

Northeastern Ontario Registered Nurses' Perceptions of E-learning

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science (M.Sc.) in Nursing

The Faculty of Graduate Studies
Laurentian University
Sudbury, Ontario, Canada

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THESIS DEFENCE COMMITTEE/COMITÉ DE SOUTENANCE DE THÈSE
Laurentian Université/Université Laurentienne
Faculty of Graduate Studies/Faculté des études supérieures

Title of Thesis Titre de la thèse	Northeastern Ontario Registered Nurses' Perceptions of E-learning		
Name of Candidate Nom du candidat	Stevens, Christopher		
Degree Diplôme	Master of Science		
Department/Program Département/Programme	Nursing	Date of Defence Date de la soutenance	December 18, 2018

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Abstract

Nurses face challenges in meeting their continuing education needs. E-learning can help to overcome these barriers and has become a common method of nursing continuing education. An integrative literature review found that e-learning benefits nurses' learning, patient care, and the hospital organization in different international contexts. E-learning has unique barriers, areas for improvement, and additional research is needed in the Northeastern Ontario context.

An interpretive description qualitative study explored the perceptions of ten Northeastern Ontario registered nurses about e-learning. The aim was to understand this phenomenon and inform continuing education practices. *Bridging the Gap* was the overarching theme, providing a rich description of how nurses perceived e-learning as a continuing educational method. The overarching theme was supported by the subthemes: *Unsatisfactory Learning Experiences*, *Meaningful Learning Experiences*, and *Enhancing Learning Experiences*. These findings could inform future e-learning continuing education and support patient care.

Keywords: Continuing Education, E-learning, Nursing, Adult Education, Northern

Acknowledgements

This thesis has been an exciting and challenging undertaking and I have certainly not done it alone. I am grateful for everyone that helped me along the way.

I would like to express my gratitude to my thesis supervisor Dr. Judith Horrigan for her support and guidance over the past few years. I feel I have come a very long way since we first started exchanging emails about four years ago prior to applying for my masters. Judith has set me on a career-long path of research and academic pursuits. For this I am very grateful.

I would like to thank Dr. Roberta Heale and Professor Irene Koren; both excellent professors of nursing and I consider it an honor to have had them on my thesis committee. Thank you for your patience and guidance through the countless drafts of research proposals, articles, and this thesis. I would also like to thank Dr. Lorraine Carter for being my external reviewer.

I would like to thank the achievement specialist at the hospital of study for his inspiration to pursue this area of research. His support made the undertaking of this research possible.

I would like to thank Dr. Laurel O’Gorman for her editing services and advice. Her keen eye and suggestions proved very useful for making this thesis more coherent.

I would like to acknowledge my wife, Alison Halpert, and my two beautiful daughters Lillian and Amy for their love, support, and patience while their husband and father took time and energy away from them. I look forward to spending more time with you in the interim period before my next academic pursuit. You are my inspiration to work hard and better myself.

To my parents, Mary and Lorne Stevens, and my sister Heather, whose unconditional love and support is always an inspiration. As well as my in-laws Don and Shelley Halpert. To all of my friends and colleagues, who are far too many to name, who helped me, and inspired me along the way. Thank you, thank you, thank you!

Table of Contents

Abstract.....	iii
Acknowledgements.....	iv
Table of Contents.....	v
List of Figures.....	viii
List of Appendices.....	ix
Chapter 1.....	1
1.1 Introduction.....	1
1.2 Background.....	3
1.2.1 The importance of continuing education.....	3
1.2.2 Continuing education in the hospital setting.....	3
1.2.3 Continuing education challenges.....	3
1.2.4 Northeastern Ontario challenges.....	4
1.2.5 Potential solutions to continuing learning challenges.....	4
1.3 Defining E-learning.....	5
1.3.1 Modern applications of e-learning.....	6
1.4 Choice of Methodology.....	6
1.4.1 Philosophical underpinnings.....	8
1.5 Theoretical Frameworks.....	10
1.5.1 Adult learning theory.....	11
1.5.2 Theoretical e-learning framework.....	11
1.6 Setting.....	12
1.7 Ethics.....	13
1.8 Significance to Nursing.....	13
References.....	14
Appendix A: Laurentian University Research Ethics Board Approval Letter.....	18
Appendix B: Study Hospitals’ Research Ethics Board Approval Letter (Identity Redacted).....	19
Chapter 2.....	20
Abstract.....	21
Introduction.....	22
Objectives.....	22
Research Question.....	22
Methods.....	23
Search Strategy.....	23
Search Outcome.....	23
Article Review and Quality Appraisal.....	24
Study Characteristics.....	24
Data Abstraction and Synthesis.....	25
Critique of the Literature.....	26
Findings.....	26

E-learning Benefits	27
E-learning Barriers	29
E-learning Improvements.....	29
Discussion	30
Limitations of the Review	33
Implications for Administration.....	34
Implications for Practice	34
Future Research	34
Conclusion	35
References.....	36
Appendix C: Article Review Summary	40
Chapter 3	43
Abstract.....	44
Introduction.....	45
Background.....	46
Methods.....	48
Study Aim and Design	48
Guiding Theory	49
Analytic Framework	49
Ethical Approval and Data Collection	49
Participants.....	50
Setting	50
Data Analysis	52
Rigor	53
Findings	55
Bridging the Gap.....	55
Unsatisfactory Learning Experiences	56
Meaningful Learning Experiences.....	58
Enhancing Learning Experiences	60
Discussion.....	63
Bridging the Gap.....	63
Unsatisfactory Learning Experiences	63
Meaningful Learning Experiences.....	66
Enhancing Learning Experiences	67
Limitations	70
Implications for Nurse Educators and Administrators.....	71
Future Research C+onsiderations	71
Conclusion	72
References.....	73
Appendix D: Guiding Interview Questions	80
Chapter 4	81
4.1 Introduction.....	81
4.2 Background.....	81
4.3 Research Focus	81
4.4 Literature Review.....	82

4.5 The Research Findings.....	82
4.6 Guiding Theories	83
4.6.1 Adult learning theory.....	83
4.6.2 E-learning theoretical framework.....	85
4.6.3 Combining adult learning theory and the e-learning theoretical framework.....	85
4.7.1 E-learning supports nursing continuing education.....	86
4.7.2 Addressing e-learning barriers.....	87
4.7.3 Implementing Change.....	87
4.8 Limitations	88
4.9 Future Research	90
4.10 Conclusion	91
References.....	92
Thesis References	97

List of Figures

Figure 1.1 Decision Tree of Article Selection	24
Figure 1.2 Schematic of Nursing E-learning Themes from the Integrative Review	27
Figure 2.1 Schematic of Themes of Nursing E-learning Perceptions.....	55

List of Appendices

Appendix A: Laurentian University Research Ethics Board Approval Letter	18
Appendix B: Study Hospitals' Research Ethics Board Approval Letter (Identity Redacted)	19
Appendix C: Article Review Summary	40
Appendix D: Guiding Interview Questions	79

Chapter 1

1.1 Introduction

This thesis presents the findings of a study on e-learning for registered nurses (RNs) in Northeastern Ontario. The research was guided by the interpretive description methodology as outlined by Thorne (2016). The study was built upon a systematic literature review using integrative review methodology by Whittemore and Knafl's (2005). The goal of this thesis was to explore how Northeastern Ontario RNs perceive e-learning as a method of continuing education.

This first chapter presents an overview of how the thesis is organized. Chapter 1 includes an introduction, an explanation of the necessity of continuing education for nurses, as well as some of its challenges. The concept of e-learning is presented and defined. The guiding theory and framework are introduced and briefly explained in the last section of this chapter.

The second and third chapters are formatted as journal articles based on the publishing guidelines of the journal *Nurse Education Today*. *Nurse Education Today* is an international journal that provides a forum for the publication of high quality and original research in nursing, midwifery, and interprofessional health care education, which contributes to the advancement of educational theory, pedagogy, and supports evidence-based practice for educators worldwide (Nurse Education Today, 2018).

Chapter 2 presents the findings of the integrative review, which sought to determine the current state of knowledge for nursing e-learning including knowledge gaps that may exist in this area. An integrative review is a type of literature review that allows for the combination and synthesis of diverse methodological studies to answer a research question or present what is known on a topic of interest (Whittemore and Knafl, 2005). The review was international in scope. Articles on e-learning for nursing continuing education were sought from peer-reviewed

journals. As a result of this search, sixteen articles were included and appraised for quality. The included studies contained a mixture of methodologies and were from several different countries. These publications were summarized and analyzed for themes. Three key themes were identified: the benefits of e-learning for nursing continuing education, the hospital, and patient care; barriers to e-learning that must be addressed; and improvements for e-learning that could further support nursing education. This review laid the foundation and justification for the research described in Chapter 3.

The third chapter presents a qualitative study that explored Northeastern Ontario RNs' perceptions of e-learning utilizing an interpretive description methodology as outlined by Thorne (2008, 2016). Ten participants were interviewed to explore their perceptions of e-learning as part of their continuing education experience as RNs working in a hospital setting. Analyses of these interviews revealed *Bridging the Gap* as an overarching theme, which was supported by three subthemes: *Unsatisfactory Learning Experiences*, *Meaningful Learning Experiences*, and *Enhancing Learning Experiences*. The themes described from the shared perceptions of the participants has the potential to help inform current and future e-learning design, development, and delivery, which could support the best possible patient care. There were also several areas identified that could be explored in future research.

The final chapter in this thesis is a review and summary of the background, research focus, and key findings of the integrative review and interpretive description study. The theories that guided the context and application of this thesis are discussed. The potential implications for nursing practice and continuing education from the studies' findings are presented. Limitations of this thesis are explored and future research considerations are stated as well as the conclusion.

1.2 Background

1.2.1 The importance of continuing education. Nursing continuing education is imperative for quality patient care (Baumbusch et al., 2017; Davis, Taylor, & Reyes, 2014; Shulman, Leonard, Benner, Sutphen, & Day, 2013; Staffileno & Carlson, 2010) and staying current with best practices is a professional licensing obligation (Canadian Nurses Association, 2004; College of Ontario of Nurses [CNO], 2002). The Ontario nursing licensing body, the College of Nurses of Ontario (CNO), has clear guidelines regarding continuing competency as part of their Quality Assurance program where all nurses must stay up to date in their knowledge through education, experience, and self-assessment (CNO, 2002).

1.2.2 Continuing education in the hospital setting. In addition to the continuing education needs of nurses as set out by professional bodies, there are also continuing education requirements for nurses set by hospital organizations as part of on-going training for staff (Wahl & Latayan, 2011). This employment-based learning can be distinct from other forms of continuing education as the nurse usually does not have a choice to take or not take this continuing education. As such, the motivation of the nurse may be different when completing obligatory learning versus learning tied to his or her professional interests.

1.2.3 Continuing education challenges. In an era of evidence-informed practice, one challenge for nurses is that new research is being generated and synthesized at a rapid rate and nurses must strive to keep up with current evidence. It is therefore necessary for nurses to dedicate time and resources for training and education to remain up to date with their practice competencies. However, this undertaking is not without its challenges. Nurses face barriers to their continuing education including time constraints, financial constraints, unsupportive

workplace culture, a lack of access to relevant materials, and a lack of competency in accessing electronic evidence-based practice literature (Santos, 2012).

1.2.4 Northeastern Ontario challenges. The Northeastern Ontario context presents unique challenges for nursing continuing education in addition to the barriers outlined by Santos (2012) such as a lack of time, financial resources, and support. These additional barriers are a lack of access to resources in general due to geographical remoteness, low population density, and inclement weather that residents in northeastern Ontario face (Al-Hamad & O’Gorman, 2015, Ministry of Health and Long-Term Care, 2010). Carter, Horrigan, and Hudyma (2010) reported that distance and geography were barriers to continuing education for Canadian telehealth nurses and that technology has the potential to address these barriers. It is necessary for nurses to receive access to training to remain competent in their profession, and in order to do so, these barriers must be overcome. There is evidence to suggest that technology-based learning may help with these barriers of time and distance. Carter, Rukholm, & Kelloway (2009) reported that a stroke education program for geographically remote nurses delivered through a web-based learning site, along with webcasting, and videoconferencing was found to support the nurses’ learning in a flexible and meaningful way.

1.2.5 Potential solutions to continuing learning challenges. Innovative solutions to address continuing education challenges have been developed in the form of computer and internet-based learning, which are becoming a standard method of education delivery (Aparicio, Bacao, and Oliveira, 2016). Electronic learning (e-learning) is a form of technology-based learning that is gaining in popularity (Aparicio et al., 2016). As an example of this, Solomon et al. (2010) explored pre-licensed interprofessional education students’ experiences with an e-learning module and found that this asynchronous learning method overcame barriers of

geography and time, allowed for collaborative problem solving between students of different disciplines, and was generally well received.

1.3 Defining E-learning

E-learning is an innovative method of education delivery with prototypes dating back to the 1950s, and has a broad definition with complex integrations of multifaceted concepts (Aparicio et al., 2016; Sangrà, Vlachopoulos, & Cabrera, 2012). The term e-learning was coined in 1981 and has continued to evolve from a single dimensional aspect of electronic resources, such as learning through television, to incorporating concepts of distance and online learning as well as pedagogical learning theory (Aparicio et al., 2016). In thinking about distance, the idea is that the learner may be at some physical distance from the learning resources and the instructor when one is involved.

To highlight this complexity and plurality of e-learning, Aparicio et al. (2016) suggests that e-learning incorporates 23 different concepts including: computer learning, teacher usage, student usage, distance education, access via the internet, remote access regardless of time and distance, adjuncts to school education, self-directed and independent learning, augmented learning, group learning, distance education, asynchronous learning, higher education use, blending multimedia, distance and face-to-face learning, free and open access to learning, incorporation of pedagogical learning theory, teacher-student integrations, and how it can be used as a supplement to learning rather than a replacement for teaching. All of these concepts, how they interact, and the context in which the e-learning is utilized can impact the user and the learning experience.

Given the complexity of the numerous concepts related to e-learning, it is important to be clear on the specific forms of e-learning included in the study. This thesis will focus on the

concept of e-learning that includes learning through electronic sources with interactive distance-learning technology that is typically on a web-based system (Aparicio et al., 2016).

