A CORRELATIONAL STUDY BETWEEN HOSPITAL PATIENT SAFETY CULTURE AND COMPUTER SELF-EFFICACY AMONG NURSES IN A HOSPITAL SETTING

By

Jean Marc Joseph

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Biomedical Informatics

Department of Health Informatics

School of Health Related Professions

Rutgers, The State University of New Jersey

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A Correlational Study between Hospital Patient Safety Culture and Computer Self-Efficacy among Nurses in a Hospital Setting

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ABSTRACT

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ABSTRACT

A largely aging population, increase in chronic diseases, and rising costs are leading to the requirement for worldwide healthcare reform (Wilson, Whitaker, & Whitford, 2012). Wilson, Whitaker, and Whitford (2012) resolved, "To meet these needs, nurses are being encouraged to practice to the full extent of their skills and take significant leadership roles in health policy, planning, and provisions" (Wilson et al., 2012). "Nurses are frequently restricted in their scope of practice even as they comprise the largest group of health professionals" (Wilson et al., 2012). Wilson et al. asserted, "Nurses can help improve health services in a cost effective way, but to do so, they must be seen as equal partners in health service provision" (2012). The purpose of this study is to examine if there is a correlation between the level of computer skills among nurses working in a hospital setting and the patient safety culture of the hospital in order to promote successful electronic medical record in the nursing practice. The methodology for this study is a questionnaire design that will be used to survey hospital patient safety culture and nurses' views using computer self-efficacy systems in a hospital setting. This data collection and the presentation of the necessary findings and results will provide key insights for the evaluation of this research management. All statistical analyses will be performed using SPSS for Windows (IBM SPSS 19.0, SPSS Inc., Chicago, IL). All of the analyses will be two-sided with a 5% alpha level. Demographic characteristics of the study sample will be described using the mean, standard deviation, and range for continuous scaled variables, and frequency and percent for categorical scaled variables. Cronbach's alpha will be used to measure the internal consistency reliability of the computer self-efficacy, teamwork within hospital units aspect of patient safety culture, hospital management support for patient safety aspect of patient safety culture, communication openness aspect of patient safety culture, and feedback and communication about errors aspects of the patient safety culture scale scores.

List of Key Words

Behavioral Intention to Use .....(BIU)

Communication Openness .....(COM)

Computer Self-Efficacy ..... (CSE)

Computer Self-Efficacy Scale for Adults ..... (CSESA)

Electronic Health Record.....(EHR)

Electronic Medical Records.....(EMR)

Feedback and Communication Errors.....(ERR)

Health Information Technology.....(HIT)

Hospital Patient Safety Culture.....(HPSC)

Management Support ..... (MAN)

Perceived Ease of Use..... (PEOU)

Perceived Usefulness .....(PU)

Teamwork .....(TEA)

Technology Assistance Model.....(TAM)

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CHAPTER I:

INTRODUCTION TO THE STUDY

Increased emphasis for using computerized systems in the nursing practice has resulted with the advent of information technology. These systems facilitate the gathering of patient information to enhance delivery of the healthcare system. Nurses encounter the use of technology on a daily basis to conduct their work (Blake, Lindgren, & Rivers, 2003). Electronic medical records (EMR) have replaced paper and pencil charting, eliminating duplicate charting and documentation, reducing errors, and allowing more time and flexibility in delivering patient care. Nursing professionals no longer have to waste time trying to decipher illegible handwritten physician orders. The use of physician order entry systems allows order entry at the point of care and provides alerts to possible contradictions for patient care, eliminating errors. Computerized programs also track standards of care (Rivers et al., 2003). Blood pressure, temperature, and additional vital signs are taken electronically, recorded, and tracked for trends. Previously established parameters programmed into the systems alert nurses to any abnormal results (Myles, 2000). The use of technology has increased efficiency in the delivery of healthcare and improved patient outcomes and patient safety.

In this study, we determined whether or not correlation exists between the level of computer skills among nurses working in a hospital setting and the patient safety culture of the hospital in order to promote successful EMR in the nursing practice. Identification of certain challenges that deter the nursing practice will include the evolution of nursing

documentation, the emergence of health information technology (HIT), and the resultant circumstances that lead to increased pressure on nursing practice and on healthcare systems for improved efficiency and effectiveness in the industry. This study contains evidence that supports the successful outcomes related to using information technology to transform this delivery and effectiveness in nursing, as well as in all healthcare professions. The use of information technology to enhance delivery of healthcare results in reduced time spent by nurses locating patient charts, increased efficiency in the delivery of patient care, and the potential for reduced costs from redundant tests (e.g., tests ordered by providers that are unable to access updated patient information stored at another provider's location), and elimination of potentially dangerous medical errors caused by the physicians. The discussion includes description of the motivating forces behind the transformation of using information technology in the nursing practice, such as the high rate of medical errors, and the nurses' lack of computer skills or education in the healthcare industry.

Nurses provide the final opportunity for insuring safety in delivery of the medication process. Hospitals may facilitate a culture of patient safety by improving teamwork within hospital units (TEA), openness of communication (COM), feedback and communication regarding errors (ERR), and management support for patient safety (MAN). Improvements to the culture of patient safety will enable nurses to voice concerns and to better contribute to a discussion about technology that impacts their practice and patient care safety. Discussions resulting from an improved culture of patient safety can facilitate the nurse's decision-making process in the presence of obstacles regarding EMR. This open communication can also improve the current technology

utilization and enhance future technology implementations by fostering a continuing dialog among nurses.

This dissertation includes a systematic review of the literature to examine the relationship between the HPSC and CSE among nurses in a hospital setting in order to identify factors that may explain functionalities and assessment of the EMR / Electronic Health Record (EHR) use, and quality improvement of the nurses' excellence (i.e., delivering the best possible and quality of nursing care in a professional and competent manner). We used a questionnaire to gather data to determine if there is a correlation between the HPSC and CSE among nurses in a hospital setting. The results of this questionnaire contain important indications about the criteria for insuring an effective HPSC in regards to a deficiency in CSE among nurses.

Statement of the Problem

A general problem exists in that hospitals have increasing levels of demand for services and fewer nurses to support these hospital services (Draper, Felland, Liebhaber, & Melichar, 2008). Many hospitals have implemented, or are in the process of implementing an EHR in order to improve efficiency of healthcare delivery. Not all nurses have sufficient computer skills to utilize the EHR effectively, which can result in poor integration of the EHR system. Empirical evidence has not indicated that a lower level of computer skills is associated with the patient safety culture of the hospital. Absent these data, stakeholders, such as researchers and hospital administrators may not have all the information necessary to maximize effectiveness in implementation of an EHR system.

Background of the Problem

Increasing demand for healthcare exists in the United States, partially due to longer life span, resulting in more elderly persons with more healthcare problems, requiring more healthcare services. Certain researchers have suggested that nurses play a significant role in providing healthcare services, particularly in the hospital setting (Hassmiller, 2010). Nurses spend more time addressing patient care activities and documentation than do physicians (Aspden, Corrigan, Erickson, & Wolcott, 2004). Deficiencies in communication and collaboration between nursing staff and physicians certainly lead to inefficiencies and delays in patient care. "The complexity of the nursing tasks and the chance of errors have served as motivation for the use of health information technology to transform the work environment of nurses" (Aspden et al., 2004). At the same time, there is a shortage of nurses entering the profession, along with a high turnover rate. Hospital administrators investigate methods for improving the efficiency of healthcare delivery, and one popular strategy is to implement an EHR. However, numerous hindrances exist, preventing the successful implementation of an EHR for hospitals that have implemented, or are in the process of implementing an EHR system. One such barrier is that users of the system, nurses in particular, must possess an adequate level of computer skills. Not all nurses have an adequate level of computer skills to use the EHR effectively.

Objective of the Research

The purpose of this study is to determine if there is a correlation between the level of computer skills among nurses working in a hospital setting, and the patient safety culture of the hospital. If we find that certain factors within the HPSC are associated with

the computer skills of the nurses working in the hospital, then hospital administrators can use these data to correct those patient safety factors. The focus of interventions to improve the computer skills of the nurses may well improve the successful implementation of an EHR system.

