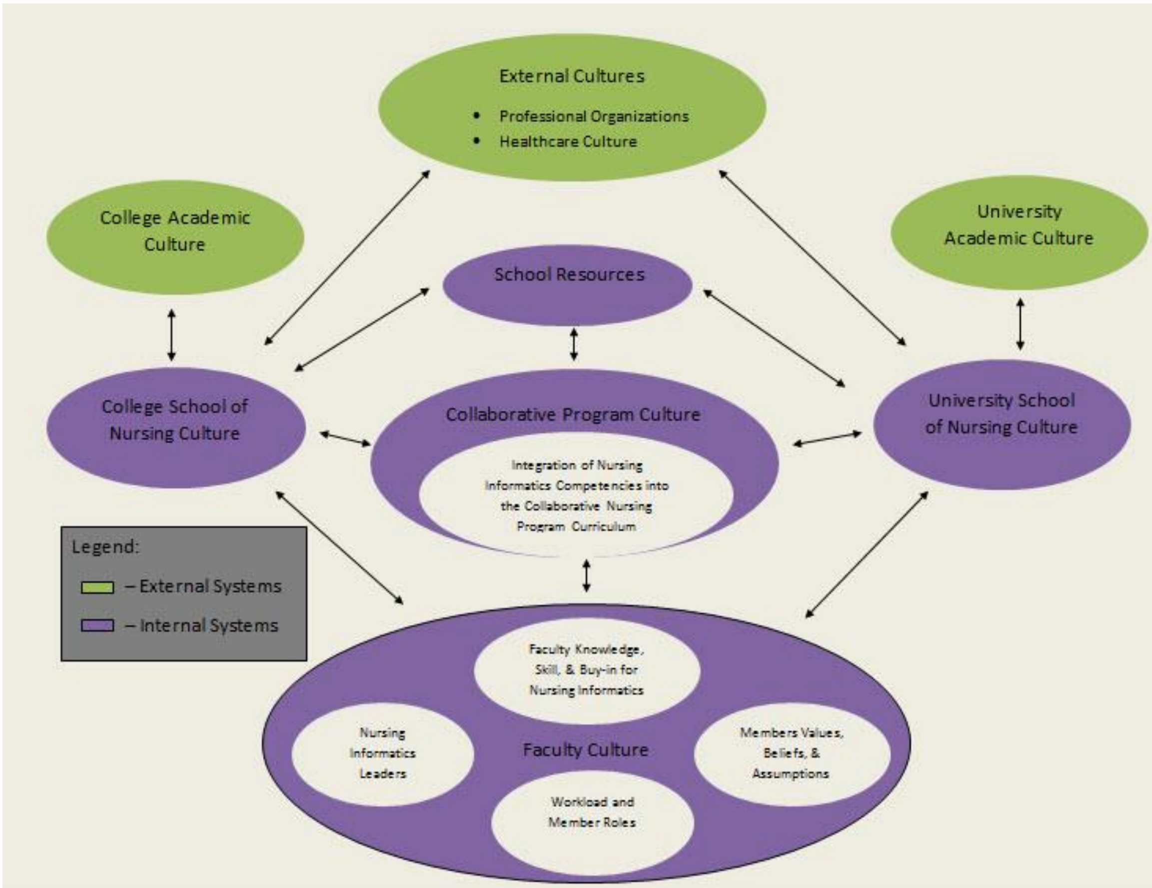


Figure 2: The Interaction Amongst Systems and Subsystems Which Impact the Integration of Nursing Informatics Competencies into the Collaborative Nursing Program Curriculum



Curriculum Vitae

Name: Stephanie Atthill

1. **Academic Preparation:**

Degree	**University**	**Department**	**Graduation Year**
Doctor of Philosophy in Nursing – Nursing Education Stream	Western University	Nursing	2015
Masters of Science in Nursing Fast Track	Western University	Nursing	2009
Bachelor of Science in Nursing	McMaster University	Nursing	2007

2. **Related Work Experience:**

Date	**Institution**	**Position**
2014, 2013	Western University	Instructor Compressed Time Frame BScN Program
2012-2013	Western University	Research Associate
2012-2013	Western University	Teaching Assistant in Collaborative Nursing Program
2009-2012	Western University	Graduate Research Coordinator
2012-2013, 2012, 2010-2011	Western University	Graduate Research Assistant
2007-2009	University Hospital – LHSC	Full-time Staff Nurse General Surgery Floor

3. **Other Scholarly and Professional Activities:**

Date	Organization	Position

2009-2012	Canadian Association Schools of Nursing Accreditation Bureau	Graduate student representative on the Accreditation Bureau
2012-2013	Western University	Course Design Committee
2012	Nurse Education Today	Journal Referee

4. Honors and Awards:

Date	Organization	Honor or Award
2014	Western University	Recognition of Achievement for Teaching
2013	Sigma Theta tau International Iota Omicron Chapter	Research Grant Recipient - $1500 to support dissertation research costs.

5. Publications:

Atthill, S., Donelle, L., Iwasiw, C. & Borycki, E. (2014). The impact of culture on the integration of nursing informatics competencies in undergraduate nursing education curricula: An integrative review. Manuscript submitted for publication.

Babenko-Mould., Y., Ferguson, K., Riddell, T., Hancock, M. & ***Atthill, S. (2014).*** Influence of Simulated Learning and Actual Community Vaccination Clinic Experiences on Nursing Students' Structural Empowerment and Self-Efficacy for Public Health Nursing Competencies. *Public Health Nursing*. Advanced Online Publication. doi: 10.1111/phn.12151

Jones, S. & Donelle, L. (2011). Assessment of EHR usability with undergraduate nursing students. *International Journal of Nursing Education Scholarship , 8, 24, p. 1-20*