1.3.1 Modern applications of e-learning. E-learning has been utilized by professional organizations, universities, and hospitals to disseminate knowledge and training to staff and students (Aparicio et al., 2016). An example of a professional organization that uses e-learning is the Registered Nurses Association of Ontario (RNAO). It offers open access web-based learning opportunities for nurses such as a tobacco cessation module to assist patients in quitting smoking (Registered Nurses Association of Ontario, 2018). Research on other health care professionals, such as physicians, indicates that e-learning can be useful (Kleinpell & Bruinsma, 2010) and convenient (Cook, Levinson, & Garside, 2010) for their learning needs. While e-learning is becoming a more common method of education and training delivery for nurses worldwide because of its utility and convenience, the perceptions of nurses regarding e-learning for continuing education purposes in hospitals in Northeastern Ontario was not found in the published literature. It is, therefore, unknown whether the barriers and benefits of e-learning found in the existing literature apply to nurses in the unique context of Northeastern Ontario and whether these nurses' perceptions of e-learning could be different from those of nurses in other contexts such as larger cities. It is also unknown if or how e-learning as a form of continuing education in northern hospitals could be improved.

1.4 Choice of Methodology

There were many questions pertaining to e-learning and northeastern Ontario nurses. A review of the literature found a paucity of publications related to the state of knowledge of e-learning for registered nurses in Ontario. To help guide this work, Kirkpatrick's four levels of training evaluation (Kirkpatrick & Kirkpatrick, 2016) was utilized. This model proposes to

explore a training program in four key ways: 1) reaction, 2) learning, 3) behavior, and 4) results. While each one of these levels may yield useful results, starting at the first level (reaction) was determined to be an appropriate starting point. This level is referred to as the degree to which participants find their training agreeable, useful, and relevant to their jobs (Kirkpatrick & Kirkpatrick, 2016). Although this element could have been explored through quantitative metrics including Likert-scale and ranking questions, this method may not have told the complete story. This is because different research methods are necessary for different research foci (McCusker & Gunaydin, 2015). It was decided that the question to be explored in this study required data collecting strategies that would yield in-depth and rich descriptions of nurses' perceptions of this e-learning phenomenon. Through their own words, nurses could express themselves freely and explore the topic more deeply than a quantitative approach would afford. Numbers and percentages might not have captured their insights in a fulsome way (Guba & Lincoln, 1994; Tuli, 2010). The kind of inquiry explored in this study is consistent with the qualitative paradigm and Thorne's (2016) qualitative interpretive description methodology. With interpretive description, the researcher seeks to answer a question based on the understanding that reality is perceived by the individual and that there is a probable truth shared by people which is contextual. These truth standards are rooted in moral defensibility, disciplinary relevance, and pragmatic obligation (Thorne, 2016).

This methodological process could also allow for the generation and focus of ideas as to where specific metrics could explore and what questions could be asked in the future. The result of this inquiry was a more profound understanding of the nurses' perceptions of e-learning than what numbers could speak to, and uncovered suggestions for e-learning improvements that

numbers could not represent. For these reasons, the decision to use a qualitative method, as guided by Thorne's (2008, 2016) interpretive description methodology was made.

1.4.1 Philosophical underpinnings. This thesis' study sought to understand how northeastern Ontario nurses perceived e-learning as a continuing education method with a goal of generating useable knowledge that could inform current nurses' e-learning practices. The nature of this inquiry required an in-depth exploration that could describe and interpret these perceptions to better understand the experiences of nurses' e-learning beyond simple observations and measurements. It was decided that interpretive description was the best suited methodology for this research for the reasons outlined below.

Interpretive description is a qualitative research method derived from the social sciences, and as such, it seeks to generate empirical knowledge about human phenomenon for which depth and contextual understanding would be more useful than measurements alone (Thorne, 2016). The primary research product of this methodology are patterns and themes representative of individual human experiences. A fundamental importance of qualitative methodology is to balance quantitative methodology, where qualitative methodology provides the important contextual information in a field of study, especially for human behavior to find the emic, or insider, viewpoint (Guba & Lincoln, 1994). This is how this research was conducted, through immersive interviews of participants to seek a deeper understanding of the e-learning experiences of nurses.

Interpretive description has a constructivist paradigm (Thorne, 2016). A constructivist paradigm views reality as subjective, multiple, and socially constructed (Guba & Lincoln, 1994; Tuli, 2010). This view of reality dictates which research methodology should be selected to seek knowledge based upon an understanding of the metaphysical issues related to ontology and

epistemology (Guba & Lincoln, 1994; Tuli, 2010). Understanding this is imperative to the integrity of the research to ensure that all the elements are in harmony and are coherent with one another (Thorne, 2016). Constructivism's ontological perspective is relativism: that the nature of reality is local and has specific constructed realities which can be mental constructions or socially and experientially based, although these can also be shared among many individuals and across cultures (Guba & Lincoln, 1994). Epistemologically, constructivism is transactional and subjectivist, meaning, that the findings are created. Constructivism's methodology by which it explores these areas are hermeneutical and dialectical interactions between, and among, the investigator and respondents. The goal of which is to distill a consensus construction that is more informed and sophisticated than any of the predecessor constructions. This is primarily based on the voice of the participant as a facilitator of multi-voice reconstruction (Thorne, 2016). This process is non-manipulative, and non-controlling, and is built upon personal contact between the researcher and the group being studied (Tuli, 2010). It is understood that the purpose of such an inquiry is to understand a particular phenomenon and not to necessarily generalize its findings to the broader population (Tuli, 2010). This is the approach that this research took. It was understood that each participant had their own unique interpretation of their e-learning perceptions, and that the interactions between them and the researcher generated an understanding of this reality, as it was influenced through social interactions, and filtered through the researcher.

Interpretive description also posits that the researcher locates themselves within a discipline, and locating their personal relationship to the ideas they hold (Thorne, 2016). The disciplinary lens of nursing for qualitative nursing inquiry expects that the problem should be justified as clinically relevant. A key source of this data would therefore favor individual

interviewing as a primary data source, in keeping with the human connectivity, that is central to support professional practice. Research in the nursing discipline would recognize that there is value in careful and systematic analysis of the phenomenon being studied with the distinction that there is an equally pressing need for putting that analysis back in the context of the practice field (Thorne 2016). This was the approach of this research. As a registered nurse, and in a nursing graduate program, the questions for the participant interviews were focused through a nursing disciplinary lens, with the goal of taking the interpretations of the participants' perceptions and potentially informing nursing e-learning practices with this generated knowledge.

It was also anticipated that the process would enable generation of ideas and questions for future research. The results of this inquiry were a more profound understanding of the nurses' perceptions of e-learning than what numbers would likely yield and suggestions for e-learning improvements that numbers could not represent. For these reasons, the decision to use a qualitative approach, as guided by Thorne's (2008, 2016) interpretive description methodology, was made.

1.5 Theoretical Frameworks

A theoretical framework is an interlinking of concepts that together provides a comprehensive understanding of a phenomenon (Thorne, 2016). In qualitative research, a framework should help to organize the researcher's thinking and deepen their understanding without being restrictive (Thorne, 2016). The theoretical frameworks required for this research would explain and provide a greater understanding of the learning needs of nurses, such as how nurses learn and what supports their learning.

1.5.1 Adult learning theory. Adult learning theory (Knowles, Holton, & Swanson, 2015), also referred to as andragogy, is built upon the premise that adults learn through different approaches when compared to children. This theory has six core assumptions about engaging adult learners: 1) adults need to know why they must learn the content, 2) they must have a ‘self-concept’ which requires autonomy and self-direction for their learning, 3) the learner’s previous experiences must be taken into account and valued, 4) the learner must be ready for the learning, meaning that it is presented at the right time, 5) the learning must be useful to solve a problem or perform a task, and 6) there must be motivation to learn by way of career promotion or improvement as a result of the learning that must come from the learner’s internal motivation.

Based on this theory, nurses as adult learners need to know the reasons why they are learning something, be self-directed in their learning, have their previous knowledge and experience taken into account, be open and ready to the learning, understand that the learning is useful in performing a task, and generate their own motivation to learn because it would allow them to perform better as a nurse. The tenets of adult learning theory can help to explain or understand nurses’ perceptions of e-learning and provide guidance in the areas that e-learning could improve.

1.5.2 Theoretical e-learning framework. The e-learning theoretical framework by Aparicio et al. (2016) helps in understanding e-learning as a concept as well as how e-learning could be studied. This framework was developed through a summary and analysis of the corpus of literature on e-learning (Aparicio et al., 2016). This theoretical framework is based upon three key dimensions: the users, the technology, and the services (the learning) related to e-learning (Aparicio et al., 2016). Users interact with e-learning systems, and e-learning technologies allow direct or indirect interaction between users. The technology provides support to integrate content,

allow for communication, and provide the tools of collaboration (Aparicio et al., 2016). The framework includes e-learning system dimensions and encompasses the e-learning system stakeholders including students, employers, and educational systems as well as several others.

The setting, application, and goals of e-learning will vary depending on who it is designed for, how it will be accessed, and what learning content is to be delivered (Aparicio et al., 2016). In this study, the setting was a hospital located in a Northeastern Ontario which has its own unique challenges for RN continuing education. This thesis explored nurses' perceptions of e-learning (the user), described and explored the e-learning modules used in the hospital (the learning content), along with potential areas for improvement based on the study participants' suggestions (the technology and the learning). This satisfies the frameworks' three key elements that an e-learning study should include. The multifaceted and complex concepts that make up e-learning can be better understood through this e-learning theoretical framework. The application of this framework to this thesis study provided a larger contextual understanding of the e-learning concepts and illuminated where this study fits within the larger domain of e-learning as a continuing education method.

1.6 Setting

The research takes place at a hospital in a small city located in the North East Local Health Integration Network (NELHIN). The NELHIN oversees, organizes, and delivers health services to more than 565,000 people dispersed over 400,000 square kilometers and includes remote communities that are accessible only by plane (North East Local Health Integration Network, 2018). The largest city in the region is the City of Greater Sudbury with over 165,000 people. The hospital where this study took place is situated in a city with a population between 50,000 to 100,000. The hospital is classified by the Ministry of Health and Long-Term Care

(2018) as a general hospital. It has no fewer than 100 beds, rehabilitation beds, fewer than 200 chronic patients, computerized axial tomography, and magnetic resonance imaging equipment to support it and the surrounding region. Currently there are 474 active RNs that work in this hospital.

1.7 Ethics

Ethics approval was obtained from the Research Ethics Boards at Laurentian University and the participating hospital. See Appendices A and B, respectively, for the ethics approval forms.

1.8 Significance to Nursing

Exploring and better understanding e-learning for RN continuing education in Northeastern Ontario could improve its design, development, and delivery. Improving continuing education for nurses would assist them in meeting their continuing professional competencies and support quality patient care (Baumbusch et al., 2017; Davis et al., 2014; Shulman et al., 2013; Staffileno & Carlson, 2010).

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Appendix A: Laurentian University Research Ethics Board Approval Letter



APPROVAL FOR CONDUCTING RESEARCH INVOLVING HUMAN SUBJECTS Research Ethics Board – Laurentian University

This letter confirms that the research project identified below has successfully passed the ethics review by the Laurentian University Research Ethics Board (REB). Your ethics approval date, other milestone dates, and any special conditions for your project are indicated below.

TYPE OF APPROVAL / New <input checked="" type="checkbox"/> / Modifications to project / Time extension	
Name of Principal Investigator and school/department	Christopher Stevens, MSC Nursing, supervisor, Judith Horrigan
Title of Project	Northeastern Ontario Nurses' Perceptions of E-learning
REB file number	6009727
Date of original approval of project	March 17, 2017
Date of approval of project modifications or extension (if applicable)	
Final/Interim report due on: <i>(You may request an extension)</i>	March, 2018
Conditions placed on project	

During the course of your research, no deviations from, or changes to, the protocol, recruitment or consent forms may be initiated without prior written approval from the REB. If you wish to modify your research project, please refer to the Research Ethics website to complete the appropriate REB form.

All projects must submit a report to REB at least once per year. If involvement with human participants continues for longer than one year (e.g. you have not completed the objectives of the study and have not yet terminated contact with the participants, except for feedback of final results to participants), you must request an extension using the appropriate LU REB form. In all cases, please ensure that your research complies with Tri-Council Policy Statement (TCPS). Also please quote your REB file number on all future correspondence with the REB office.

Congratulations and best wishes in conducting your research.

Rosanna Langer, PHD, Chair, *Laurentian University Research Ethics Board*

Appendix B: Study Hospitals' Research Ethics Board Approval Letter (Identity Redacted)

[REDACTED]

Research Ethics Board (REB) - [REDACTED]

May 8, 2017

Mr. Christopher Stevens
[REDACTED]

Dear Christopher Stevens,

After careful review and consideration, the protocol you submitted has been **APPROVED** by full review through the Research Ethics Board.

Type of Approval		New Project Approval	<input checked="" type="checkbox"/>
Name of Principal Investigator	Christopher Stevens		
Program/ School/ Department	Laurentian University		
Title of Project	1610-001- Northeastern Ontario Nurses' Perceptions of E-Learning		
Initial Approval Date	May 8, 2017		
Renewal/ Final Report Due on:	May 8, 2018		
Additional Conditions Placed on Project	None		

If, during the course of the research, there are any adverse/unanticipated events, confidentiality concerns, deviations in the approved protocol/consent form/recruitment material, or any new information that must be considered with respect to the project, these should be brought to the immediate attention of the Board and the appropriate REB form completed.

All projects must submit an annual renewal or final report to the REB before their project's approval expires. You are responsible for ensuring the study receives re-approval by completing the appropriate REB form prior to the expiry of your approval.

Best wishes for the successful completion of this study.

Sincerely,

[REDACTED]

Research Ethics Board Interim Chair



Chapter 2

NURSES' EXPERIENCES WITH E-LEARNING: AN INTEGRATIVE REVIEW

CONTRIBUTORS

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ABSTRACT

Background: E-learning has become a common method of continuing education for hospital staff registered nurses. However, no published systematic reviews were found on e-learning for registered nurses and little is known about how nurses in Northeastern Ontario perceptions of e-learning.

Objective: To present an integrative review on e-learning for registered nurses.

Design: An integrative literature review was conducted using a systematic approach that identified, critically appraised, and synthesized the published literature on e-learning for registered nurses.

Data Sources: The search was initially undertaken in 2015 and then updated at the end of 2017 using Scholar's Portal and CINAHL databases. The search included articles with the keywords 'e-learning' and 'registered nurse' published between 2010 and 2017. The search was limited to English articles. Reference lists of all articles were scanned for further relevant articles.