Research Questions

The overarching question in this study is, what, if any correlation exists between CSE, and patient safety culture, among nurses working in the hospital setting? The following specific questions will be addressed:

1. What, if any correlation exists between CSE and the perceived TEA among nurses working in the hospital setting?
2. What, if any correlation exists between CSE and the perceived MAN among nurses working in the hospital setting?
3. What, if any correlation exists between CSE and the perceived COM among nurses working in the hospital setting?
4. What, if any correlation exists between CSE and the perceived ERR among nurses working in the hospital setting?
5. Do two or more of the independent variables - TEA, MAN, COM, and ERR - better predict CSE among nurses working in the hospital setting than any single independent variable alone?

Hypotheses

Hypothesis 1

$H1_0$: There is no correlation between CSE and TEA.

H1a: There is a correlation between CSE and TEA.

Hypothesis 2

$H2_0$: There is no correlation between CSE and MAN.

H2a: There is a correlation between CSE and MAN.

Hypothesis 3

$H3_0$: There is no correlation between CSE and COM.

H3a: There is a correlation between CSE and COM.

Hypothesis 4

$H4_0$: There is no correlation between CSE and ERR.

H4a: There is a correlation between CSE and ERR.

Hypothesis 5

$H5_0$: Two or more of the independent variables - TEA, MAN, COM, and ERR - do not better predict CSE than any single independent variable alone.

H5a: Two or more of the independent variables - TEA, MAN, COM, and ERR - better predict CSE than any single independent variable alone.

Knowledge and Research Gap

We explored the extant journals and literature for this study and found that empirical evidence has not been produced to show whether or not a lower level of computer skills is associated with the patient safety culture of the hospital. Absent these data, hospital administrators or stakeholders may not have all necessary information to maximize effectiveness in the implementation of an EHR system. The aim for this study is to bridge the knowledge gap between HIT / CSE technology and the lack of adherence to HIT procedures by exploring the system in relationship to patient safety culture in hospitals. Perhaps by understanding the patient safety culture within hospitals, we can

focus on the patient safety culture dimensions to encourage the proper use of CSE to reduce patient safety culture errors.

Definition of Terms

Following are the conceptual and operational definitions for this study:

Health Information Technology (HIT) - DesRoches (2008) noted,

> Health information technology (HIT), and specifically electronic health records (EHRs), has the potential to improve healthcare by making patient health information more accessible at the point of care, reducing medical errors, assuring that guidelines and standards are applied in the care of patients with acute and chronic conditions, and in measuring and reducing health disparities.

Operationally defined, HIT helps transform the work environments of nurses by reducing the burden of non-value-added activities and promoting increased and improved aspects of safety and satisfaction for patients. One of the outcomes of using HIT applications is that EMR replaces the paper-based patient records and enhances clinical decisions. EMR facilitates the improvement of the nursing workflow, improving the efficiency and quality of patient care.

Electronic Medical Record (EMR) - Hartley & Jones (2005) defined EMR as,

> A computerized practice management system that provides real-time data access and evaluation in medical care; Together with clinical workstations and clinical data repository technologies, the EMR provides the mechanism for longitudinal data storage and access. A motivation for healthcare providers to implement this technology derives from the need for medical outcome studies, more efficient

> care, speedier communication among providers, and easier management of health plans. (p. 4)

Electronic Health Record (EHR) - Hartley & Jones (2005) defined EHR as,

> A set of components that form the mechanism by which patient records are created, used, stored, and retrieved. The EHR system includes people, data, rules and procedures, processing, and storage devices (paper, pen, hardware, software), and communication and support facilities. It also includes longitudinal collection of electronic health information for and about persons; immediate electronic access to person- and population-level information by authorized (and only authorized) users; provision of knowledge and decision support that enhance the quality, safety, and efficiency of patient care; and support of efficient processes for healthcare delivery. (p. 4)

Hospital Patient Safety Culture (HPSC) - The Agency for Healthcare Research and Quality (AHRQ) has defined the Patient Safety Culture as follows:

> The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures.

For the purpose of this study, we defined HPSC as having the following components: (a) teamwork within hospital units, (b) hospital management support for patient safety, (c)

communication openness, and (d) feedback and communication about errors. These HPSC variables of TEA and MAN, and COM and ERR measure the PEOU, and PU aspects of the TAM, respectively, and are the independent variables in this study.

Perceived Ease of Use (PEOU) - Davis (1989) defined PEOU as "the degree to which a person believes that using a particular system would be free from effort" (p. 320). In this study, we defined PEOU as the nurse's belief that HIT technology is free from effort. Section F of the survey instrument defines the operational conditions of PEOU, as follows: (a) Using the HIT system is clear and understandable, (b) Using the HIT system does not require a lot of my mental effort, (c) I find the HIT system to be easy to use, and (d) I find that there are minimal complications in using the HIT system. In this study, the HPSC variables of TEA and MAN measure PEOU, and are independent variables.

Perceived Usefulness (PU) - Davis (1989) defined PU as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). In this study, we defined perceived usefulness as the nurse's belief that HIT enhances his or her job performance. Section E (i.e., questions 1-4) of the survey instrument defines the operational conditions of PU, as follows: Using the HIT system will (a) improve my job performance, (b) increase productivity, and (c) be useful in my job. In this study, the HPSC variables of COM, and ERR measure PU, and are independent variables

Behavioral Intention to Use (BIU) - Behavioral Intention to Use is "a measure of the strength of one's intention to perform a specified behavior" (Bagozzi, Davis, & Warshaw, 1989, p. 984). In this study, we defined BIU as the nurse's intention to use HIT

technology. Section E (i.e., questions 5-6) of the survey instrument contains the operational conditions of BIU as follows: (a) Assuming I have access to the HIT system, I intend to use it, and (b) Given that I have access to the HIT system, I would use it. In this study, the variable of CSE measures BIU, and is the dependent variable.

Teamwork Within Hospital Units (TEA) - The definition of TEA in the HPSC survey includes that "staff support one another, treat one another with respect, and work together as a team" (AHRQ, 2010, p. 14). In this study, we defined TEA as nurses working within the same hospital unit assisting one another to care for patients. Section A of the survey instrument contains the operational conditions for TEA, as follows: (a) People support one another in this unit, (b) When a lot of work needs to be done quickly, we work together as a team to get the work done, (c) In this unit, people treat each other with respect, and (d) When one area in this unit gets really busy, others help out. In this study, the HPSC variable for TEA measures the PEOU aspect of the TAM.

Management Support for Patient Safety (MAN) - The HPSC survey defines MAN as existing when "hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority" (AHRQ, 2010, p. 15). Conceptually defined, MAN exists when hospital management promotes an environment that identifies patient safety as a top priority. Section D of the survey instrument contains the operational conditions of MAN, as follows: (a) Hospital management provides a work climate that promotes patient safety, (b) The actions of hospital management show that patient safety is a top priority, and (c) Hospital management seems interested in patient safety only after an adverse event happens. In this study, the HPSC variable of MAN measures the PEOU aspect of the TAM.

Communication Openness (COM) - The HPSC survey defines COM as "staff freely speaking up if they see something that may negatively affect a patient and feel free to question those with more authority" (AHRQ, 2010, p. 15). The HPSC survey presents COM as fluid and unimpeded discussions with persons of authority as it impacts patient care. Section B of the survey instrument contains the operational conditions of COM, as follows: (a) Staff will freely speak up if they see something that may negatively affect patient care, (b) Staff feels free to question the decisions or actions of those with more authority, and (c) Staff is afraid to ask questions when something do not seem right. The HPSC variable of COM measures the PU aspect of the TAM.

Feedback and Communication about Errors (ERR) - The HPSC survey defines ERR as existing when "staff is informed about errors that happen, are given feedback about changes implemented, and discuss ways to prevent errors" (AHRQ, 2010, p. 15). The definition of ERR includes the exchange of information regarding errors, and the discussion of error prevention. Section C of the survey instrument contains the operational conditions of ERR, as follows: (a) We are given feedback about changes put into place based on event reports, (b) We are informed about errors that happen on this unit, and (c) In this unit, we discuss ways to prevent errors from happening again. The HPSC variable ERR measures the PU aspect of the TAM.

Computer Self-Efficacy (CSE) - Bandura (1997) defined self-efficacy as "judgments of how well one can execute courses of action required to deal with prospective situations." Self-efficacy is situational and highly influences "people's decisions, goals, their amount of effort in conducting a task, and the length of time they persevere through obstacles and difficulties" (Khorrami-Arani, 2001, p. 18). A useful

definition for CSE is “a judgment of one’s capability to use a computer” (Compeau & Higgins, 1995). Questions 1 through 36 from the CSESA questionnaire contain the operational conditions for determining CSE. The CSESA variable of CSE measures the BIU aspect of the TAM.

Significance of the Study

The significance of this study is to examine the relationships between the HPSC and CSE among Nurses in a hospital setting, and between the PEOU and PU that influences the BIU computer technology among registered nurses in hospitals. The results of this study might assist hospitals to re-evaluate and improve their patient safety culture, leading to improved use of information technology such as the EMR. This improved application of EMR has the potential to reduce significantly the frequency of medication errors. Identification of the relationship between the HPSC and CSE, and between PEOU and PU in this study might enable nurses to more appropriately evaluate their own values and behaviors regarding the decision to use EMR with efficacy (i.e., taking into account the influences of their healthcare organization’s patient safety culture).

Summary

Extant research confirms that the use of technology results in efficiency in the delivery of healthcare, and improved patient outcomes and patient safety. Using this study, we confirm whether or not correlation exists between the level of computer skills among nurses working in a hospital setting and the patient safety culture of the hospital, and whether or not this relationship promotes successful EMR in the nursing practice. This research includes examination of the motivating forces that lead to the growing demand for complex information technology in the nursing practice. A general problem

exists in that hospitals have increasing levels of demand for services, and fewer nurses to support these hospital services (Draper, Felland, Liebhaber, & Melichar, 2008).

Many hospitals have implemented, or are in the process of implementing an EHR in order to improve efficiency of healthcare delivery, but this process is not without hindrance. Most notable, not all nurses have sufficient computer skills to utilize the EHR effectively. We posit that this hindrance results in poor integration of the EHR system, with potentially negative outcomes for HPSC. Hospitals may facilitate a culture of patient safety by improving TEA, COM, ERR, and MAN. Interventions to improve the computer skills of nurses may well improve the successful implementation of an EHR system. The purpose of this study is to determine if there is a correlation between the level of CSE among nurses working in a hospital setting, and HPSC. If we find that certain factors within the HPSC are associated with the computer skills of the nurses working in the hospital, then hospital administrators can use these data to correct those patient safety factors and more effectively implement EHR. Chapter 2 contains details about the review of literature for this study, concerning applications of the Technology Acceptance Model (TAM) for determining correlations that influence CSE and HPSC, and about HIT and Nursing Challenges.

CHAPTER II:

LITERATURE REVIEW

Concerns exist among healthcare professionals, particularly among nurses about the impact upon their jobs from rapidly changing healthcare information systems. Certain experts have asserted that the Healthcare Information Technology (HIT) can improve the quality of nursing documentation in most areas of the healthcare industry by resulting in increased information record, reduced errors in documentation, and comprehensive assessments of nursing patient outcomes. Nursing involvement in all stages of healthcare information systems can improve the effective utilization of healthcare systems. This literature review includes investigation about the Technology Acceptance Model (TAM); the PEOU, the PU, and the BIU regarding information technology; hospital information survey perceived usefulness / perceived ease of use; and nurses' challenges when using the progressive HIT / EMR. We used online databases such as PUBMED®/ Medline®, JSTOR®, academic journals and books, Google Scholar, and additional resource searches to determine the scope of the available research and its effects on nurses, the TAM, and the HPSC. This review includes the TAM research, and the improvements upon that model to address the discrepancy about technology acceptance among nurses. Additionally, this review includes studies pertaining to the effect of these constructs on nurses in relation to the focus of this dissertation on PEOU and PU for nurses in patient care in hospitals. This Chapter includes certain studies pertaining to the present

challenges of nurses and their CSE issues. The summary of the findings includes analysis regarding the impact to the HPSC and CSE among nurses in the hospital setting.

Technology Acceptance Model

Development of the TAM emerged in the decade of the 1980s to investigate computer usage behavior as it related to user acceptance of information systems (Davis1989). The TAM is one of the most widely used theoretical models for predicting and explaining whether users will accept new information technology or other systems (Ju-Ling et al., 2013). The TAM was applied to most of the technology related usage-behavior and user populations (Bagozzi, Davis, & Warshaw, 1989a). According to Bagozzi, Davis, and Warshaw (1989a),

> The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. Ideally one would like a model that is helpful not only for prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable, and pursue appropriate corrective steps. (p. 4)

Bagozzi et al. (1989a) explained further,

> A key purpose of TAM is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. TAM was formulated in an attempt to achieve these goals by identifying a small number of fundamental variables suggested by previous research that dealing with the cognitive and affective determinants of computer acceptance. (p. 4)

Based on these data in the extant research, we selected the TAM as the conceptual model for this study.

The TAM has been applied widely in research models concerning user acceptance of computer technology. The application of TAM in this study is to evaluate whether there is a relationship between HPSC and the PEOU and PU of CSE among nurses, and if

such relationship influences the behavioral intention to use HIT / EMR, as conveyed in Figure 1, below. According to Davis (1989), the PEOU "reflects physical effort, mental effort, and ease of learning, and has the theoretical basis supported by the Bandura's Self-Efficacy theory" (p. 321). Davis stated, "self-efficacy beliefs are theorized to function as proximal determinants of behavior" (p. 321). This research theorizes that healthcare organizations can promote a patient safety culture and influence positively the adoption of technology by evaluating the relationship between HSPC and CSE, HPSC and PEOU, HPSC and PU - and by incorporating a set of dimensions that includes teamwork within hospital units (TEA), hospital management support for patient safety (MAN), communication openness (COM), and communication about errors (ERR).

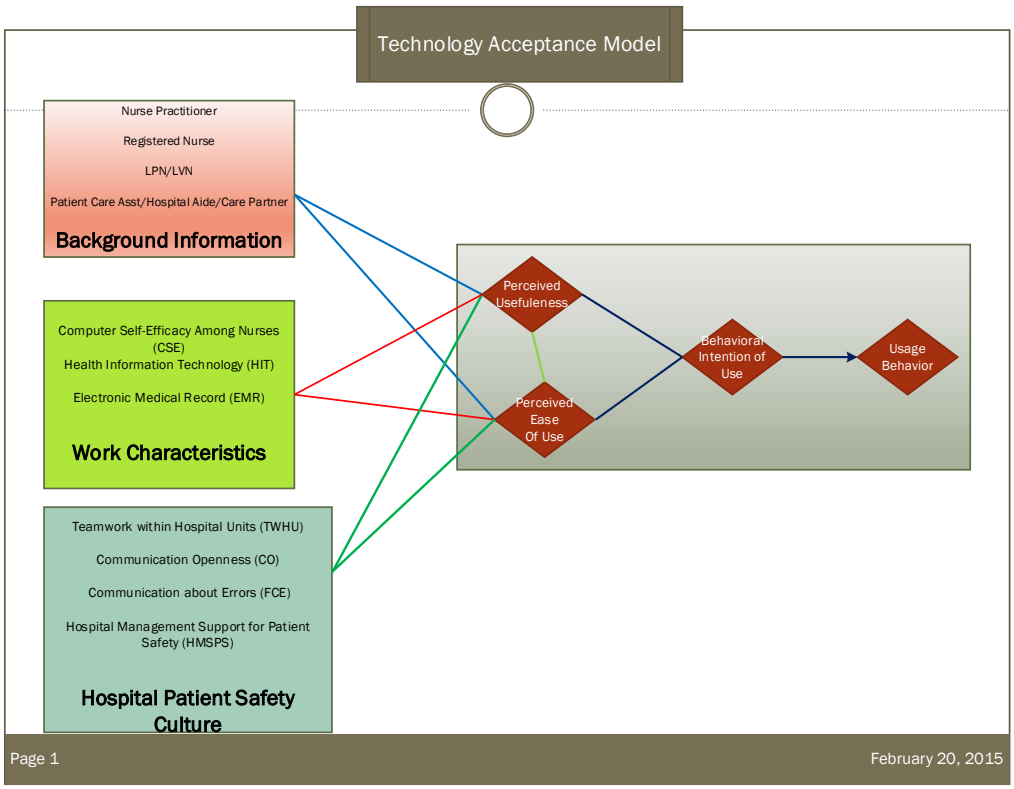

Figure 1. Technology Acceptance Model (Davis, 1989).

The TAM focuses on two primary theoretical constructs, including PEOU, and PU. These two constructs have been theorized to be fundamental determinants of system use. Definitions for these constructs have been formulated, and the theoretical rationale has been hypothesized concerning the influence of the constructs on system use. The defined constructs influence the behavioral objective to use technology, which explains the resulting usage behavior, or adoption of technology. These two constructs are the basis for individual perceptions influencing the BIU technology, and ultimately determine acceptance of information technology.