Review methods: Studies were appraised using the Critical Appraisal Skills Programme. Each article was analyzed, summarized, and then a synthesis of the articles was completed.

Results: Sixteen studies with a variety of methodological designs were included in this review. The main themes were: benefits of e-learning to the nurse, the patient and the hospital organization, barriers to e-learning, and improvements for e-learning.

Conclusion: E-learning has many suggested benefits for continuing education for registered nurses, but there are also barriers and areas for improvement. Additional research with a focus on Northeastern Ontario is needed to explore how nurses perceive e-learning in this specific context.

Keywords: E-learning, Continuing Education, Nursing, Northern, Rural, Remote

INTRODUCTION

Continuing education for registered nurses (RNs) is imperative for professional continuing competency and licensing obligations (Canadian Nurses Association, 2004; College of Ontario of Nurses, 2002). Nurses' continuing education is also necessary to support optimal patient care (Baumbusch et al., 2017; Davis et al., 2014; Shulman et al., 2013; Staffileno & Carlson, 2010). Nurses face barriers in meeting their obligation of continuing education including time constraints, financial constraints, unsupportive workplace cultures, lack of access to relevant materials, and lack of competency in finding electronic evidence-based literature (Santos, 2012). E-learning has the potential to overcome such barriers and is becoming a popular form of education and training delivery (Aparicio et al., 2016). E-learning is used by individuals and by institutions, such as universities and hospitals, for convenient and accessible education (Aparicio et al., 2016). However, there is little research to date on how nurses experience their e-learning in the context of their continuing education.

OBJECTIVES

The purpose of this integrative review was to locate, appraise, summarize, and synthesize the published research on RN e-learning to identify how nurses experience e-learning that could inform the design and development of education practices in Northeastern Ontario hospitals. These findings could also direct future research efforts on e-learning for nurses.

Research Question

The guiding question for this review was: what are the experiences of nurses with e-learning?

METHODS

The methodology used for this inquiry was the integrative review framework by Whitemore and Knafl (2005). This review presents the current state of knowledge on RN e-learning experiences for hospital staff. Qualitative and quantitative research studies on e-learning for staff nurses that were published in English between 2010 and 2017 were included in this analysis. Electronic learning (e-learning) is a broad concept (Aparicio et al., 2016; Sangrà et al., 2012). For the purpose of this study, the definition of e-learning will be learning accessed through electronic sources, with interactive distance-learning technology, typically on a web based system (Aparicio et al., 2016).

Search Strategy

A systematic search was completed using the Scholar's Portal and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. The keywords 'e-learning' and 'registered nurse' were used with the exclusion term 'student' applied.

Search Outcome

The literature search identified 227 articles using the above criteria. Additional limits included publications in English from peer-reviewed journals were applied. The titles and abstracts of each article were reviewed. Studies were excluded if nurses did not make up the majority of the participants, if the focus was on nursing students, or if the e-learning modules in the study were not similar to this study's definition. For example, an article's intervention may have been labelled as e-learning, but it turned out to be an online journal-club discussion forum, rather than a self-directed learning module, it was determined to be not similar enough to this review's definition of an e-learn and was therefore excluded. The analysis proceeded with the remaining 16 articles. The references of the selected articles were screened for additional

relevant studies, but no further articles were added in this manner. See Figure 1.1 for a decision tree schematic of this process.

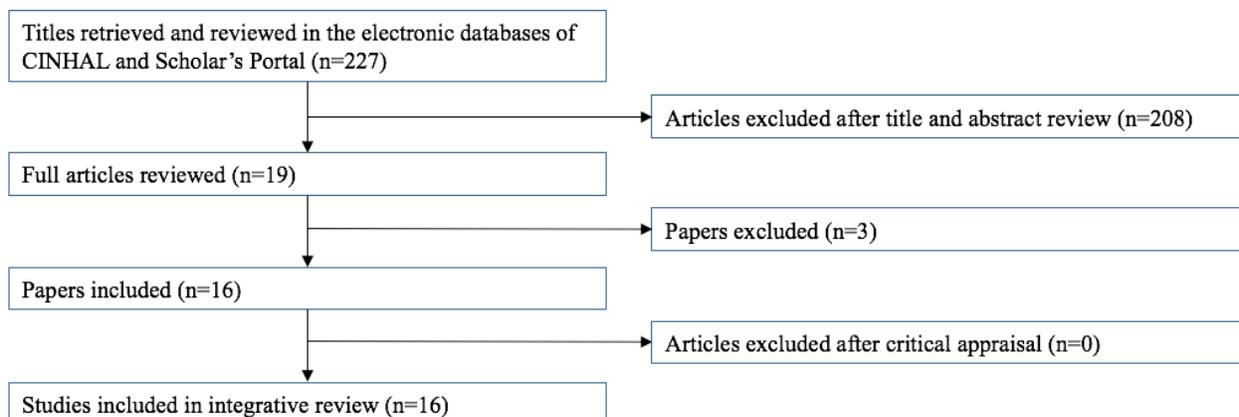


Figure 1.1 Decision Tree of Article Selection

Article Review and Quality Appraisal

The integrative review framework does not have an explicit way to appraise the quality of research articles (Hopia, Latvala, & Liimatainen, 2016). The primary researcher applied the relevant Critical Appraisal Skills Programme (CASP) checklists (Critical Appraisal Skills Programme, 2018) to assist with assessing the trustworthiness, relevance, and results of published papers. A descriptive summary of the selected articles is presented in Appendix C that highlights the study's country of origin, the methodologies, the samples, the study's foci, analyses, and what themes each article supported.

Study Characteristics

Only papers published in English from electronic databases were included. Only one study took place in Canada. Seven articles came from the United Kingdom, four from Australia and New Zealand, and one each from Finland, Belgium, the United States and Taiwan. Eight of the articles were qualitative studies (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Hurst & Marks-Maran, 2011; Lahti, Kontio, Pitkänen, & Välimäki, 2014; Latif, Carter,

Rychwalska-Brown, Wharrad, & Manning, 2017; Murphy, Worswick, Pulman, Ford, & Jeffery, 2015; Shaw et al., 2014; Wahl & Latayan, 2011), three were quantitative studies (Blackman, Mannix, & Sinclair, 2014; Johnson, Kelly, Siric, Tran, & Overs, 2015; C. J. Thorne et al., 2015), and five were mixed method studies (Detroyer et al., 2016; Eyres, Richards, James, Morton, & Sweeney, 2012; Ilott et al., 2014; Liu, Rong, & Liu, 2014; Rankin, Then, & Attack, 2013). On the levels of evidence hierarchy by Melnyk and Fincoult-Overholt (2005) (as cited by LoBiondo-Wood and Haber, 2012), level I articles, which are considered the highest level with the most robust empirical evidence, are systematic reviews of randomized control trials (RCTs), and at the bottom, level VII articles, considered the lowest level of evidence, are opinions of authorities or experts. Of the studies included in this review, only one was a level II, two were level III, five were level IV, and eight (half of the studies) were level VI. See Appendix C for each article's specific level of evidence. These levels of evidence indicate that the studies were lower on the evidence hierarchy and may impact the reliability of their findings and the strength of evidence to support practice change.

Data Abstraction and Synthesis

The primary researcher performed the abstraction and analysis. Each article was read for content and key findings were summarized and then later coded (Whittemore & Knafl, 2005). These codes were extracted from all articles, organized, and then themes were abstracted. The summary and synthesis of all relevant articles provided an account of nurses' e-learning experiences. With each step, the codes and themes that emerged were verified with the primary sources to verify that they were congruent with the individual article findings (Whittemore & Knafl, 2005).

CRITIQUE OF THE LITERATURE

There were articles in this review that took place at single sites and were qualitative studies (Cottrell & Donaldson, 2013; Detroyer et al., 2016; Green & Huntington, 2017; Hurst & Marks-Maran, 2011; Ilott et al., 2014; Lahti et al., 2014; Latif et al., 2017; Wahl & Latayan, 2011) and these studies would place lower on the evidence hierarchy and therefore provide less robust evidence for practice (LoBiondo-Wood & Haber, 2012). There were studies that relied on reported self-perceptions of improvements from e-learning from the participants (Blackman et al., 2014; Cottrell & Donaldson, 2013; Eyres et al., 2012; Hurst & Marks-Maran, 2011; Ilott et al., 2014; Lahti et al., 2014; Latif et al., 2017; Shaw et al., 2014) and would be considered a less reliable form of evidence because this is based on participant perceptions, which can be confounded by bias, rather than quantifiable measurements which could impact reliability of the studies (LoBiondo-Wood & Haber, 2012). The quantitative studies were confounded by issues such as the comparison groups were not sufficiently differentiated from experimental groups (Liu et al., 2014; Rankin et al., 2013), had weak coefficient numbers to support claims (Blackman et al., 2014) and were not randomized (Detroyer et al., 2016; Eyres et al., 2012; Ilott et al., 2014; Johnson et al., 2015; C. J. Thorne et al., 2015). The reported barriers and benefits from the studies are context dependent and there may be discrepancies in the quality of e-learning modules in each hospital organization. With these limitations in mind, further development of the evidence could be warranted.

FINDINGS

The reviewed articles had three key themes: benefits of e-learning, barriers to e-learning, and considerations for improvement. See Figure 1.2 for a schematic diagram of these themes.

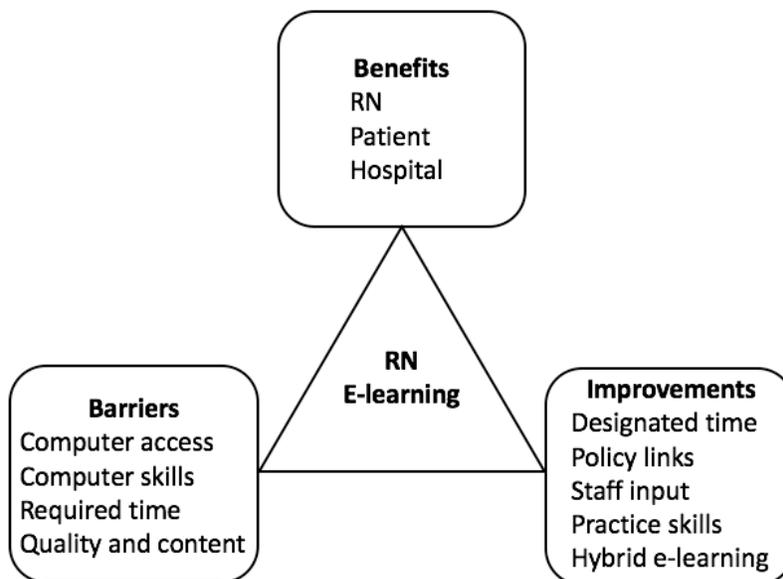


Figure 1.2 Schematic of Nursing E-learning Themes from the Integrative Review

E-learning Benefits

The benefits of e-learning had three distinct subthemes: benefits for nurses' learning, improved patient care, and benefits for the hospital. The benefits for nurses were demonstrated in several ways. E-learning improved nurses' confidence and self-perceptions of abilities and knowledge (Eyres, Richards, James, Morton, & Sweeney, 2012; Hurst & Marks-Maran, 2011; Ilott et al., 2014). There was experimental evidence indicating that e-learning resulted in knowledge retention and application for nurses (Ilott et al., 2014; Liu, Rong, & Liu, 2014; Rankin, Then, & Attack, 2013). A non-randomized experimental study on e-learning in ACLS by Thorne et al. (2015) compared an e-learning-based program to the traditional classroom learning methods; participants in the e-learning version of the learning demonstrated equivalent test outcomes to those in the traditional group.

Nurses who participated in e-learning had immediate demonstrated observable changes to their nursing practices (Eyres et al., 2012; Ilott et al., 2014; Lahti, Kontio, Pitkänen, & Välimäki, 2014). For example, one study found that e-learning improved nurses' fall prevention practices

(Johnson, Kelly, Siric, Tran, & Overs, 2015). In another study, nurses showed improvement in rates of delirium risk screening and recognition (Detroyer et al., 2016). E-learning had advantages over conventional learning for nurses because it was flexible, accessible, convenient, and an enjoyable way to learn (Hurst & Marks-Maran, 2011; Ilott et al., 2014; Shaw et al., 2014). Use of e-learning was able to overcome barriers to continuing education such as time constraints (Green & Huntington, 2017; Liu et al., 2014; Murphy, Worswick, Pulman, Ford, & Jeffery, 2015), costs (Green & Huntington, 2017), as well as distance and geography issues for rural and remote nurses (Blackman, Mannix, & Sinclair, 2014).

Patients benefited from RN participation in e-learning. E-learning had nurse-perceived patient safety improvements with blood transfusions (Cottrell & Donaldson, 2013), measurable reductions in insulin errors by nurses (Eyres et al., 2012), improved nurses' screening and recognition of patient delirium (Detroyer et al., 2016), improved accuracy of nurses' triage scores (Rankin et al., 2013), and improved patient post-fall management (Johnson et al., 2015). These studies highlight examples of nurse learning and training delivered from e-learning that can positively impact immediate safety and quality of care.

Healthcare organizations, such as hospitals, also benefited from e-learning. E-learning had the potential to standardize and deliver training to large numbers of staff in a more efficient manner than traditional learning (Detroyer et al., 2016; Eyres et al., 2012; Wahl & Latayan, 2011), especially for hard-to-reach shift workers (Green & Huntington, 2017; Wahl & Latayan, 2011). E-learning curriculums are easily updated, which provides benefits over conventional methods of education (Shaw et al., 2014; Thorne et al., 2015). E-learning can impact departmental changes in practice (Green & Huntington, 2017; Ilott et al., 2014). For example, nurses' insulin administration practices for an entire ward were changed as a result of an e-

learning module (Eyres et al., 2012). There were also potential cost savings for staff education through e-learning (Detroyer et al., 2016; Green & Huntington, 2017; Latif, Carter, Rychwalska-Brown, Wharrad, & Manning, 2017; Thorne et al., 2015). Examples of cost savings were estimated to be in the hundreds of thousands of dollars annually because there was less need of classroom space, educator time, and paper materials (Ilott et al., 2014; Johnson et al., 2015; Wahl & Latayan, 2011).

E-learning Barriers

Another theme from the literature is that there were barriers and requirements to e-learning. E-learning requirements become barriers when they are not met. Hospital organizations must provide computers and the information technology capacity to deliver e-learning for nurses (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Shaw et al., 2014). E-learning must have managerial approval prior to implementation (Wahl & Latayan, 2011). Nursing staff require a certain level of computer proficiency (Blackman et al., 2014; Green & Huntington, 2017; Shaw et al., 2014) and enough time away from distractions to complete their e-learning modules (Hurst & Marks-Maran, 2011; Ilott et al., 2014; Shaw et al., 2014). Furthermore, the e-learning programs must meet certain standards in terms of content, design, topic relevance, must be up to date (Blackman et al., 2014; Hurst & Marks-Maran, 2011) and provide nurse and patient-specific information (Latif et al., 2017).

E-learning Improvements

Areas for e-learning improvements was the third theme found in literature. Nurses' suggestions for improvements included having designated time and space for e-learning (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Ilott et al., 2014; Wahl & Latayan, 2011) and direct links to policy documents within the e-learning module (Green & Huntington, 2017).

Nurses also suggested patient and staff input into the development of e-learning content (Latif et al., 2017).

Nurses need to practice the skills learned from the e-learning modules (Blackman et al., 2014; Cottrell & Donaldson, 2013), therefore the concept of hybrid or blended e-learning was presented in the literature (Cottrell & Donaldson, 2013; Detroyer et al., 2016). Hybrid e-learning was described as a combination of a self-guided e-learning programs followed by hands-on practice. There were two studies that explored types of hybrid learning. Thorne et al.'s (2015) study on Advanced Cardiac Life Support training had one day of at-home self-guided e-learning followed by a day of hands-on training. This hybrid method was found to have equivalent test outcomes as the traditional two-day courses in performance and test outcomes. The authors suggested that hybrid e-learning provided the participants and the institutions the benefits of e-learning, such as the convenience and cost savings, while still fulfilling the need for hands-on practical experience (Thorne et al., 2015).

DISCUSSION

E-learning is a complex and growing field of continuing education for nurses and has many diverse applications and contexts to which it can be applied. The articles included for this review were international in context and the appropriateness of applying these findings in a smaller and less resource rich area, such as a Northeastern Ontario setting is unclear. As such, this review generated themes based on international research articles about hospital nurses' experiences with this method of education.

The research indicated that e-learning can positively impact nurses' education, patient care, and the hospital organization's education delivery for staff. E-learning was perceived as accessible for nurses in the hospital system (Hurst & Marks-Maran, 2011; Wahl & Latayan,

2011) and required less of a time commitment compared to traditional learning (Liu et al., 2014; Murphy et al., 2015; Wahl & Latayan, 2011). Furthermore, e-learning increased the nurses' confidence and knowledge in practice (Johnson et al., 2015; Latif et al., 2017; Murphy et al., 2015) such as in nurses' insulin administration (Eyes et al., 2012).

E-learning improved patient care by promoting safety practice changes (Cottrell & Donaldson, 2013; Detroyer et al., 2016; Johnson et al., 2015). However, these claims of improvements were based upon participants' perceptions. Additional experimental evidence is needed to further support the claim of improved patient safety and whether changes over time remain present.

E-learning had benefits for the hospital. E-learning was reported to be easier to standardize and deliver to large numbers of nurses, at lower costs, and with fewer barriers for nurses who work shiftwork (Detroyer et al., 2016; Wahl & Latayan, 2011). Organizations and institutions have been rapidly implementing e-learning as a method of education delivery because of convenience and economics (Aparicio et al., 2016). In these reviewed studies, the cost-savings were estimated and speculated (Wahl & Latayan, 2011). A clear and transparent cost analysis is needed to compare e-learning to traditional learning and provide evidence for this claim.

Barriers and prerequisites must be addressed in order to successfully implement e-learning. E-learning requires sufficient information technology infrastructure, adequate computer access, and nursing staff proficiency with computers and the internet (Blackman et al., 2014; Green & Huntington, 2017; Shaw et al., 2014). The degree to which these issues would be challenges to an individual healthcare setting is context dependent. Hospitals already utilizing computers are likely to have an adequate computer system and staff that is reasonably computer

proficient. E-learning must be of reasonable quality in terms of design and the material must be adequate, relevant, patient-specific, and interactive (Blackman et al., 2014; Hurst & Marks-Maran, 2011; Latif et al., 2017).

Other barriers for nurses e-learning include a lack of time and space to complete their modules, and as such, nurses require designated time and space to complete e-learning away from other work (Cottrell & Donaldson, 2013; Hurst & Marks-Maran, 2011; Shaw et al., 2014). A lack of time and support from work are already barriers for nurses' continuing education (Santos, 2012). Despite claims in the literature that e-learning is a solution to these barriers, it is still susceptible to them.

This review also identified areas for improvement for e-learning. For example, e-learning modules should directly relate to hospital policies and should be developed in consultation with patients and nursing staff (Latif et al., 2017). Nurses must have opportunity to practice the skills from e-learning (Blackman et al., 2014; Cottrell & Donaldson, 2013). This is where the concept of hybrid e-learning emerged (Detroyer et al., 2016; Thorne et al., 2015). Hybrid e-learning is where a portion of learning content is delivered, on an individual basis, through e-learning modules, such as the reading or viewing a video of a nursing procedure. This is then followed by an in-person opportunity to practice the hands-on skills of the procedure with relevant equipment, materials, and educator presence. For instance, an ACLS program was delivered through one day of self-directed e-learning modules and was then followed the next day with hands-on simulations of ACLS skills (Thorne et al., 2015).

E-learning could play a role in continuing education as part of a hybrid method of education. As such, e-learning may not be a complete replacement for all continuing learning needs and e-learning can be used in conjunction with other hands-on methods to solidify nursing

practice. Hybrid e-learning could be a more cost-effective method of learning by reducing the amount of in-person learning, thus reducing educator time and classroom space (Thorne et al., 2015). The hybrid method may make up for some of the shortcomings of e-learning, such as the need for nurses to practice newly acquired skills. Exactly how much e-learning versus hands-on learning should make up this hybrid method is unclear, but it is likely context dependent. Hybrid e-learning is still a concept and requires further exploration to refine it.

LIMITATIONS OF THE REVIEW

The literature in this review was international in scope and the transferability of these findings to a Northeastern Ontario context is limited due to the northeast being more isolated and lacking the resources of other settings. There are limitations related to each article's quality as previously mentioned that limit application and strength of their claims. Only one study directly compared e-learning methods to traditional learning and demonstrated e-learning as an equivalent method to disseminate knowledge (Thorne et al., 2015).

The integrative review method recognizes that there are inherent limitations with searches and terms (Whittemore & Knafl, 2005). The term 'e-learning' is broad, and the way in which it is used can be inconsistent. For instance, an e-learning program may not have been labeled as 'e-learning' and therefore would not have been found for this review. Therefore, despite systematic searching of the literature, studies may not have been found for this reason. Only papers published in English from electronic databases were included. Thus, the context was limited to more Western countries. This review did not include 'grey literature' such as hospital policies or government documents (Hopia et al., 2016). The integrative review methodology is still evolving, which includes questions about methodological rigor, as well as the potential of introducing unknown biases when combining different methodologies (Hopia et al., 2016). There

was only one researcher coding and summarizing the data, and this presents limitations as well (Hopia et al., 2016).

IMPLICATIONS FOR ADMINISTRATION

Educators and administrators could use this information to help inform future design, development, and delivery of e-learning in their organization. By considering the suggested prerequisites for e-learning this could reduce current barriers. E-learning is proposed to be a more cost-effective method of education delivery and an easier way to deliver training to staff on shiftwork, who are typically difficult to schedule education for. E-learning has the potential to reduce educator time which could reduce costs and free up time to support nursing education elsewhere. Administrators could save on costs of training, such as the need for printed materials, required teaching space, or paid training time for their staff (Thorne et al., 2015; Wahl & Latayan, 2011).

IMPLICATIONS FOR PRACTICE

E-learning could be a valuable education tool for nurses because of its suggested abilities to overcome barriers to continuing education, which could positively impact the nurses, hospitals, and patients. E-learning shows promise as a continuing education method for nurses, either in a hybrid form or as a primary method. There are also considerations for potential areas of improvement in e-learning such as designated time and space for e-learning learning (Cottrell & Donaldson, 2013; Ilott et al., 2014), links to policy (Green & Huntington, 2017), and seeking staff input for developing e-learning (Latif et al., 2017).

FUTURE RESEARCH

Future research could explore the e-learning perceptions of nurses in a smaller, and more northern city setting as it is unclear how comparable the findings are in this context. Additional

evidence in the form of experimental randomized control trials could be undertaken to compare traditional classroom learning with e-learning in terms of test scores or measurable practice changes. Clear empirical evidence could be sought to support the claims of cost savings and time savings from e-learning. The development and application of hybrid e-learning is not well explored in the literature and further study of this area could be conducted.

CONCLUSION

Through this integrative review, research articles were found, appraised, and synthesized to provide a multiple methodological perspective and understanding of e-learning for nurses. The findings of this paper highlighted the potential benefits of e-learning for nursing continuing education as well as benefits to patient care and to the hospital organization. Challenges were highlighted relating to implementing e-learning, along with potential solutions and improvements. Potential future application of e-learning was brought forth in the form of hybrid e-learning that may provide the best of both learning methods. Further areas of inquiry were highlighted including the need for empirical evidence to determine the circumstances where e-learning could be an alternative option for access to quality continuing education.

It is unclear if nurses in Northeastern Ontario perceive the same benefits and challenges from e-learning identified in this review. Research on e-learning in this population and context is warranted. The results of such a study could potentially help inform policy makers and educators in future design, development, and delivery of e-learning in Northeastern Ontario hospitals. Improved quality of education and training for nurses would support learning needs and competencies as well as quality patient care.

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APPENDIX C: ARTICLE REVIEW SUMMARY

Authors	Country	Design	Level of Evidence	Sample and Setting	Focus of Study	Data Analysis	Findings on E-learning		
							Benefits	Barriers	Improve
1. Hurst & Marks-Maran (2011)	UK	Qualitative	VI	34 RNs single site	RN experiences of virtual patient prescribing	Framework Method of qualitative data Percentages	•	•	
2. Wahl & Latayan (2011)	US	Qualitative	VI	2000 RNs single site	Description of a pilot project of e-learning	Thematic and cost calculations.	•	•	
3. Eyres, Richards, James, Morton, & Sweeney, (2012)	UK	Mixed Method	IV/VI	1246 NHS health care workers	Impact of RN e-learning on insulin safety on department practice	Descriptive analysis Thematic analysis	•		
4. Cottrell & Donaldson (2013)	UK	Qualitative	VI	7 RNs	RN opinions of an e-learn on blood transfusion	Thematic analysis	•	•	•
5. Rankin, Then, & Atack (2013)	Canada	Mixed Method	III	132 Emergency RNs	Impact of web learning on the accuracy of triage training?	Chart audits Fisher exact test Statistical analysis Survey responses Interview analysis	•		
6. Blackman, Mannix, & Sinclair (2014)	Australia and NZ	Quantitative Survey	IV	101 hemodialysis RNs	Self-confidence after an e-learn for buttonhole cannulation	PLS-PATH Strength of relationships psychometric test using four-point Likert scale	•	•	•
7. Ilott et al. (2014)	UK	Mixed Method	IV	22 RNs 10 HCAs single stroke rehab	The learning effect and cost savings of a blended e-learn on dysphagia for stroke patients	SPSS/PASW Wilcoxon signed rank test, Friedman test Content analysis Cost calculation	•	•	

Authors	Country	Design	Level of Evidence	Sample and Setting	Focus of Study	Data Analysis	Findings on E-learning		
							Benefits	Barriers	Improve
8. Lahti, Kontio, Pitkänen, & Välimäki (2014)	Finland	Qualitative	VI	35 Psychiatric RNs	How e-learning transfers knowledge, changes practice, and RN experiences.	Content analysis	•		
9. Liu, Rong, & Liu (2014)	Taiwan	Mixed Method	II/VI	216 Psychiatric RNs	Description of the development and effectiveness of an e-learn for psychiatric RNs	5-point self-perception scale SPSS statistical significance Generalized Estimating Equation	•		
10. Shaw et al. (2014)	Australia	Participatory Action Research	VI	151 HCPs incl. RNs	To describe and discuss the access to an e-learn on cancer care information for health care providers	Surveys Focus groups Individual interviews Website usage statistics	•	•	
11. Murphy, Worswick, Pulman, Ford, & Jeffery (2015)	UK	Qualitative	VI	43 HCPs 26 RNs	Health care provider's opinions and attitudes towards an e-learn on nutrition for cancer survivors	Thematic analysis	•		
12. Johnson, Kelly, Siric, Tran, & Overs (2015)	Australia	Non-experimental Pre-post, observation, chart audits	IV	HCPs incl. RNs at two sites	Investigate the impact of an e-learn program on falls risk screening, fall prevention and post fall management	Descriptive statistical analysis with chi-squared SPSS 19.0	•		
13. Thorne et al. (2015)	UK	Quasi-experimental	III	27170 HCPs incl. RNs	How an e-learn hybrid ACLS course compared to a traditional one	Compared test and simulation pass rates between two groups SPSS 22	•		•

Authors	Country	Design	Level of Evidence	Sample and Setting	Focus of Study	Data Analysis	Findings on E-learning		
							Benefits	Barriers	Improve
14. Detroyer et al. (2016)	Belgium	Mixed Method	IV/VI	54 RNs and 59 HCPs single site	The effect of a delirium e-learn tool of HCP's delirium recognition, knowledge and care strain	Descriptive analysis Percentages McNemar's test, Paired t-tests, Wilcoxon sign rank SPSS 16 and SAS 9.2	•		•
15. Green & Huntington (2017)	NZ	Participatory Action Research	VI	10 RNs	What strategies would help a diverse group of RNs in their e-learning	Thematic analysis	•	•	•
16. Latif, Carter, Rychwalska-Brown, Wharrad, & Manning (2017)	UK	Participatory Action Research	VI	7 pediatric RNs and 4 pediatric patients	Description of co-producing an e-learn on children self-harm with patients and RN staff	Thematic and topical analysis	•	•	•

Chapter 3

NORTHEASTERN ONTARIO NURSES' PERCEPTIONS OF E-LEARNING

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ABSTRACT

Background: E-learning as a form of continuing education for registered nurses has become a common method for supporting competencies and learning needs. However, variations in setting, information technology, and quality of the e-learning may impact nursing experiences.

Objective: To explore and describe nurses' perceptions of e-learning in a hospital setting in Northeastern Ontario, Canada.