Perceived Ease of Use

Davis (1989) defined PEOU as "the degree to which a person believes that using a particular system would be free from effort" (p. 320). This follows from the definition of ease, as freedom from difficulty or immense effort. Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible (Radner & Rothschild, 1975). Given no other varying circumstances, one application perceived to be easier to use than another is more likely to be accepted by users. In this study, we defined PEOU as the nurse's belief that there is teamwork between the clinicians, along with management support, which provides freedom from mental efforts when addressing tasks. We used those questions in the HSPSC pertaining to TEA and MAN, which comprise the independent variables, to measure the PEOU of the TAM.

Perceived Usefulness

Perceived usefulness is a major construct within the TAM that drives the user's (e.g., nurse) intention to use technology. Davis (1989) defined PU as "the degree to

which a person believes that using a particular system would enhance his or her job performance" (p. 320). According to Davis, perceived usefulness follows from the definition of the word useful, which is, "capable of being used advantageously" (p. 320). Placed in an organizational context, users are reinforced, generally, for good performance through raises, promotions, bonuses, and other rewards (Pfeiffer, 1982). A system high in PU, in turn, is one for which a user believes in the existence of a positive use-performance relationship. In this study, we defined PU as the nurse's belief that having COM and ERR will enhance job performance. We used those questions in the HSPSC pertaining to COM and ERR, that comprise the independent variables, to measure the PU of the TAM.

Behavioral Intention to Use

Behavioral intention to use is "a measure of the strength of one's intention to perform a specified behavior" (Bagozzi et al., 1989a, p. 321). In this study, we defined BIU as the nurse's intention to use HIT or CSE systems in their hospital. The nurses understand that, assuming they have access to the HIT in their hospital, they intend to use it or they expect to use it. In this study, we used the CSESA to measure the BIU of the TAM, which is the dependent variable.

Self-Efficacy

Information technology is completely embedded within a technological context in 21st century society, which makes the understanding and evaluation of technological self efficacy critical. The importance of PEOU is supported by Bandura's (1997) extensive research on self-efficacy. Bandura defined self-efficacy as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura,

1997). According to Bandura, self-efficacy is not the same as actual knowledge of a task, and it is not self-esteem, which refers more to feelings of self-worth. Self-efficacy is situational and highly influences "people's decisions, goals, their amount of effort in conducting a task, and the length of time they persevere through obstacles and difficulties" (Khorrami-Arani, 2001, p. 18). A useful definition for CSE is "a judgment of one's capability to use a computer" (Compeau & Higgins, 1995). Self-efficacy is similar to PEOU as defined above. Self-efficacy beliefs have been theorized to function as proximal determinants of behavior.

Hospital Patient Safety Culture

In this study, HPSC is defined as having components such as TEA, MAN, COM, and ERR. Sorra and Nieva (2004) described patient safety culture (2004):

> The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. (para. 2)

Teamwork

Teamwork plays an essential role or is the most important component for efficient job completion. According to Ward (2013), when employees feel as if they are part of a unit, relevant outcomes are improved. Nurses report enhanced job satisfaction, and that their patient care outcomes are met and they no longer function in isolation (Ward, 2013). Ward concluded that their (i.e., the nurses) profession mandates teamwork and effective communication: "In nursing, when teamwork is emphasized and valued, every member of the hospital works together to meet their patients' needs; therefore improved patient

outcomes is their common goal" (Ward, 2013, para. 2). Sorra and Nieva (2004) suggested that teamwork is comprised of specific behaviors when “staff support one another, treat one another with respect, and work together as a team” (para. 1). In this study, we defined teamwork within hospital units as nurses working within the same hospital unit, assisting one another to care for patients. Section A of the survey instrument establishes this definition with the following questions:

1. People support one another in this unit.
2. When a lot of work needs to be done quickly, we work together as a team to get the work done.
3. In this unit, people treat each other with respect.
4. When one area in this unit gets really busy, others help out.

Communication Openness

Asnani (2009) Stated: “Extensive research has shown that no matter how knowledgeable a clinician might be, if he or she is not able to open good communication with the patient, he or she may be of no help." This communication between the clinician and patients is very important for patient care. Effective patient-clinician communication can enhance symptom management for the patient, and reduce family caregiver burden and distress. Furthermore, communication among healthcare team members influences the quality of working relationships, and job satisfaction, and has profound impacts on patient safety (Institute for Healthcare Communication [IHC], 2011). The extant research indicates that when communication about tasks and responsibilities is executed effectively, outcomes show “significant reduction in nurse turnover and improved job satisfaction because it facilitates a culture of mutual support” (Lein et al., 2007).

Evidence supports that “one-third of adverse events are attributed to human error and system errors" (IHC, 2007, para. 7). Data indicate that patient safety is at risk and patient care will suffer when there is a lack of communication between healthcare clinicians. "Research conducted during the 10-year period of 1995-2005 has demonstrated that ineffective team communication is the root cause for nearly 66 percent [*sic*] of all medical errors during that period” (IHC, 2007, para. 7). In this study, communication is defined by the following set of questions from Section C of the survey instrument:

1. Staff will freely speak up if they see something that may negatively affect patient care.
2. Staff feels free to question the decisions or actions of those with more authority.
3. Staff is afraid to ask questions when something do not seem right.

Healthcare Information Technology and Nursing Challenges

The effects of the use of technology in the healthcare industry in the 21st century have the potential to become destructive elements to the nursing profession. There are numerous challenges that nurses encounter when using the progressive HIT and EMR. Discussion of these challenges follows, including components of nursing education, the evolution of HIT, and the innovativeness of EMR, along with the challenges resulting in the nursing profession from use of these technologies, and the nursing efficacy of the documentation, or data, that comprises an essential component of the HIT / EMR.

Nursing Education Issues

The nursing profession includes a range of specialties that require engagement in independent and collaborative care of individuals from diverse demographic, age, family, and community backgrounds, and the sick (i.e., degree or designation of illness) across

the full range of the spectrum for illness. Nurses strive to achieve the best possible quality of care for their patients, regardless of illness or disability (American Nurses Association [ANA], 2010). The role of nurses in the healthcare industry is measurably important and evolving by definition as nurses embrace a broader objective in their daily tasks and variety of health care responsibilities. One of the primary issues the nurses encounter in a 21st century environment concerns nursing education. The advent of innovation in technology requires an advanced nursing education to empower nurses to take initiative with and have advanced knowledge and skills for managing the prevailing HIT systems. Nurses must “be better educated to deal with a complex patient population that is aging, has increasing levels of chronic disease, and is more acutely ill when accessing health care" (The Joint Commission [TJC], 2010, p. 2). Nurses do not obtain the necessary skills for improved patient care and enhanced outcomes from incorporating the innovative EMR systems without advanced nursing training and education. "Appropriate opportunities are needed for nurses to develop leadership and technology skills and have greater decision-making authority, thus allowing frontline nurses to create innovative solutions to patient care issues” (TJC, 2010, p. 2).

The testimony of The Joint Commission (TJC) includes the Robert Wood Johnson Foundation's position on the state of the nursing profession. This position addresses the systemic needs for retention, increased diversity, improved cost effectiveness, and technology advancements. These areas of concern represent pressures upon the system that "are profoundly changing the way that health care is delivered" (TJC, 2010, p. 4). According to TJC (2010), nurses are leaving jobs for better pay, and are seeking reduced work stress, or different work schedules. In addition, the workforce must reflect

demographic changes in the general population (p. 4). Systemic demands for decreasing health care delivery cost, including reducing the workforce, and continuously incorporating current developments in technology have continuous impact upon the evolving methods for delivery of care. These issues impacting the future of health care delivery require solutions to improve operational and cost efficiency. Such solutions must include consideration for the ongoing needs of nurses in terms of providing improvements to "work setting, workflow processes, and skilled use of new technology," (p. 4). According to TJC, "Nursing has an opportunity to help shape innovative approaches for patient-centered care across the continuum in the next decades of the 21st Century" (p. 4). Tiffin (2012) acknowledged the tendency for talented (i.e., capable) nurses to apply their formal knowledge across the spectrum of "key concepts," "research," and "policy and societal considerations to make surprising, difficult, life-or-death decisions every day" as the basis for prioritizing the education of nurses (para. 15).