Design: A qualitative study using Thorne's Interpretive Description methodology.

Setting: A small urban Northeastern Ontario hospital.

Participants: Ten registered nursing staff from acute medical and surgical inpatient departments.

Method: Guided by adult learning theory and the e-learning theoretical framework, individual semi-structured interviews were conducted to explore nursing e-learning perceptions. Interview transcripts were analyzed for themes.

Results: *Bridging the Gap* was the overarching theme describing the participants' perceptions of e-learning and how e-learning related to their continuing education. This theme was supported by three subthemes: *Unsatisfactory Learning Experiences*, describes barriers to e-learning, *Meaningful Learning Experiences*, describes ways that e-learning facilitates continuing education and *Enhancing Learning Experiences* describes ways that e-learning could be improved.

Conclusion: E-learning is a useful method of continuing education for registered nurses. There are challenges for the delivery of e-learning and ongoing need for quality development. There are several areas of nurses' e-learning requiring further inquiry.

Keywords: E-learning, Continuing Education, Nursing, Northern, Rural, Remote

INTRODUCTION

Continuing education is imperative for nurses to remain competent (Canadian Nurses Association, 2004; College of Ontario of Nurses, 2002) and to promote quality patient care (Baumbusch et al., 2017; Davis, Taylor, & Reyes, 2014; Shulman, Leonard, Benner, Sutphen, & Day, 2013). Nurses experience challenges in meeting their continuing learning needs including insufficient time to review materials, lack of personal finances to attend courses, unsupportive workplace culture, poor access to relevant articles, and lack of computer skills to access electronic evidence-based practice literature (Santos, 2012). These barriers are compounded further for nurses living in northern, rural, and remote locations such as Northeastern Ontario. Carter, Horrigan, and Hudyma (2010) reported that distance and geography were barriers for continuing education for Canadian telehealth nurses and that technology has the potential to address these barriers. One such technology is electronic learning (e-learning) which offers potential solutions to these barriers because it is convenient, accessible, cost effective, current, and evidence-based (Blackman et al., 2014; Hurst & Marks-Maran, 2011; Ilott et al., 2014).

E-learning is a method of education with a broad definition (Sangrà et al., 2012). E-learning is an interactive distance-learning technology and its use is expanding rapidly in educational settings, such as universities and colleges (Aparicio et al., 2016). There are significant variations in e-learning contexts, technology, and quality that could impact nursing learning experiences. Exploring e-learning for geographically isolated nurses, such as those in Northeastern Ontario, would aid in understanding how e-learning can support them, whether it overcomes geographic, time, or financial barriers to continuing education, and how it could be improved to better meet the needs of these learners.

This article was written following the publishing guidelines of *Nurse Education Today*. However, it should be noted that this article is over the 5000-word limit. This was necessary in order to include adequate details and explanation of the methodology and guiding theories to satisfy the requirements of this thesis.

BACKGROUND

Published literature, in English, from 2010 to 2017 indicated that e-learning supported RN continuing education and competency requirements by improving nursing confidence and perceived abilities to perform skills. For instance, authors suggested that an outcome of nursing e-learning was improvements in administering insulin (Eyres et al., 2012) and nurse medication prescribing (Hurst & Marks-Maran, 2011). E-learning supported nursing knowledge retention immediately following the modules, for example, improvements were measured in studies on psychiatric patient management (Liu et al., 2014), triage training (Rankin et al., 2013), and Advanced Cardiac Life Support (ACLS) courses (Thorne et al., 2015). Researchers reported observable changes to nurses practices from e-learning for stroke rehabilitation dysphagia (Ilott et al., 2014) and nursing psychiatric practice (Lahti et al., 2014). E-learning promoted patient care by improving nurse confidence in administering blood transfusions (Cottrell & Donaldson, 2013), earlier patient delirium screening (Detroyer et al., 2016), and increased patient post-fall management (Johnson et al., 2015).

Nurses reported that e-learning was more flexible, accessible, convenient, and enjoyable than conventional education methods such as classroom learning (Blackman et al., 2014; Murphy et al., 2015; Shaw et al., 2014). E-learning can overcome some of the barriers to continuing education for nurses such as financial and time constraints because learners do not have to attend in-person classes (Green & Huntington, 2017; Liu et al., 2014; Murphy et al., 2015).

Geographically isolated nurses, who experience considerable costs associated with travel to conferences or professional development courses, are particularly likely to benefit from e-learning (Blackman et al., 2014). E-learning is easily updated because materials do not need to be printed and distributed like textbooks for conventional learning (Shaw et al., 2014; Thorne et al., 2015). E-learning can be less costly to deliver because there is less classroom space, educator time, and materials required (Latif, Carter, Rychwalska-Brown, Wharrad, & Manning, 2017; Thorne et al., 2015).

E-learning as an education method has prerequisites to consider before beginning this form of education as well as challenges that must be addressed for it to function properly. E-learning requires adequate information technology capacity and computers must be available to staff (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Wahl & Latayan, 2011). Nurses must be reasonably proficient with computers (Blackman et al., 2014; Green & Huntington, 2017; Shaw et al., 2014) and have enough time to complete the modules (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Wahl & Latayan, 2011). The e-learning modules must be of acceptable quality and design (Blackman et al., 2014; Hurst & Marks-Maran, 2011). Modules must be relevant, interactive, and sensitive to patient-needs (Latif et al., 2017). Nursing staff also need to be given the opportunity to practice the skills obtained through e-learning (Blackman et al., 2014; Cottrell & Donaldson, 2013).

Researchers proposed solutions to some of the challenges to successful nurse e-learning implementation, such as designating time and space for e-learning (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Wahl & Latayan, 2011), linking modules directly to policies (Green & Huntington, 2017), and consulting staff and patients in the development of e-learning modules (Latif et al., 2017). Researchers described hybrid e-learning models designed to address the need

for nurses to practice skills. Hybrid models consist of a combination of e-learning modules and in-person, usually hands-on, learning (Cottrell & Donaldson, 2013; Detroyer et al., 2016; Illott et al., 2014). For example, Thorne et al. (2015) described a training program with one day of e-learning followed by a day of hands-on and in-person training.

Evidence was found in the published literature that e-learning supports nurses' continuing education needs (Eyres et al., 2012; Hurst & Marks-Maran, 2011; Liu et al., 2014; Rankin et al., 2013; Thorne et al., 2015). Challenges to e-learning as well as potential solutions to meet these challenges were also identified. However, due to the significant variations in e-learning design, technology, and quality, as well as the unique context of geographically isolated and fewer educational opportunities for Northeastern Ontario nurses; the e-learning perceptions of these nurses remains unclear. Other unresolved research areas in the Northeastern Ontario context include assessing the impact of e-learning, determining if there are cost-savings, whether there are any challenges to delivering e-learning in this area, and whether there are areas for improvements.

METHODS

Study Aim and Design

The aim of this study was to gain insight into the perceptions of Northeastern Ontario RNs with e-learning in a hospital setting with a secondary goal to generate knowledge that could potentially contribute to the design, development, and delivery of e-learning. Thorne's (2016) qualitative interpretive description was used as a guide for this research, which considered existing nursing discipline and clinical knowledge to add clinically relevant information for practice. Theoretical scaffolding was used to create the foundation for the study, beginning with a literature review, then adding guiding theoretical structures and the disciplinary orientation.

The primary source of data was individual interviews exploring RN perceptions of e-learning (Thorne, 2016).

Guiding Theory

Adult learning theory by Knowles, Holton, and Swanson (2015) was utilized to aid in understanding the learning perceptions and needs of nurses. According to this theory, adult learners need: 1) to know why they must learn the content, 2) autonomy over their learning, 3) their previous experiences to be valued, 4) the learning to be presented at the right time, 5) the learning to be useful to solve a problem or perform a task, and 6) motivation for learning, such as promotion or personal improvements.

Analytic Framework

The e-learning theoretical framework by Aparicio et al. (2016) was used to guide this study. This framework describes e-learning as an interactive distance-learning technology. There are three key dimensions that a study using an e-learning theoretical framework should consider: the user, the technology, and the service (the learning content). People interact with e-learning systems and the technologies allow direct or indirect interaction between users (Aparicio et al., 2016).

Ethical Approval and Data Collection

Ethics approval was obtained from both the participating hospital and Laurentian University in Sudbury, Ontario, Canada. RNs were recruited and then interviewed one-on-one using semi-structured questions and a topical interview guide. The guiding interview questions were developed based on the literature review which served as a scaffolding for this study (Thorne, 2016). The questions were kept deliberately broad and had a two-fold purpose: 1) to explore whether the participants in this study had perceptions of e-learning similar to those found

literature such as benefits, barriers, and areas of improvement, and 2) to explore and elaborate on areas of e-learning that could be further refined or explored through future research. These questions were part of the initial research proposal and approved in conjunction with the thesis supervisor and the committee. See Appendix D for the guiding interview questions used in the study. Interviews were audio recorded and transcribed by the primary researcher. Supplementary field notes were taken during and after each interview.

Participants

A purposive sampling strategy was used to recruit as diverse a set of participant opinions as possible. The sample size necessary for this research was evaluated on an ongoing basis. Data collection concluded when rich descriptions that answered the research question were obtained (Morse, 2015; Thorne, 2016). There were 384 RNs eligible to participate in this study. Recruitment was undertaken through emails and posters over a five-month period from May to October 2017. Ten female RNs participated in this research. Due to the small sample size, the description of the participants is limited to protect their identity and confidentiality. The typical participant was degree prepared, between 25-45 years old, and had 5 to 15 years' experience as a registered nurse.

Setting

The setting for this research was a hospital in a Northeastern Ontario city with a population of approximately 50,000 that used e-learning as a key method for staff continuing education. The hospital is classified by the Ministry of Health and Long-Term Care (2018) as a general hospital with no fewer than 100 beds, includes rehabilitation beds, with chronic patients fewer than 200, with computerized axial tomography and magnetic resonance imaging equipment to support it and the surrounding region. This hospital is located in the North East

Local Health Integration Network (NELHIN) which provides health services to more than 565,000 people dispersed over 400,000 square kilometers and includes remote communities that are accessible only by plane, with the largest city in the region being the Greater Sudbury area with over 165,000 people (North East Local Health Integration Network, 2018).

The e-learning programs delivered at this hospital were computer-based, guided, and self-paced learning modules housed on the hospital's intranet. This hospital has used the Medworxx Learning Management System for e-learning since 2008. The majority of modules were developed in-house by the hospital's clinical nurse educators. The most common e-learning module was a self-paced PowerPoint presentation, accompanied by audio narration of the slides, accessed via the hospital's intranet. There were also videos. Nurses complete these modules as independent learning experiences. Each module is followed with a quiz to test for knowledge retention. A threshold is set for test results and, if not achieved, the participant repeats the module and the test until a satisfactory level is obtained.

The modules cover everything from yearly mandatory accreditation topics such as hand hygiene to more complex medical treatments such as administering blood transfusions. A dedicated education specialist manages and distributes e-learning modules to staff through email. The e-learning modules are assigned by hospital administrators and educators and were mandatory. These modules are expected to be completed by the nurses during their shifts in between patient care duties. These modules are expected to be completed within six months of being assigned. These modules could also be accessed from home, but on unpaid time. Participants were occasionally given paid time for their e-learning, free of working duties. Clinical educators were available to provide additional support for the staff's e-learning, but access to them could be inconsistent.

Data Analysis

Thorne's (2016) interpretive description methodology is a process for moving from data to patterns and from patterns to themes to find meaning and answer the research question. Data collection and analysis occurred concurrently as an iterative and non-linear process of identifying patterns and themes through coding. The data analysis was guided by focusing on the broader research question rather than micro-coding. The goal of the analysis was to gain insight that clinicians and educators could use rather than creating theory (Thorne, 2008, 2016).

Interviews were transcribed by the primary researcher, which reinforced familiarity with the data and allowed for additional insights into the tone and meaning of the participants' choice of words in the context of the interview (Thorne, 2008). Purposive and repeated immersions into the data occurred with the research question as the guiding focus. Reading and re-reading of the data facilitated grouping codes with similar characteristics. Notes, thoughts, and questions were written in the transcript margins. Field notes were used to record thoughts or ideas that occurred during and immediately following the interviews.

Thorne (2016) recommends the use of 'quoteables' which are illustrative quotes, or participant excerpts, that highlight an important section of data within the context of the interview. These quoteables were grouped together with the codes. The coding labels used in this study were initially kept as broad as possible to avoid the premature closure of codes and then refined as the process moved forward. Coding labels were taken from the data to answer the research question. Similar data pieces were organized in patterns and then these patterns were analyzed for themes that spoke to the essence, or meaning, of each section (Morse, 2008). This was further refined through repeated immersions into the data and by asking further questions of what was being seen and how it was being seen (Thorne, 2016). Themes were compared back to

the original transcripts to ensure that they accurately reflected participant experiences as well as across all data sets (Thorne, 2016).

Rigor

Epistemological credibility was achieved through researcher familiarity with interpretive description's knowledge paradigm of constructivism with a specific methodological goal of generating clinically relevant knowledge (Thorne, 2016). The qualitative nature of this study's question is congruent with Thorne's (2008, 2016) methods within this epistemological lens: the research is a transaction that occurs between the researcher and the research participants (LoBiondo-Wood & Haber, 2012). The researcher is the instrument of interpretation and the themes reflect the experiences of many people rather than the individual (Morse, 2015). Qualitative research is interpretive and inductive and this study used methods that sought understanding of nursing perceptions of e-learning, through in-depth interviews, and analysis of these interviews, that could describe and interpret these perceptions, what they could mean, and how they could be used to inform practice.

Representative credibility was achieved through a 'thoughtful clinician test' (Thorne, 2016) where this study's findings were formally presented to the study's population of nurses as well as educators and managers as a source of collateral data. The study's themes presented to the audience 'rung true' with them and were consistent with their experiences of e-learning. In particular, the subtheme of *Unsatisfactory Learning Experiences*, when presented with participant excerpts to illustrate and support the findings, had the audience nodding in agreement, chuckling to themselves, and had them commenting in a 'I am not surprised' tone during the presentation's question period. The audience expressed that they did not expect that e-learning would be perceived as positively as it was, under the subtheme *Meaningful Learning*

Experiences. The audience was pleasantly surprised about the supportive comments in this area when e-learning was found to be enjoyable and convenient. The majority of the questions from the audience focused on the subtheme *Enhancing Learning Experiences*, regarding which improvements could have the biggest impact of nursing e-learning, and which improvements would be the easiest to implement, such as, allowing for better user control options throughout the e-learn modules or having protected learning time.