The Evolution of Health Information Technology

The healthcare systems in the United States continue to expand and advance steadily towards the widespread use of HIT. As a result, the evolution of healthcare information systems integrates definitively with the advent of computer technology. Brailer and Thompson (2004) defined HIT as “the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making.” Chaudhry et al. (2006) explained that HIT provides the "umbrella framework to describe the comprehensive management of health information across computerized systems and its secure exchange between consumers, providers,

government and quality entities, and insurers" (p. 6). Chaudhry et al. asserted that HIT "is in general increasingly viewed as the most promising tool for improving the overall quality, safety and efficiency of the health delivery system" (2006, p. 6). Table 1, on the following page, indicates the specific outcomes cited by Chaudhry et al. as resulting from consistent utilization of HIT.

Table 1

Outcomes Related to the Consistent Use of HIT

improve health care quality or effectiveness;
Increase health care productivity or efficiency;
Prevent medical errors and increase health care accuracy and procedural correctness;
Reduce health care costs;
Increase administrative efficiencies and healthcare work processes;
Decrease paperwork and unproductive or idle work time;
Extend real-time communications of health informatics among health care professionals; and
Expand access to affordable care.

Note. From "Systemic review: Impact of health information technology on quality, efficiency, and costs of medical care" by Chaudhry et al., 2006, p. 6.

Fuller (2009) stated that "the position of National Coordinator for Health Information Technology, under the direction of President Bush, was created with the goal of a nationwide adoption of electronic medical records within 10 years" (para. 4). In May, 2014, the Obama administration requested additional budgeted funds of $19 billion for the purpose of health information technology development (Fuller, 2009). In President Obama's address to the nation (i.e., United States) relative to this budget, he

reaffirmed plans to promote electronic health records as a means to improve the healthcare industry (Fuller, 2009).

Innovative Use of EMR in the Healthcare Setting

Electronic medical records represent a sizable improvement over paper based records. With the use of EMR, more than one clinician can have access to a patient's chart from any location, eliminating illegible handwriting, and allowing storage for additional information. EMR provide the definitive solution that facilitates clinicians as they address complete aspects of EMR functions in every aspect of the nursing practice. Examples of these practices include reliable and affordable integrated application of patient care, lab ordering and results, prescription writing, and appointment scheduling. Cimino and Shortliffe (2006) asserted that "the paper-based medical record is woefully inadequate for meeting the needs of modern medicine" (p. 5). The advancing information technology incorporates exponential changes and requires a more reliable system to accommodate the new developments, and to facilitate immediate and intuitive access to the information that nurses and doctors need at the moment they deliver care to patients.

Cimino and Shortliffe (2006) stated that "difficulty in obtaining information, either about a specific patient or about a general issue related to patient management, is a frustrating but common occurrence for practitioners" (p. 5). The use of EMR can increase the potential for improved access to patient-specific information, and provide a major benefit for both the quality of patient care and the quality of work experience for the clinicians in practice. The innovative use of EMR / EHR helps to eliminate the manual task of extracting data from charts or filling out specialized datasheets. The nurse does not need to go to a specific department to collect or pick up patient information, as EMR

enable the timely (i.e., quickly) transfer of patient data from one department to another. The use of EMR results in increases to the number of patients served per day for enhanced patient workflow and increased productivity. EMR improve results, management, and patient care with a reduction in errors within the medical practice.

The Challenges of HIT for Nurses

Fuller (2009) explained that “computer and telecommunication systems have proven to be effective management tools for health care data and communication of this information to other healthcare professionals and their use will become the way of the future” (para. 5). However, given the plans of the United States federal government for implementation of an EHR system by 2014, Fuller noted that “the next generation of nurses will not be prepared to work in such a technology-rich environment” (para. 5). Kaminski (2005) noted that occupations that are concentrated on the complex processing and application of information (e.g., nursing) require efficacy and comfort in "working with computerized data" (para. 6). Leadership support for increased efficacy among nurses in the use of information technology management was evident in 1992 when the American Nurses Association (ANA) "established the role of the informatics nurse specialist, offering the first credentialing exam in 1995” (Kaminski, 2005, para. 6).

Nursing Documentation and Data Issues

According to Fuller (2009), “nursing documentation has been a hand-written account of the nurse’s fulfillment of the professional and legal duty of care" (para. 3). Fuller observed,

> This documentation process has evolved to provide effective communication between health care professionals, a plan of patient care for the patient, an avenue for compensation from health care insurances, analysis of health care, a source for

> education and research, and the legal document of the patient's medical position. (para. 3)

As we embrace the innovative 21st century technology, transformation of the nursing documentation process is due significantly to "the vast amounts of medical-related knowledge generated" (Fuller, 2009, para. 3). Kaminski (2005) reported the exponential pace of the development of information, along with the relative impact to all aspects of professional health care, not just nursing. The demand for complex proficiency in information and technology management is exponential across the health care field. "The high rate of medical errors and rising healthcare costs are now the driving forces behind the transformation of information management, and affects not only nursing, but all healthcare professionals" (para. 3).

Langowski (2005) expressed concern with the present gaps in nursing documentation as compared to the electronic record, along with the abilities of nursing students to adapt their skills for using this new technology (para. 7). As the progress towards evidence-based practice influences the direction of health care, it is conceivable that it will become necessary for nurses to have important information for decision making at the point of care. Langowski defined point-of-care technology as a "computerized patient record that includes all the patient data in one place and is accessible to caregivers at different locations" (para. 7). The author explained that this technology can facilitate the quick decisions required of health care professionals by increasing the speed and accuracy in delivering individualized care as data are entered for computerized analysis (para. 7).

One of the objectives of using EMR systems in the healthcare setting is to provide nationwide access to patient information collected by various providers regardless of

whether those providers are in the same network or not. Collection of these data will require the use of certain EMR components / modules, such as the Practice Management Software (PMS) component that includes financial and administrative information, patient demographics, health insurance, and billing information. Additional module examples include EHR that contains patient medical records with all the information found in a paper chart, and the Clinical Decision Support (CDS) system that contains options for appropriate treatment. These components combine to form the comprehensive EMR system.

Thede (2008) described the process whereby EMR systems will facilitate nationwide networking for health care delivery as originating "with the creation of a Regional Health Information Organization (RHIO) in which providers in the same [geographical] area share information" (para. 3), incorporating established procedures. Thede explained that the RHIOs will converge for nationwide access and application of patient information in connectivity with a "National Health Information Network (NHIN)" (para. 3). The author noted the process for refining components of this system, including not only the types of data included, but also technical approaches to addressing "data security, data access, patient identification, and the ability for all systems to communicate with one another" (para. 4). However, the detailed aspects of the EMR comprise individualized patient information and components of patient-specific care that are not retrieved for application as secondary data in decisions for care. Thede described secondary data usage as "when data is [*sic*] used for purposes other than the original purpose for which it [*sic*] was [*sic*] collected, which in the case of patient records is for describing the patient care provided" (para. 5). The author described the process by which

nursing notes are collected as a requirement of protocol, but are not applied to patient care usefully and stated that by extant standards, “nursing notes are filed upon patient discharge in medical records departments, and then are generally ignored. They are never used in the writing of discharge summaries" (para. 5). Thede added that "nursing documentation is only a record of compliance with the medical regimen.... [and] is not representative of the knowledge that we as nurses have and use when providing care" (para. 5).

Consequently, this paradigm is evolving with the application of the EMR in health care. The EMR allows for organization of separate components of patient data for analysis (Thede, 2008, para. 6). Thede (2008) elaborated on the application of these data: "Secondary data can easily be de-identified. With electronic records, more de-identified data will be shared and analyzed at all levels. Decisions will be made about priorities and funding based on the knowledge gleaned from analyzing this [*sic*] data” (para. 7). Thede noted that "nursing care data" are generally absent in the sets of data comprising the EMR, "despite studies demonstrating that including nursing problems improves the accuracy of costing healthcare and predicting outcomes" (para. 8). Citing the exclusion of secondary data from the EMR / EHR, the author described the potential for reduced efficacy in the essential role of nurses in the comprehensive approach to patient care in the healthcare industry:

> This means that if electronic healthcare documentation, whether part of an EMR / EHR, contains no data about the decisions nurses make, such as decisions about nursing problems, independent intervention actions, and the resulting outcomes, nursing data will not be used in healthcare planning and priority selections. Nursing’s role in healthcare will remain invisible, and nursing’s potential contribution will not be considered in healthcare policy. (para. 8)

Summary

In Chapter 2, we reviewed the extant research concerning applications of the TAM for measuring the influence of CSE and HPSC on nurses' PEOU, PU, and BIU technology, and investigated HIT / EMR and nursing challenges. We identified the improvements upon the TAM to address the discrepancy about technology acceptance among nurses, and discussed studies pertaining to the effect of these constructs on nurses in relation to the focus of this dissertation on PEOU and PU for nurses in patient care in hospitals. Based on findings in the extant research, we selected the TAM as the conceptual model for this study to evaluate whether there is a relationship between HPSC and the PEOU and PU of CSE among nurses, and if such relationship influences the behavioral intention to use HIT / EMR. The review contains consideration for the general advancement of HIT in patient care, along with related developments throughout the United States, and consideration of the specific nursing environments and applications of HIT that influence CSE and HPSC. Chapter 3 contains discussion about the research methodology, including the design for evaluating a correlational study, and the procedures for data collection and assessment.

CHAPTER III:

METHODOLOGY

This Chapter contains a correlational study focused on the relationship between HPSC and CSE among nurses in a hospital setting. The purpose of this study is to evaluate this correlation. We used a questionnaire design to survey HPSC and the nurses' views using CSE systems in a hospital setting for collecting data and presenting necessary findings. The results of these findings provide key insights for the evaluation of this research management. The primary content in this Chapter includes a discussion of the research design, setting and sample, data analysis plan, justification of the sample size, instrumentation and materials used, reliability and validity of survey instruments, data collection plans using dependent and independent variables, and summary.

Research Design

In this study, we used a quantitative research method with a correlational approach to examine the relationship between the HPSC and CSE among nurses in a hospital setting. A quantitative research refers to the systematic empirical investigation of social phenomena via statistical, mathematical, or numerical data, or computational techniques (Given, 2008). A correlational study is a quantitative method of research in which two or more quantitative variables from the same group of subjects exist, and the researcher determines if there is a relationship between these two variables (Waters, 2014). In this type of correlational study design, relationships between and among a number of facts are sought and interpreted. This type of research indicates trends and

patterns in data. A correlation exists when one variable increases and another either increases or decreases in somewhat predictable fashion (Leedy & Ormrod, 2005). One of the most commonly used measures of correlation is Pearson Product Moment Correlation or Pearson's correlation coefficient, measured using the formula,

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left(n\sum x^2 - \left(\sum x\right)^2\right)\left(n\sum y^2 - \left(\sum y\right)^2\right)}}$$

The value of Pearson's correlation coefficient varies from –1 to +1 where –1 indicates a strong negative correlation and +1 indicates a strong positive correlation. In statistics, Pearson product-Moment Correlation is a measuring tool to determine whether or not a linear relationship exists between two variables. This tool quantifies the strength and the direction of the relationship, identified by the correlation coefficient. A correlation exists when measuring two variables - when there is a change in one variable, there is a change in another, whether it is in the same or opposite direction. Spearman's rho is another type of correlation statistic used if the data violate assumptions of the Pearson's correlation statistic, such as the presence of outliners (Sponaugle, 2014).

The objective of this correlational study using a quantitative survey is to explore the relationship between the independent variables of HPSC including: TEA, MAN, COM, ERR, and self-reported levels of CSE among nurses in a hospital setting. The methods and research questions are useful to examine the perceptions and attitudes of those nurses. Outcomes of cause and effect do not form the basis for the type of observational research (i.e., correlational study). This type of research includes only the data, relationships, and distributions of variables. Such study does not include manipulation of variables; variable identification and study occurs in a natural setting.

This approach, as well as variables and analysis, comprises the appropriate means to better understand and locate answers to the research questions.

The previous Chapter includes listing of the TAM-based research questions and hypotheses for this study. The significance of this study is identification of whether or not measures of HPSC are valid predictors of nurses' CSE. This method can explain why certain external and internal factors may be significant predictors for a general picture of the research problem; the factors that contribute to and / or hinder nurses' CSE, and in turn, may be related to the nurses' ability to utilize a HIT / EMR system.

Setting and Sample

Nurses currently practicing in a hospital setting comprise the target population for this study. A convenience sample of nurses as the target population (N = 500) were invited to participate in the Hospital Survey on Patient Safety Culture (HSPSC) and CSESA questionnaire to collect information. A non probability sampling method called convenience sampling was used, which involves people whom are readily available for sampling (Leedy & Ormrod, 2005). Recruitment of participants for this survey occurred in HHC – NYC Metropolitan Hospital Center. Invitation was initiated with recruiting emails that were sent to the larger population of nurses working in the referenced hospital. In addition, a notification flyer was posted on the message board and the hallway of HHC – NYC Metropolitan Hospital Center. A sample size of 100 was obtained and a statistical power analysis (presented below) showed that a sample size of 100 is justifiable for detecting medium effect sizes. Therefore, the obtained sample size was deemed adequate to generate new knowledge about the relationship between hospital patient safety culture and nurses working in a hospital setting.

Data Analysis Plan

SPSS for Windows is the method for statistical analyses in this study (IBM SPSS 19.0, SPSS Inc., Chicago, IL). All of the analyses are two-sided with a 5% alpha level. Description of the demographic characteristics of the study sample consists of the mean, standard deviation, and range for continuous scaled variables, and frequency and percent for categorical scaled variables. Cronbach's alpha will be used to measure the internal consistency reliability of the CSE, TEA, MAN, COM, and ERR scale scores.

Hypothesis 1 will be tested using Pearson's correlation coefficient. If the Pearson correlation coefficient is statistically significantly different than zero, then the null hypothesis will be rejected, and it will be concluded that there is a correlation between CSE and the TEA among nurses working in the hospital setting. The strength and direction of the correlation will be reported and interpreted.

Hypothesis 2 will be tested using Pearson's correlation coefficient. If the Pearson correlation coefficient is statistically significantly different than zero, then the null hypothesis will be rejected, and it will be concluded that there is a correlation between CSE and the MAN among nurses working in the hospital setting. The strength and direction of the correlation will be reported and interpreted.

Hypothesis 3 will be tested using Pearson's correlation coefficient. If the Pearson correlation coefficient is statistically significantly different than zero, then the null hypothesis will be rejected, and it will be concluded that there is a correlation between CSE and the COM among nurses working in the hospital setting. The strength and direction of the correlation will be reported and interpreted.

Hypothesis 4 will be tested using Pearson's correlation coefficient. If the Pearson correlation coefficient is statistically significantly different than zero, then the null hypothesis will be rejected, and it will be concluded that there is a correlation between CSE and the ERR among nurses working in the hospital setting. The strength and direction of the correlation will be reported and interpreted.

Hypothesis 5 will be tested using stepwise multiple linear regression analysis. The dependent variable in the regression model will be the CSE score. The independent variables will be the TEA, MAN, COM, and ERR patient safety culture measures. All four independent variables will be entered into the stepwise model selection procedure. If the regression coefficients for two or more independent variables are statistically significant, then the null hypothesis will be rejected, and it will be concluded that combinations of perceived patient safety culture scores better predict the CSE score than any single independent variable alone. Otherwise, it will be concluded that combinations of perceived patient safety culture scores do not better predict the CSE score than any single independent variable alone. The equation of the model will be reported, and statistically significant regression coefficients will be interpreted. The R-square for the final model will also be presented and interpreted.

Justification of Sample Size

The power calculations were performed using the PASS 2008 software (Hintze, 2008). As discussed elsewhere in the proposal, all 500 members of the target population will be invited to participate in the study. Typical survey response rates are approximately 20% (Singleton et al., 2005). Thus, a sample size of approximately 100 is anticipated.

Hypotheses 1 - 4 will be tested using Pearson's correlation coefficient. According to Cohen (1988), small, medium, and large effect sizes for hypothesis tests about the Pearson correlation coefficient (r) are: $r = 0.1$, $r = 0.3$, and $r = 0.5$, respectively. A sample size of 100 produces 80% power to detect an effect size of 0.28, which is a medium effect size. For example, if the true population correlation between the CSE score and the TEA within hospital units score is 0.28 or greater, this study will have an 80% chance of detecting (i.e., achieving statistical significance) this correlation at the 0.05 level of statistical significance.

Hypothesis 5 will be tested using stepwise multiple linear regression analysis. Power analysis for multiple linear regression analysis is based on the amount of change in R-squared attributed to the variables of interest. According to Cohen (1988), small, medium, and large effect sizes for hypothesis tests about R-squared are: R-squared = 0.0196, R-squared = 0.13 and R-squared = 0.26, respectively. A sample size of 100 achieves 80% power to detect an R-squared of 0.090 (which is a medium effect size) attributed to two independent variables (e.g., TEA, and MAN) using an F-Test with a significance level (alpha) of 0.05. Thus, a sample size of 100 is justifiable for detecting medium effect sizes for hypotheses 1 - 5.