Analytic logic uses audit trails and thick description of participant perceptions to ensure findings are credible (Thorne, 2016). Analytic logic is supported by excerpts from the transcripts that the reader could recognize (Morse, 2015), which interpretive description refers to as ‘quoteables’ (Thorne, Kirkham, & Macdonald-Emes, 1997). The details and logic of decisions made in this study were recorded to show the reader how themes were developed (Morse, 2015). Peer review and debriefing with the thesis supervisor and research committee were used to also ensure dependability. A research log and a reflective journal were kept to aid the auditability of findings (Thorne et al., 1997). This served as a place for thinking reflexively about the implications of the role of the researcher in data collection and helped to recount thoughts and control biases (Thorne et al., 1997). Questions such as: ‘what am I seeing’ and ‘how am I seeing this’ were used for this purpose.

Interpretive authority was achieved through the critical review of the findings and evaluating the numerous participant perspectives. This is done to ensure that findings were based upon the participants’ perceptions rather than the researcher’s experiences so that interpretations of the data are trustworthy and free of researcher bias (Thorne, 2016). Data excerpts were provided so the reader could follow the analytic reasoning and judge whether the findings were grounded within the data (Thorne et al., 1997). The identified patterns and themes were

constantly challenged as to how and why they were seen. Outlier or contrary experiences described by participants' were sought, and if not found, were theorized as to what they could be (Thorne, 2016). Outlier and contrary experiences were not found. The data was critically reviewed to monitor for premature closure to ensure that the collection and analysis of data did not stop at the first set of findings, or that subsequent findings were not shoehorned into these initial preliminary findings, which could risk overlooking larger and more profound understandings of the participants' experiences (Thorne, 2016).

FINDINGS

Bridging the Gap

Bridging the Gap was the overarching theme of the participants' perceptions of e-learning as it related to their continuing education. *Bridging the Gap* is supported by three subthemes: *Unsatisfactory Learning Experiences*, *Meaningful Learning Experiences*, and *Enhancing Learning Experiences*. These three subthemes describe the participants' perceptions of the challenges, facilitators, and improvements needed for their e-learning, respectively. See Figure 2.1 for a schematic of the themes.

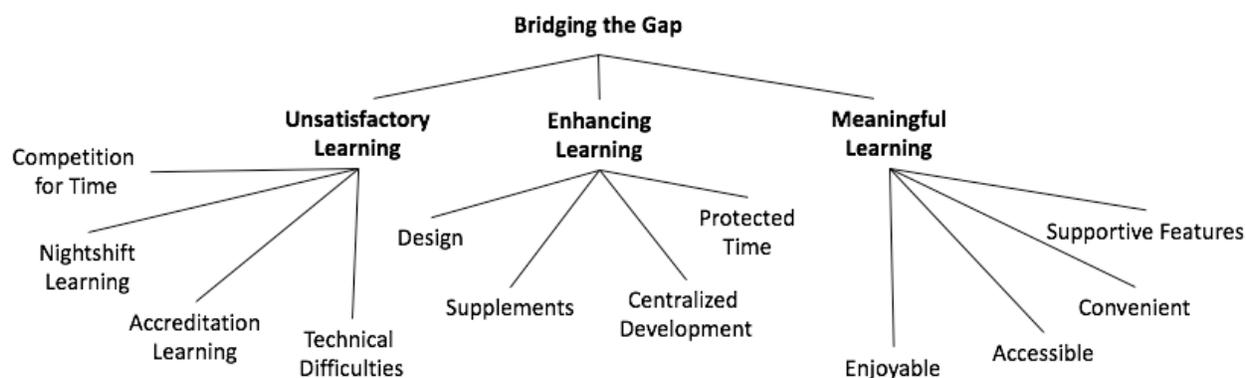


Figure 2.1 Schematic of Themes of Nurses' E-learning Perceptions

Unsatisfactory Learning Experiences

A subtheme in the participants' e-learning perceptions was *Unsatisfactory Learning Experiences*, which was learning that did not support their continuing education needs in a meaningful or useful way. Several factors contributed to the hollow learning aspect of e-learning including competition for time, nightshift learning, accreditation learning, poor design, and technical difficulties.

The participants described the competition for their time, or a lack of time, as a challenge for completing their e-learning. Participants were expected to complete their e-learning modules while simultaneously performing their nursing duties. The distractions and interruptions that occurred during the shift negatively impacted their ability to engage in their learning. One participant described:

There are nights when there are no call-bells that are ringing and I can go do the e-learning, go to my round, and all is well. There have been times when I have had to close an e-learning and come back to another day because the patient comes first. (RN7)

This quote demonstrates competing pressures for time and how this can impede RN e-learning.

Nightshifts became the default time for nurses to complete e-learning because day shifts were too busy. Nightshift e-learning presented challenges for learning because most of participants felt “foggy” (RN1) at night time. Sometimes the participants would just “go through the motions” (RN1) to complete their learning and not absorb the content. As one participant shared:

I usually do them on night shifts when I have the time. Which you would think is probably also a barrier just because I am not alert... I don't retain as much information on my night shifts as I probably would during the day. (RN10)

The majority of participants commented on how nightshift e-learning was not ideal for knowledge retention.

Participants described “accreditation learning” (RN8) in their e-learning perceptions, which was when an e-learning topic was found to be redundant but required for policy reasons. In these instances, e-learns were lacking “usefulness” (RN5), were viewed as “just another task” (RN3), or as a “chore” (RN10). One participant said:

The hand hygiene one, where you don’t have to read the slides and you don’t have to watch the video again you can just click through, and you can do it in two minutes. Is it really helping anyone? I guess it is just a benchmark to say ‘yeah, we know how to wash our hands’, as opposed to enhancing learning. (RN5)

These participants suggested that e-learning that covered simple and very familiar topics did not yield meaningful learning and was not a good use of time.

Poor e-learning design contributed to *Unsatisfactory Learning Experiences* when an e-learning topic was “too big” (RN5) in terms of time required to complete it or if the content was too complex. The participants also described inconsistencies in e-learning quality, such as when e-learns were found to be incomplete, contained incorrect information, or were not “realistic” (RN7). One participant shared:

I find a lot of them lack real world case scenarios. And the ones that do are very obviously fabricated and don’t really happen that way in real life. I find that if you were going to have case studies, which a lot of them should, they should relate to practice and capture the interest of whatever group that you are doing the e-learning for. (RN7)

Inconsistent and poor quality e-learn modules that lacked realistic situations resulted in unhelpful learning experiences for the participants.

Participants also described issues with technical difficulties, such as difficulties hearing the e-learning audio or losing content. As one participant found:

Sometimes you can’t really hear it, sometimes you can’t find the headphones, and there are headphones that have been around for like seven years and I don’t really want to put those on my head. A lot of the computers do not have speaker abilities. (RN8)

In other cases, the e-learn program itself was inefficient or stopped working and needed to be restarted, as expressed by one participant:

They take forever to buffer and it's just so slow and repetitive. I would rather just read the information for myself. And kind of apply that way. The videos I can't... I just can't (Laughing). (RN9)

Finding and accessing e-learns could be problematic, as one participant mentioned:

I was unable to find them; like the ones that require management approval. Our nurse educator was pushing and pushing and pushing for us to do these e-learnings. (RN8)

The participants suggested that making all e-learning modules available to the staff would better support their learning.

Meaningful Learning Experiences

Meaningful Learning Experiences was another subtheme that described participants' perceptions of their e-learning experiences. *Meaningful Learning Experiences* was described by participants as "enjoyable" (RN1), "beneficial" (RN8), and "useful" (RN4), in part because it was "less formal" (RN6), "evidence-based" (RN10), and "provided new knowledge" (RN7).

When the e-learning was enjoyable, accessible, convenient, and had supportive features, participants found it to be meaningful and useful to their continuing education. as this excerpt highlights:

I think the e-learns are wonderful because you can do them at your own pace, you can do them at your own speed. If you're on night shift and you want to do a couple of hours you can. (RN4)

The accessibility and convenience of e-learning was described as helpful, as highlighted in one participant's words: "it's nice that you can do it whenever you have time, there is no specific date, or you don't have to go to a classroom to learn something" (RN3). The e-learns modules could also be accessed afterwards as reference: "I think people who don't feel

comfortable can always go back and look at it again... I think it's very time efficient and a good way to learn" (RN4).

E-learning was perceived as flexible because modules could be done "at your own pace" (RN4). Another convenient feature of e-learning was that modules could be completed as an individual or as a group, which allowed for discussion between colleagues. As described by one participant:

I also find that doing it in a group is helpful because you can bounce ideas off of one another. You can ask questions and gain knowledge from your peers. (RN7)

The flexibility of e-learning allowed for group work and discussions that the participants appreciated and supported their learning

The participants described many supportive features of e-learning that they found helpful for their learning, especially when it had the right amount of "challenge" (RN1). As one participant shared: "some of the questions were a little bit tricky and I think that forces you to actually go back and seek out the information" (RN5). Some e-learns contained media that enhanced learning, such as images, audio, and videos, which helped to solidify learning. Participants found this useful: "if it is something that requires some demonstration then sometimes the videos have been good" (RN6). E-learning was also reinforced through the clinical educators, depending on their availability. As one participant described:

Sometimes the nurse educator will touch on it, she will go around and do a quick in-service just to kind of see where the knowledge of the topic is at. Our specific nurse educator she really makes it fun. She bribes us with candy and whatnot (laughing). (RN9)

Supportive features were important to the participants because they further promoted their learning.

Enhancing Learning Experiences

The subtheme *Enhancing Learning Experiences* described participants' perceptions on how e-learning programs could be improved. Areas for improvements included design, supplemental options, protected learning, and centralized development.

Participants suggested that e-learning could be more concise, more relevant, have better flow, and should have limits to the length of modules. Participants suggested that maximum time limits should be anywhere from 10 to 30 minutes, especially if the e-learning was to be completed while nurses provided patient care. As one participant excerpt highlights:

Ensuring that they are short and to the point so that is not taking: 15, 20, 25 minutes to go through each e-learning. Our shifts are busy we just don't have the time to dedicate to that. (RN10)

A couple of participants suggested better user-friendliness, such as the ability to pause or rewind the e-learn without having to restart from the beginning. Also, the ability to progress through the sections at their own speed, as one excerpt indicates: "if I read faster than someone else I would want the ability to skip through the screens as I read them (RN9). Participants wanted to have the choice between reading independently or watching the supporting video. One participant described:

If you could choose the option between watching the video and reading the content of the video, that would be perfect. Because forcing me to sit and listen to a 20-minute video (laughing) is torture. And often, when you've got call bells and you got other things going on and with videos there's no going back, you have to restart the entire thing. (RN9)

Having open access to all e-learns without the need for management approval was another suggestion. As one excerpt highlights: "having access to different e-learns on different topics would be helpful" (RN7). Participants suggested having immediate feedback on the post-tests: "even if they just give you a rationale behind why the answer is right or wrong" (RN2).

The ability to retest right away rather than having to wait 24 hours was also suggested because one participant felt this would help solidify the knowledge of the e-learn.

A couple of participants suggested having additional supplemental materials, such as videos, to support their learning. As one participant explained:

Especially because when you are listening to someone speak, they can emphasize what is important. Whereas on e-learning you can bold things or you can underline things and you can repeat them but it is not as effective. (RN5)

Another suggestion was to have more case studies available:

...information was presented to you and then you have the two case studies and then you had to return those to the nurse educator. Those I found helpful. (RN9)

Additional suggestions for supporting positive learning experiences were to have reference pictures of equipment and direct links to policies. One participant also described the need to practice the skills learned in the module and to interact with equipment from the e-learning either independently or with the educator. The participant elaborated:

You have the e-course component and then you do in class component and it didn't solidify for me until I had the hands-on component and I was able to program the Continuous Ambulatory Delivery Device pumps myself. (RN7)

The participants described the need for multiple methods of learning, including hands-on opportunity, to support their continuing education through e-learning.

Protected learning time was a suggestion put forward by most participants. Participants needed designated time, away from other work responsibilities, to overcome the barrier of e-learning's competition for time. One participant said:

...it would be nice to have designated education opportunities, just to be like someone's got your team covered. You have an hour or so to go do this e-learning. Like a formal, paid opportunity to just go and do them. (RN5)

One participant, who had experience working in other hospitals, noticed that training material, content, and quality varied between hospital organizations. Even for those hospitals within the same Local Health Integration Networks (LHIN) which are regional health authorities responsible for several hospitals and health services within a region. She shared:

I feel like this is something that is consistent throughout the LHINs, yet each hospital has a different e-learning for them and you are required to do the e-learning at each hospital you go to when that is something that could very easily be consistent throughout all the LHINs... it's a bit of an annoyance to do the repeat work if it is all based on best practice then why aren't they the same? (RN7)

Having e-learns developed centrally by experts and then disseminated to the hospitals, was another suggestion put forward by the same participant:

This is consistent and everything is done by one body; then you are not having too many hands in the pot. Additionally, it allows for more modern platforms to be used because you are not using the information technology guys here to create something on flash. (RN7)

The suggestion of developing e-learning from a central body could help to regulate nursing education and practice as well as increase the quality of the e-learning. This could be especially useful for those hospitals and nurses in more northern, rural, and remote settings that lack specialized education and resources.

In summary, the overarching theme *Enhancing Learning Experiences* described participants' perceptions of e-learning related to their continuing education. This was supported by the subthemes that described the participants' perceptions. The subtheme *Meaningful Learning Experiences* described the participants' perceptions of e-learning when it was experienced as enjoyable, accessible, convenient and had supportive features. The subtheme *Unsatisfactory Learning Experiences* described the participants' perceptions of e-learning when there was a lack of time to complete them, occurred on nightshifts, covered accreditation

learning, or if there were technical difficulties. The subtheme *Enhancing Learning Experiences* described the participant's perceptions of ways to improve e-learning in terms of design improvements, having additional learning supplements available, having protected learning time, and developing e-learning centrally to improve quality and evidence-based learning.

DISCUSSION

Bridging the Gap

Bridging the Gap was the overarching theme that was revealed from the analysis of the participants' descriptions of e-learning related to their continuing education. *Bridging the Gap* was supported by three subthemes: *Unsatisfactory Learning Experiences*, *Meaningful Learning Experiences*, and *Enhancing Learning Experiences*.