Instrument and Materials Used in this Study

In this study, we used the CSESA survey, created by Dr. James H. Brown of the University of Wisconsin, as one of the instruments to collect data (Brown, 2007). By contacting Dr. Brown, we received permission to use the CSESA to collect data from the clinicians at HHC – NYC Metropolitan Hospital Center, and present the necessary findings and results for the evaluation of this research management. Thirty-six items

comprise the CSESA survey. The instrument has been tested and shown to be valid and reliable.

The second instrument used in this study to gather information is the HSPSC from the Agency for Healthcare Research and Quality (AHRQ). We contacted the author of the HSPSC instrument and learned that the HSPSC instruments "for Hospitals, Nursing Homes, Medical Offices, and Community Pharmacies are not copyright protected" and that "the surveys and all related materials are free for public use without permission, including for use in the hospital survey in your [*sic*] dissertation research at Rutgers University" (contact reference number 24-33164). The HSPSC consists of 42 self-administered questions from section A to F, covering 12 dimensions of patient safety culture and background information (Sorra & Nieva, 2004). On the scale, 18 items pertain to TEA from section A; four items pertain to Supervisor / Manager from section B; six items pertain to COM and ERR from section C; three items pertain to Frequency of Events Reported from section D; and 11 items pertain to MAN from section F (AHRQ). We excluded section E, which is Patient Safety Grade, as no items in that section pertain to this study. The HSPSC uses a 5-point Likert scale from "Strongly disagree" to "Strongly agree," or from "Never" to "Always." Eighteen items were reverse coded. For each item, frequencies were calculated based on the overall response. Additionally, composite frequencies based on each patient safety dimension can be calculated for a particular dimension. The total score for the instrument ranges from 1to 5, with higher scores indicating a higher quality of patient safety culture.

Reliability and Validity of Survey Instruments

We used valid and reliable instruments in this study. Instruments include the HSPSC questionnaire, to measure HPSC, and the CSESA questionnaire, to measure CSE. In addition, a researcher-developed demographics questionnaire was used to measure basic demographic characteristics of study participants and eligibility questions.

Reliability of CSESA and HSPSC

The reliability and discrimination analysis for the CSESA instrument indicates that it has a Cronbach's alpha coefficient of $\alpha = 0.969$ (Brown, 2007).

The reliability and statistical analysis conducted for the HSPSC by Sorra and Nieva (2004) shows the subscales exhibited Cronbach's alpha coefficients for TEA, MAN, COM, and ERR as follows: (a) the reliability of the dimension of Teamwork Within Hospital Units - Cronbach's alpha $\alpha = .83$, (b) the reliability of the dimension of Hospital Management Support For Patient Safety - Cronbach's alpha $\alpha = .83$, (c) the reliability of the dimension of Communication Openness - Cronbach's alpha $\alpha = .72$, and (d) the reliability of the dimension of Feedback and Communication about Errors - Cronbach's alpha $\alpha = .78$. The composites and their reliabilities (i.e., Cronbach's α) include the safety culture dimensions as displayed in Table 2, below. Higher scores within the patient safety culture composites indicate a higher quality of patient safety culture. In this study, we analyzed four of the safety culture dimensions with CSE, PEOU, and PU.

Table 2

HSPSC Dimensions, Reliability, and Number of Items per Composite

Category	Composite	Cronbach's Alpha	Number of Items
Safety Culture	Teamwork within hospital unit	.83	4
	Management support	.83	3
	Communication openness	.72	3
	Communication about errors	.78	3

Notes: From Sorra and Nieva, 2004.

Validity of CSESA and HSPSC

Brown (2007) administered the CSESA survey instrument to 108 adult and continuing-education students over the age of 21 at more than one university. The sample was diverse with respect to gender, age, education level, and ethnicity. The total score demonstrates excellent internal consistency reliability, with a Cronbach's alpha of $\alpha = 0.969$. Strong positive correlations between CSE scores and several other instruments that measure similar constructs demonstrates construct validity. Brown (2007), and the professionals who designed the items making up the survey instrument taught basic adult technologies (i.e., computer) courses, thus establishing content validity. Brown (2007) established criterion validity with an analysis of variance (ANOVA), demonstrating that students with greater computer skills scored higher on the CSESA than students with a lower level of computer skills.

Sorra and Nieva (2004) conducted the validity and statistical analyses for the HSPSC. To develop the HSPSC survey, Sorra and Nieva conducted a review of the

literature pertaining to safety, accidents, medical error, error reporting, safety climate and culture, and organizational climate and culture. The authors pretested the survey, using the participation of hospital staff to ensure the items were easily understood and relevant to patient safety in a hospital setting (Sorra & Nieva, 2004). Sorra and Nieva conducted a pilot study to test the reliability and validity of the instrument, as well as the factor structure of the survey, with participation by more than 1,400 hospital employees among 21 different hospitals located in different regions of the United States. The authors distributed 4,983 surveys and obtained 1,437 responses. The authors demonstrated construct validity to illustrate strong positive correlations of HPSC scores that measure related constructs. Sorra and Nieva revised the survey by retaining only the most relevant items and scales, based on the analysis of the pilot data. The resulting HSPSC has sound psychometric properties for the included items and scales (Sorra & Nieva, 2004).

Data Collection Plans, Dependent and Independent Variables

Questionnaires were used as methods to achieve participation from respondents. The respondents received assurances that their identity would remain anonymous, which facilitate increased truthfulness in responses (Leedy & Ormrod, 2005). We distributed the surveys electronically, using surveymonkey.com. Prior to statistical analysis of the quantitative survey results, we conducted data screening (i.e., assessment) on the univariate and multivariate analysis.

The questionnaire consists of two parts. Part 1 addresses questions relevant to the HPSC to measure TEA, MAN, COM, and ERR. Part 2 addresses questions relevant to CSE related to the BIU for the TAM because nurses with a higher level of CSE are more likely to use the HIT system than nurses with lower CSE. This approach can yield

important information about nurses' utilization of HIT, which might help improve hospital and patient outcomes such as better utilization of HIT by nurses, improved retention of nurses, and improved patient care.

Dependent Variables

The CSE variable will be measured on a continuous measurement scale with a range of 1 to 6. The score will be derived by calculating the average of questions 1 through 36 from the CSESA questionnaire. Response choices to the 36 questions will be coded as 1 = I completely disagree, 2 = I mostly disagree, 3 = I somewhat disagree, 4 = I somewhat agree, 5 = I mostly agree, and, 6 = I completely agree. Thus, smaller scores indicate a study participant with lower CSE, while larger scores indicate a study participant with higher CSE.

Independent Variables

The TEA variable will be measured on a continuous measurements scale with a range of 1 to 5. The score will be derived by calculating the average of questions 1, 3, 4, and 11 from section A of the HSPSC questionnaire. Response choices on the questionnaire will be coded as: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither, 4 = Agree, and 5 = Strongly Agree. Thus, smaller scores indicate a perception that the TEA is of lower quality while larger scores indicate a perception that the TEA is of higher quality.

The MAN variable will be measured on a continuous measurements scale with a range of 1 to 5. The score will be derived by calculating the average of questions 1, 8, and 9 from section F of the HSPSC questionnaire. Response choices on the questionnaire will be coded as: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither, 4 = Agree, and, 5 =

Strongly Agree. Question 9 will be reverse coded prior to calculating the score. Thus, smaller scores indicate a perception that the MAN is of lower quality while larger scores indicate a perception that the MAN is of higher quality.

The COM variable will be measured on a continuous measurements scale with a range of 1 to 5. The score will be derived by calculating the average of questions 2, 4, and 6 from section C of the HSPSC questionnaire. Response choices on the questionnaire will be coded as: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither, 4 = Agree, and, 5 = Strongly Agree. Question 6 will be reverse coded prior to calculating the score. Thus, smaller scores indicate a perception that the COM is of lower quality while larger scores indicate a perception that the COM is of higher quality.

The ERR variable will be measured on a continuous measurements scale with a range of 1 to 5. The score will be derived by calculating the average of questions 1, 3, and 5 from section C of the HSPSC questionnaire. Response choices on the questionnaire will be coded as: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither, 4 = Agree, and, 5 = Strongly Agree. Thus, smaller scores indicate a perception that the ERR is of lower quality while larger scores indicate a perception that the ERR is of higher quality.