Unsatisfactory Learning Experiences

Unsatisfactory Learning Experiences perceptions described by participants included accreditation learning, time constraints, nightshift challenges, poor design, and technical difficulties. The e-learning modules were mandated by the hospital's educators and administrators and expected to be completed by the nurses while they also performed patient care. This situation led to a lack of time at work and workplace distractions as challenges to e-learning, which was also found by several authors in the literature (Ilott et al., 2014; Shaw et al., 2014; Wahl & Latayan, 2011). Adult learning theory can assist in understanding why these participants perceived unhelpful learning in these instances. For example, due to the barrier of a lack of time, or if the learning was not presented at the right time, it would not support adult learning because the learner was not ready or motivated to learn. Also, this kind of mandated learning by the employer does not respect the participant's or learner's autonomy and self-direction (Knowles et al. 2015).

Employment-based learning that is required learning presents an interesting scenario pertaining to responsibility. As previously stated, continuing education is imperative for professional competencies, licensing obligations, and quality patient care. The Ontario Nurses' Association, a union that represents 65,000 nurses in Ontario, has a collective agreement with participating hospitals that recognizes continuing professional development as a shared responsibility between the nurse and the hospital organization. As such, the hospital has obligations to provide a practice environment that supports continuing education (Ontario Nurses' Association, 2018). As for who is responsible for what falls to a hospital committee composed of the Chief Nursing Executive, Human Resources, and Union representatives. Each committee determines funding and supports and is responsible for the development of relevant policies. In short, responsibilities and accountabilities pertaining to continuing education are largely the subject of debate and negotiation

Multitasking and distractions, such as trying to complete an e-learning module while also providing patient care, can negatively impact nurses' ability to learn. Researchers suggest that nurses who are required to multitask or who are distracted experience reductions in performance, such as patient care errors (Bower, Jackson, & Manning, 2015; Kalisch & Aebersold, 2010) and negative impacts on their mental workload (Kim, Parameshwara, Guo, & Pasupathy, 2019). Researchers also suggest that multitasking diminishes students' ability to retain knowledge and, therefore, negatively impacts learning (Carrier, Rosen, Cheever, & Lim, 2015; Fulton, Schweitzer, Scharff, & Boleng, 2011; Zhang, 2015). There are two potential implications here: 1) nurses will not retain information while multitasking, e.g., they will not retain knowledge from an e-learning module if they are completing them while also providing patient care, and 2)

attempting to learn while providing patient care may negatively impact patients and the nurses' mental well-being.

Participants described the competition for time to be less prevalent on nightshifts. As such, nightshifts became the default time for participants to complete e-learning. Wahl and Latayan (2011) presented the option of nightshift e-learning as a positive feature for hard-to-reach shift workers. However, nightshifts can be a difficult time for nurses to focus (Registered Nurses Association of Ontario, 2010; Royal College of Nursing, 2012), which the participants in this study described.

Participants described experiences with e-learning modules that were of poor quality and design, took too long to complete, or were too complicated. As a result of this, the content of the learning was less likely to be transmitted to the learner. Adult learning theory would explain these issues as negative factors. If learning is poorly poor designed, it will not useful in solving a problem or performing a task (Knowles et al., 2015). This idea is consistent with those of researchers who suggest that e-learning must be high quality, design, and content to be useful (Blackman et al., 2014; Hurst & Marks-Maran, 2011), and that it needs to be relevant, appropriate, interactive, and patient specific (Latif et al., 2017). Poor quality can also result from content not being properly translated or formatted for an e-learning environment. This could speak to the necessity of better prepared e-learning modules. In a study by Carter et al. (2014), it was suggested that meaningful e-learning modules need to be properly adapted to the format, and that they are best prepared when experts, such as videographers, graphic designers, and app developers, work with subject matter experts and instructional designers.

Technical difficulties with e-learning were perceived by participants and included difficulty finding e-learning modules, computer program failure, or lacking audio equipment.

Authors stated that e-learning required accessible computers and adequate information technology (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Wahl & Latayan, 2011). Carter et al. (2014) suggest that there is a need for appropriate information and technology support. Technical difficulties can negatively impact the adult learning principles of learner motivation and readiness to learn. For instance, if there are barriers to learning such that excessive effort is required to access resources, then the learning payoff is diminished. The learner may lose motivation because there is a lack of intrinsic or worthwhile value in the learning activity (Knowles et al., 2015).

Authors suggested that senior nurses may struggle with computer proficiency and e-learning courses (Blackman et al., 2014; Green & Huntington, 2017; Shaw et al., 2014). However, participants in this study did not express this challenge. This could be due to this study's population and setting being more familiar with using computers than those in other study's, or it could reflect how in recent years, computers are now a standard tool in healthcare and nurses have become accustomed to them.

Meaningful Learning Experiences

Meaningful Learning Experiences were described as enjoyable, accessible, convenient, and supportive. Generally, participants found that the e-learning was well designed, useful, and preferable to traditional classroom learning environments. These findings were consistent with other authors' research, which found that e-learning increased nursing self-perceptions of abilities, knowledge, and confidence (Eyres et al., 2012; Ilott et al., 2014; Johnson et al., 2015). Knowles et al. (2015) theory could help explain this experience, that because this learning provided useful skills and motivation, it would be well received by the learner and therefore be an *Meaningful Learning Experiences*. Researchers also found empirical evidence of increases in

knowledge retention of nursing related skills that suggests e-learning is accommodating and useful to nurses' learning (Ilott et al., 2014; Liu et al., 2014; Rankin et al., 2013).

Participants in this study appreciated e-learning's accessibility: that it could be done at any time, from any computer, and even from home. This finding was supported by researchers' findings. E-learning was described as flexible, accessible, convenient, and an enjoyable way to learn (Murphy et al., 2015; Rankin et al., 2013; Shaw et al., 2014). Participants in this study occasionally completed e-learning as a group. However, this occurrence was opportunity dependant and rare. Group e-learning does highlight a way in which the benefits of classroom room learning, such as discussion, could be incorporated into e-learning. It is unclear if e-learning was designed for group learning, and group e-learning is not mentioned by the researches in the literature.

The participants also appreciated the supportive features of videos, audio, and case studies that they could use to practice and apply their learning. These features have the potential to accommodate those who prefer learning through hands-on experience. These e-learning features would result in *Meaningful Learning Experiences* because they are in harmony with Knowles et al. (2015) theory of 'self-concept' of learning and respects the previous experience of the learners. The prevalence of media within e-learning modules was not clear in the reviewed literature and could be explored further.

Enhancing Learning Experiences

The *Enhancing Learning Experiences* encompassed the participants' suggestions for improvements to e-learning in terms of design, supplemental options, protected learning time, and centralized development for the e-learners. Suggested design improvements for e-learning modules were to make them more concise, flow better, and be limited in time and size. There

was a variety of suggestions from participants regarding time and size limits. These are important considerations that are supported by researcher's findings: e-learning modules and courses need to be of acceptable quality and be relevant (Blackman et al., 2014; Hurst & Marks-Maran, 2011; Latif et al., 2017). This study's participants suggested that the e-learning technology could have user-controls that allow them to progress forwards, backwards, and pause it easily, without having to restart the whole module. This would also support nurses' learner autonomy, value their previous experiences, and present learning at the right time (Knowles et al., 2015). Having open access to the library of e-learning, without the need for managerial approval, was also suggested. For e-learning post-tests, the participants suggested to have immediate answer feedback and correction that would aid the user in understanding the content.

Many participants suggested having optional learning supplements to support different learning styles, such as videos, links to policies, and case studies. This is consistent with adult learning theory's claims that learners need a sense of 'self concept,' a respect for previous learning experiences, and learning preferences (Knowles et al., 2015). Researchers also support the ideas that direct links to policy documents should be provided within the e-learning module (Green & Huntington, 2017), and that patients' and nurses' input should be part of the development of content (Latif et al., 2017).

Many of the study's participants suggested the need for protected learning time and space to reduce distractions and competition for time. Protected time and space for e-learning has been recommended by researchers who suggest that e-learning could be scheduled and free of work distractions (Cottrell & Donaldson, 2013; Green & Huntington, 2017; Ilott et al., 2014). This strategy would also support the concept of introducing learning at the right time and respect learner autonomy (Knowles et al., 2015).

Participants identified a need for hands-on or practical learning experiences. Practical learning often happened with the clinical educator or with a colleague, but was opportunity dependent. This would satisfy the adult learner's need for useful and practical skills (Knowles et al., 2015). Study findings by Cottrell and Donaldson (2013) point to the value of a blended approach so that nurses can practice skills related to administering blood transfusions first learned through an e-learning experience. Similarly, Blackman et al. (2014) suggest that nurses still need the opportunity to practice hands-on use of the equipment for buttonhole cannulation for dialysis patients to complement their e-learning about the process. There were examples of hybrid e-learning in the literature, where content was delivered by e-learning and was then solidified with hands-on learning (Cottrell & Donaldson, 2013; Detroyer et al., 2016; Ilott et al., 2014; Thorne et al., 2015). The area of hybrid e-learning in nursing continuing education has the potential to bridge the need of hands-on learning.

One participant suggested having e-learning modules developed centrally by a group of experts and then disseminated to the hospitals. There were examples of this in the literature, such as online resources for cancer patient care (Murphy et al., 2015; Shaw et al., 2014) and Advanced Cardiovascular Life Support training (Thorne et al., 2015) for health care providers. Centralized e-learning development could result in higher quality and design. The rationale behind this is that these e-learning modules could be more evidence based, and be more cost effective, if one team of experts designed them. Rather than have every individual hospital educator developing their own e-learning, in isolation, because the experts would have more resources to support them, and likely produce a better learning product. This could also potentially free up educators' time so they could support the needed practical learning suggested by this study and the literature (Thorne et al., 2015).

LIMITATIONS

This study has limitations. The primary researcher was an employee of the hospital where this study took place, which could introduce bias relating to previous experiences and opinions about nurses' e-learning despite careful reflexivity (LoBiondo-Wood & Haber, 2012). However, this scenario could allow for insider insights and familiarity with the study's topic and nuances and potentially help understanding and interpretation of the research (Greene, 2014).

Coworkers in the same department as the researcher were not recruited for this study to reduce potential researcher influence and conflict of interest. This did eliminate the opportunity for this group of people to share their perceptions which may have provided additional or different insights into nursing e-learning and introduce sample bias (LoBiondo-Wood & Haber, 2012).

This was a single site study, with a small sample size, and without male participants, which could impact the results (LoBiondo-Wood and Haber, 2012). However, this sample size and setting are still consistent and appropriate with interpretive description's methodology (Thorne, 2016). Although purposive sampling was employed for the participants, not all nurses' opinions may have been represented. Outlier cases were actively sought out, but it must be acknowledged that outliers may not have been found and these insights may not have been captured and included in this thematic analysis. Qualitative research is built upon the paradigm of constructivism epistemology and accepts the shared realities and interpretation of these realities (LoBiondo-Wood & Haber, 2012).

The term e-learning can describe many different programs (Aparicio et al., 2016; Sangrà et al., 2012). The e-learning system assessed in this study could be significantly different from other settings and its transferability to other contexts may therefore be limited. To assist the

reader in this regard, details about the setting, e-learning modules, and participant excerpts were presented to create an audit trail, and increase research credibility (Thorne, 2016). Despite these limitations, this study's findings illuminated nursing perceptions of e-learning and could be applicable and relevant to other similar contexts that use hospital-based e-learning for its nursing staff.

IMPLICATIONS FOR NURSE EDUCATORS AND ADMINISTRATORS

Clinical educators could consider the need for hands-on learning, the length of time of individual e-learns, the time of day that e-learning is expected to be completed, and the content of the e-learning. Administrators could consider the feasibility of centralized development of e-learning for the potential cost savings in development time and resources and increase in quality.

FUTURE RESEARCH CONSIDERATIONS

E-learning as a method of nurses' continuing education could use further exploration. Researchers could explore optimal design features to support continuing education in terms of the length of e-learning modules and the time of day when modules are completed, or if nightshift e-learning is appropriate. Researchers could investigate how other learning methods such as group-work or hybrid e-learning could best support RN continuing education as well as how protected learning time could work in a hospital setting. Research on the centralized development of e-learning modules could be undertaken as to how they could be developed and by whom. Also, whether centrally developed e-learning quality could improve e-learning in terms of: the use of evidence, better design, or if it would be more cost-effective. Additionally, comparing e-learning outcomes with conventional learning methods, ideally in a randomized control trial, could provide insight into the effectiveness of e-learning.

CONCLUSION

E-learning could be considered a useful method of continuing education to support Northeastern Ontario nurses' learning. However, there are challenges for the delivery of e-learning and there is a need for ongoing quality development. The findings of this study have the potential to inform future design, development, and delivery of e-learning for nurses to support continuing competencies and patient care.

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Appendix D: Guiding Interview Questions

Warm Up Questions:

1. Could you please tell what department you work in?
2. What is your role there?

Personal Learning Strategies

3. What do you do to meet your continuing learning needs?
4. As a nurse with respect to your continuing learning needs: Can you tell me what is your preferred/optimal way to learn?
5. What challenges if any, hinder you in meeting your continuing learning needs?
6. How does Hand-on, or practical, learning happen for you? Is this important to you?

E-learning Specific Questions

7. What is your experience of e-learning?
8. What kind of things have you found helpful for your e-learning?
9. Have you experienced any challenges to using e-learning? If so, what are they?
10. What suggestions or improvements, if any, would you like to see from e-learning?
11. If you could change anything about the e-learning, what would it be?

Conclusion

12. Are there any other comments that you would like to share about e-learning that we have not touched upon?

Do you have any questions before we end?

Thank you for your time.

Chapter 4

4.1 Introduction

This final chapter provides a review and summary of the first three chapters, including the background, research focus, and key findings of the integrative review and interpretive description study. Then, the guiding theory and framework are connected to the research and implications for nursing practice are explored. The limitations of this thesis are presented and suggestions for future research are put forward followed by the conclusion of the thesis.

4.2 Background

Continuing education is imperative for nursing competencies (Canadian Nurses Association, 2004; College of Ontario of Nurses, 2002), and supports nurses in providing high quality patient care (Baumbusch et al., 2017; Davis et al., 2014; Shulman et al., 2013; Staffileno & Carlson, 2010). However, nurses face challenges in meeting their continuing education needs due to time and financial constraints, unsupportive work culture, a lack of relevant learning materials, and a lack of competency in accessing electronic evidence-based practice literature (Santos, 2012). These challenges are exacerbated for nurses in Northeastern Ontario due to its geographic remoteness, low population densities, fewer resources, and inclement weather (Al-Hamad & O’Gorman, 2015; Ministry of Health and Long-Term Care, 2010). E-learning has been proposed to overcome these barriers and has been rapidly implemented in many different realms of education (Aparicio et al., 2016).

4.3 Research Focus

This thesis explored registered nurses’ (RNs) perceptions of e-learning in Northeastern Ontario. This research intended to generate knowledge for nurses, clinical educators, and health care administrators to support nursing continuing education and competencies.

4.4 Literature Review

The literature review, guided by Whittemore and Knafl's (2005) integrative review methodology, found three key themes based on the synthesis of the published literature. E-learning has benefits for nurses' learning, the hospital, and the patient; there are barriers to e-learning; and there are improvements to e-learning that could be made. The literature was international in scope, and additional research was warranted for nurses in a Northeastern Ontario setting.

4.5 The Research Findings

The qualitative research study, guided by Thorne's (2016) interpretive description methodology, explored Northeastern Ontario RN's perceptions of e-learning. This particular methodology enabled rich descriptions of this phenomenon based on each participant's perceptions. The findings were described and interpreted as themes and subthemes that could inform clinical practice. This research process also identified potential future research questions which may inform where future research including opportunities best suited for quantitative methodologies.

The overarching theme *Bridging the Gap* described nurses' perceptions of their e-learning experiences related to their continuing education needs. This overarching theme was supported by the subthemes; *Meaningful Learning Experiences* described RN's perceptions of e-learning that were helpful for their continuing education; *Unsatisfactory Learning Experiences* described the barriers nurses perceived in their e-learning experiences that impeded their continuing education; and *Enhancing Learning Experiences* described RN's suggestions as to how e-learning could be improved.

4.6 Guiding Theories

The two guiding theories assisted in organizing and understanding the findings of this study; adult learning theory as described by Knowles, Holton, and Swanson's (2015) and the e-learning theoretical framework by Aparicio et al. (2016).

4.6.1 Adult learning theory. Adult learning theory by Knowles et al. (2015) assisted in understanding and interpreting participants' perceptions of e-learning as a continuing education method. In instances where participants described features of the e-learning to be *Unsatisfactory Learning Experiences*, the e-learning may not have adhered to the principles of autonomous or self-directed learning axioms, or the purpose of the learning was not obvious or useful to solve a problem (Knowles et al., 2015).

The nurses in this study were directed to complete their e-learning by the hospital organization. They did not voluntarily elect to complete e-learning for their own learning needs. Employer-required e-learning is seemingly incongruent with adult learning principles as it runs counter to two principles pertaining to the self-concept of the learner. Ideally, the adult learner should be autonomous and self-directing (Knowles et al., 2015). In the case of this study, the hospital is deciding what the learner needs to learn and how he or she will learn it rather than allowing the learner the chance to choose what to learn and how to do so (Knowles et al., 2015). Disregard for the principles of adult learning could explain why, in this study, e-learning was experienced by some nurses as unsatisfactory learning. As an example, the annual hand hygiene e-learning modules were mandatory, tied to hospital accreditation, and covered a familiar topic. A big part of motivation to learn comes from intrinsic value or personal payoff for adult learners (Knowles et al., 2015). As such, it is important that learning is personally motivated, not mandated. Even though hand hygiene compliance is imperative for nurses and patient safety,

these e-learning modules did not present new or useful information. As a result, respect the participants' prior knowledge and familiarity with a fundamental topic was not shown (Knowles et al., 2015) and may have resulted in complacency. Perceived familiarity with a topic or repetition can result in complacency. For instance, while all health care workers are aware of the importance of hand hygiene, they can be complacent about learning related to it. Numerous and varied strategies may help in addressing this situation (Samuel, Almedom, Hagos, Albin, & Mutungi, 2005).

When e-learning was described as *Meaningful Learning Experiences*, or useful learning, it was in harmony with the adult learning theory in that it supported learner autonomy or gave new knowledge or skills that could accomplish a task (Knowles et al., 2015). For example, an e-learning module on blood transfusion administration presented a less familiar but important and complex topic. This module did a better job of respecting the nurses' prior knowledge and gave specific and relevant information on how to administer a transfusion blood product, which was a useful and important skill. Therefore, this e-learning module was more congruent with adult learning principles (Knowles et al., 2015).

Enhancing Learning Experiences described the participants' suggestions for improvements to e-learning. These improvements could bring e-learning more in line with adult learning theory principles, such as improving motivation and readiness to learn. As an example, study participants suggested having protected and designated learning time for completing e-learning modules. The current e-learning practice was that participants completed them while on duty and would often be distracted from their learning by patient care needs. By eliminating the distractions of nursing duties, the nurse could focus on their e-learning, and would be more likely

to retain the learning content because it was presented at the right time, and not while competing for the nurse's attention (Knowles et al., 2015).

4.6.2 E-learning theoretical framework. The e-learning theoretical framework by Aparicio et al. (2016) provided guidance in the organization of the complex concepts of e-learning. The framework provided a concise definition of e-learning, a historical perspective of e-learning development, and considerations for three key elements that a study of e-learning should include: the user, the technology, and the services (the learning content). This framework also incorporated education and learning theories, specifically pedagogy, to better understand e-learning as a method of education.

This thesis contained the three key elements of the e-learning theoretical framework: the user, the technology, and the content - both in the integrative review and the interpretive description study. In the integrative review article, the resulting synthesis and findings explored the nurses' experiences of e-learning (the user), how e-learning modules were delivered and where it could be improved (the technology), and how the content and learning from the e-learn impacted nursing practice (the learning content). In the interpretive description study, the perceptions of the users were explored (the user), recommendations for technological adaptation and adjustments were shared (the technology), the service and educational content was elucidated, and suggestions for improvement were made (the learning content).

4.6.3 Combining adult learning theory and the e-learning theoretical framework.

The e-learning theoretical framework's underpinnings are based in pedagogical theory, which is the 'basis of learning theory' according to the framework (Aparicio et al., 2016). This framework could potentially be at odds with adult learning theory (andragogy), which is the guiding theory used in this thesis. Some of the principles of andragogy seemingly run counter to pedagogy

(Knowles et al., 2015). Andragogy's axioms are that the adult learner is unique and self-motivated, while pedagogy believes that the learner must be lead along the path of learning - like a child (Knowles et al., 2015). At the same time, there are learning situations in which pedagogical approaches are appropriate for adults, particularly when the learner has little previous knowledge about a topic (Knowles et al., 2015). In such cases, these learners often do not have a sense of where to begin, or what they would need to know, and it may be helpful for them to be told what they need to know. Exploring whether there is a possible reconciliation of these two paradigms was beyond the scope of this thesis but would be worthwhile to explore in the future.

4.7 Implications for Nursing Practice

4.7.1 E-learning supports nursing continuing education. This thesis presents several potential implications for nursing practice both in a Northeastern Ontario setting and in a more general context. First and foremost, e-learning can support nursing continuing education. E-learning has features that can overcome barriers to continuing education because it is accessible, can be delivered from a distance, and asynchronously (Aparicio et al., 2016). Nurses have found e-learning to be more convenient, accessible, and enjoyable compared to traditional learning methods (Hurst & Marks-Maran, 2011; Ilott et al., 2014; Shaw et al., 2014). E-learning can overcome barriers such as time constraints (Green & Huntington, 2017; Liu et al., 2014; Murphy et al., 2015), costs (Green & Huntington, 2017; Wahl & Latayan, 2011), as well as distance and geography for rural and remote nurses (Blackman et al., 2014). Similarly, participants in this study perceived e-learning to be an enjoyable way to learn, and reported that e-learning was accessible, convenient, and had supportive features.

4.7.2 Addressing e-learning barriers. The above section highlights how e-learning can be a useful method of continuing education for nurses. However, e-learning also has its challenges. This section presents suggestions for overcoming these barriers.

E-learning barriers were present both in the literature and in this study's findings. For instance, there is a clear need for appropriate information technology and support in e-learning (Cottrell & Donaldson, 2013; Hurst & Marks-Maran, 2011; Shaw et al., 2014). Nurses also need enough time to complete the e-learning modules (Cottrell & Donaldson, 2013; Hurst & Marks-Maran, 2011; Shaw et al., 2014). Participants in this study expressed similar barriers such as technological challenges and a lack of time to complete their e-learning.

The participants had suggestions for improvements for e-learning. For example, there is a need to further refine e-learning modules through design improvements, such as by creating more concise and relevant e-learn modules with user-friendly controls; providing supplemental options, such as optional videos, case studies, and links to hospital policies; providing protected learning time, such as paid and designated time away from work duties; and centralizing the development of e-learning, such as a group of experts who could develop the e-learning modules and then distribute them. An example of centrally developed e-learning would be the Registered Nurses Association of Ontario (RNAO) e-learning series which offers open access web-based learning for nurses, such as the tobacco cessation module to assist nurses in helping patients to quit smoking (Registered Nurses Association of Ontario, 2018)

4.7.3 Implementing Change. In Ontario, the responsibility of continuing education falls on the nurse by way of professional competency standards (Canadian Nurses Association, 2004; College of Ontario of Nurses, 2002) and the hospital organization via collective agreements (Ontario Nurses' Association, 2018). As such, as new evidence is found to inform continuing

education practices, both nurses and hospitals bear responsibility for potential changes. However, in this study's context, the continuing education is mandated e-learning for nursing staff in a hospital setting. Therefore, if the employer is implementing e-learning for staff and it has been found that there is room for improvement, hospital administrators and educators should bear responsibility for making appropriate changes. As this thesis suggests, there is room for improvement in relation to quality, protected learning time, and knowledge translation. To implement these changes, relevant policies (Howlett, Ramesh, & Perl, 2009) and items in collective agreements (Ontario Nurses' Association, 2018) are required.

4.8 Limitations

There are limitations to this thesis. Some methodological limitations are inherent in each articles' applied methodologies, which are presented in their respective sections. These will briefly be restated in this section.

The integrative review was comprised of international articles and had limited transferability to a Northeastern Ontario setting. The review itself may be limited because only studies published in English between 2010 and 2017 were included. Terminology related to e-learning may be inconsistent in the published articles, which may impact the findings (Whittemore & Knafl, 2005). There may be unresolved issues of rigor in integrative reviews when combining articles with different methodologies for analysis (Hopia et al., 2016). The data was coded and summarized by one researcher, which presents a potential for bias (Hopia et al., 2016).

Interpretive description is a qualitative methodology and, thus, has particular limitations. The transferability of findings ultimately comes down to judgement, particular need, and applicability of the research (Thorne, 2016). Based on this, while qualitative research lacks the

generalizability of quantitative methods, it can offer a deeper understanding of a phenomenon, can answer questions that measurements alone may not, and generate questions and ideas requiring further investigation (LoBiondo-Wood & Haber, 2012).

The primary researcher was an employee at the study hospital which could introduce bias relating to previous experiences and opinions about e-learning (LoBiondo-Wood & Haber, 2012). In the researcher's experience, some e-learning modules were unhelpful because they did not give new or useful information. However, the researcher's familiarity with the study's setting also had the benefits of insider insights and familiarity with the study's topic and nuances (Greene, 2014).

This was a single site study with a small sample size which could impact the results and transferability as well as introduce bias (LoBiondo-Wood & Haber, 2012). However, this sample size and setting are still appropriate for interpretive description's methodology (Thorne, 2016). This study did adhere to the criteria for rigor as outlined by the methodology. For instance, representative credibility was achieved through a 'thoughtful clinician test'. This source of collateral data was included when the study's findings were formally presented to the study's population of nurses, educators, and managers, which they found consistent with their own experiences of e-learning (Thorne, 2016).

This study did not have any male participants. As a result, different perceptions of e-learning tied to gender may have been missed. Researchers have suggested that males and females may have different learning preferences, with females having a greater preference for combinations of learning approaches in addition to traditional methods of learning (Benditz et al., 2018; Nuzhat, Salem, Hamdan, & Ashour, 2013). Other researchers have indicated that male students have a kinesthetic learning style while female students prefer the aural learning style

(Sarabi-Asiabar et al., 2015). These findings point to gender-based learning preferences and differences that could have been meaningful in this study.

There is a wide variety of e-learning modules and the definition of e-learning is broad (Aparicio et al., 2016; Sangrà et al., 2012). This could lead to a variance in quality and design of an individual e-learning module. The e-learning modules in this study could be significantly different from e-learning modules elsewhere. This study provided descriptions of the setting, context, and e-learning programs in detail so that potential future readers could have enough information to judge for themselves the degree of this study's transferability to their context (Morse, 2015; Thorne, 2016).

4.9 Future Research

The articles in this thesis presented several areas of potential future research. Additional experimental research is needed to provide more high quality evidence on the effectiveness of e-learning for nurses. For example, randomised control trials could compare e-learning outcomes with traditional learning outcomes. Other topics that could be explored include the optimal size and length of e-learning modules, the appropriateness of e-learning on nightshifts, e-learning user controls, and the feasibility of centralized e-learning development. Additionally, exploring the cost-effectiveness of e-learning, group e-learning, hybrid e-learning, and determining the frequency, necessity, and feasibility of protected e-learning time could also be of value.

It could be worthwhile to explore further how two seemingly opposing learning theory paradigms could be reconciled and applied to e-learning; pedagogy, in the e-learning theoretical framework, and andragogy, in the adult learning theory. There is a great deal of territory that could be investigated for this method of continuing education for nurses in Northeastern Ontario and beyond.

4.10 Conclusion

E-learning, as a method of continuing education, has potential to support nurses' learning and competencies in Northeastern Ontario and abroad. International literature supports the claims that e-learning is a convenient, cost-effective, and accessible method of education for nurses, provided that certain prerequisites and barriers are addressed. The qualitative research study undertaken for this thesis elucidated nurse's perceptions of e-learning with the overarching theme of *Bridging the Gap*, supported by the subthemes: *Unsatisfactory Learning Experiences*, *Meaningful Learning Experiences*, and *Enhancing Learning Experiences*. There were several areas of potential future research identified in the literature and in this thesis that could be further explored. Nursing must continue to expand and improve upon their methods of continuing education to support a high standard of nursing competencies and patient care.

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