Summary

This Chapter contained a discussion regarding a correlational study that focuses on the relationship between HPSC and CSE among nurses in a hospital setting, used to conduct this present research. The Chapter also contained a description of the survey instruments used to collect data using surveymonkey.com, and how the dependent variables for CSE and the independent variables for HPSC were measured. SPSS was

used to conduct the statistical data analyses. Chapter 4 will include the study results that detail analysis of whether or not the hypotheses were rejected, and about the correlated relationship of the dependent and independent variables.

CHAPTER IV:

RESULTS

This research was guided by a primary research question: Is there a correlation between HPSC and CSE among nurses in a hospital setting? The purpose of this correlational study was to examine the relationship between CSE (dependent variable) and the HPSC (independent variable). The objective of the evaluation was to determine if there is a relationship between HPSC and CSE among nurses in a hospital setting. A web-based electronic survey was used to collect data from qualified participants. The primary study was conducted between November 27, 2014 and January 3, 2015. This Chapter contains discussion of the human subjects protection, data collection procedures, descriptive statistics and analysis using SPSS for Windows (IBM SPSS 19.0, SPSS Inc., Chicago, IL) for the independent and dependent variables, Cronbach's Alpha for the HPSC and CSE scores, and hypothesis test results addressing the research questions and hypothesis

Human Subjects Protection

The Office of Research Integrity's Institutional Review Board (IRB) reviewed this study and granted an exempt status. The IRB issued this waiver of consent because the participants did not complete the questionnaire in the presence of the researcher; participants completed the survey anonymously and automatically using Surveymonkey.com, with an accompanying consent form as a cover page. Additionally, the Rutgers University Human Subjects Review Board (HSRB) approved an exempt

status for this study. The Rutgers University IRB approval number for this study is Pro20140000878.

Data Collection Procedures

After obtaining IRB approvals, one of HHC - NYC Metropolitan Hospital Center's Head Nursing Officers, Sylvia Seecharan granted permission to survey the nurses at that hospital. Head Nurse Seecharan distributed the online survey by emailing a copy to each of the nurses to complete voluntarily the online survey, and placed the flyers upon specific HHC - NYC Metropolitan Hospital Center posting boards. The target population consisted of 500 nurses working at different facilities (e.g., the Emergency Department, Intensive Care Unit, and Pediatrics) at HHC - NYC Metropolitan Hospital Center. The response rate among the targeted 500 Registered Nurses was 20%, or 102 nurses willing to participate voluntarily in this study. Among the 102 respondents to the study invitation, 2 (1.96%) failed to agree to the informed consent that is included as the cover page in the survey, and were omitted from the study. Among the remaining 100 respondents, all 100 answered all survey questions pertinent to the independent and dependent variables. Thus, the final sample size for the study is $n = 100$. Participants reported 14 different primary work units among the 100 respondents. The most common primary work unit reported is “Many different hospital units/no specific unit,” $n = 16$ (16%). The other most common units reported include: 1) Emergency Department, $n = 12$ (12%); Intensive care unit, $n = 10$ (10%); Pediatrics, $n = 10$ (10%), and Medicine, $n = 10$ (10%). See appendix A for detailed descriptive statistics for all of the survey questions.

Descriptive Statistics for the Independent and Dependent Variables

Table 3 shows descriptive statistics for the independent and dependent variables. Considering the lowest possible score for the patient safety culture measures is 1.0, and the highest possible score is 5.0, all of the patient safety culture scores indicate a relatively high level of HPSC, with averages ranging from 3.37 (COM) to 4.02 (TEA). With regard to CSE, the lowest possible score is 1.0, and the highest possible score is 6.0. The average CSE score is 4.55, which is well above the midpoint of 3.5, indicating a relatively high level of CSE.

Table 3

Descriptive Statistics for the HPSC and CSE Scores

	n					
	Valid	Missing	Mean	Std. Deviation	Minimum	Maximum
Patient Safety Culture - Teamwork	100	0	4.0200	.78148	1.00	5.00
Patient Safety Culture - Management Support	100	0	3.9367	.81332	2.33	5.00
Patient Safety Culture - Communication Openness	100	0	3.3700	.77256	2.00	5.00
Patient Safety Culture - Communication About Errors	100	0	3.5867	1.05635	1.00	5.00
Computer Self-Efficacy	100	0	4.5503	1.01224	2.47	5.92

Cronbach's Alpha for the Patient Safety Culture and Computer Self-Efficacy Scores

Cronbach's alphas were calculated for the HPSC and CSE scale scores. Table 4 shows that with the exception of the MAN and COM scores, all of the scores had an alpha value above .70, indicating high reliability. The low reliability for MAN and COM

was surprising considering other studies have shown those scale scores to have high reliability. The scoring instructions were strictly followed, thus the possibility of having miscalculated the scale scores was ruled out as a possible explanation for the low reliability. There is no certain explanation of why these two scale scores had low reliability. One can only speculate that in this particular sample, some extraneous factor(s) may have influenced the reliability of those two scale scores. One hypothetical example is, perhaps the nurses were more rushed than typical samples of nurses and they did not give thoughtful answers to the survey questions making up those two subscales. Regardless of the cause, the low reliability for MAN and COM are limitations of the study.

Table 4

Cronbach's Alpha Reliability for the HPSC and CSE Scores

Variable	Cronbach's alpha (n = 100)	Number of items
Patient Safety Culture - Teamwork	0.88	4
Patient Safety Culture - Management Support	0.63	3
Patient Safety Culture - Communication Openness	0.37	3
Patient Safety Culture - Communication About Errors	.90	3
Computer Self-Efficacy	.99	36

Hypothesis Test Results

Hypothesis 1.

$H1_0$: There is no correlation between CSE and TEA.

$H1_a$: There is a correlation between CSE and TEA.

This hypothesis is testing the relationship between perceived ease of use and behavioral intention to use of the TAM construct. Prior to collecting the data, it was anticipated that Pearson's correlation statistic would be used to test hypothesis 1. However, testing of the assumptions for Pearson's correlation revealed that the data were not appropriate for Pearson's correlation statistic. Specifically, the assumption that there were no outliers was evaluated by inspection of box plots for CSE and TEA. The box plot for TEA revealed outliers were greater than 1.5 box lengths below the 25th percentile, indicating extreme outliers. Thus, the assumption of no outliers was violated.

The second assumption for Pearson's correlation statistic is that the two variables should have a roughly normal distribution. The normality assumption was evaluated by calculating the Kolmogorov-Smirnov (KS) Test for the CSE and TEA scale scores. The null hypothesis is that the distribution is normal. If the p-value is less than .05, the null hypothesis is rejected and it is concluded the distribution is not normal. The p-values were .13 and <.001 for CSE, and TEA, respectively. Thus, the assumption of normality was violated.

The linear relationship and homogeneity of variance (i.e., homoscedasticity) assumptions were evaluated by inspection of a scatter plot. Figure 2 is a scatter plot that graphically depicts the relationship between CSE and TEA. The figure shows no indication of a non-linear relationship. Thus, the assumption of a linear relationship was assumed to be satisfied. The figure gives some indication that the variation in CSE changes with changes in the independent variable (TEA). Thus, the assumption of homoscedasticity was considered violated.

Because several of the assumptions for Pearson's correlation statistic were violated, the non-parametric equivalent of the Pearson's correlation statistic, Spearman's rho was used instead. Spearman's rho works by transforming the independent and dependent variables into ranks and then applying the Pearson's correlation statistic to the transformed (i.e., ranked) data. Spearman's rho is an appropriate method for testing hypothesis 1 because it makes no assumptions about the shape of the distribution, linearity, outliers, or homoscedasticity. The assumption for Spearman's rho is that the relationship between the two variables is monotonic. This term means that as one variable increases, so does the other, or, as one variable increases, the other decreases. This assumption is violated if inspection of the scatter plot reveals a "U" shape, or inverted "U" shape, for example. The scatter plot gave no evidence that the relationship was non-monotonic. Therefore, it was assumed that Spearman's rho statistic was appropriate for testing hypothesis 1.

The results showed a statistically significant, positive correlation between CSE and TEA, $r_s(98) = .56$; $p < .001$. The null hypothesis was rejected and it was concluded there is strong evidence to suggest that nurses who perceive a higher level of TEA tend to have a higher level of CSE.

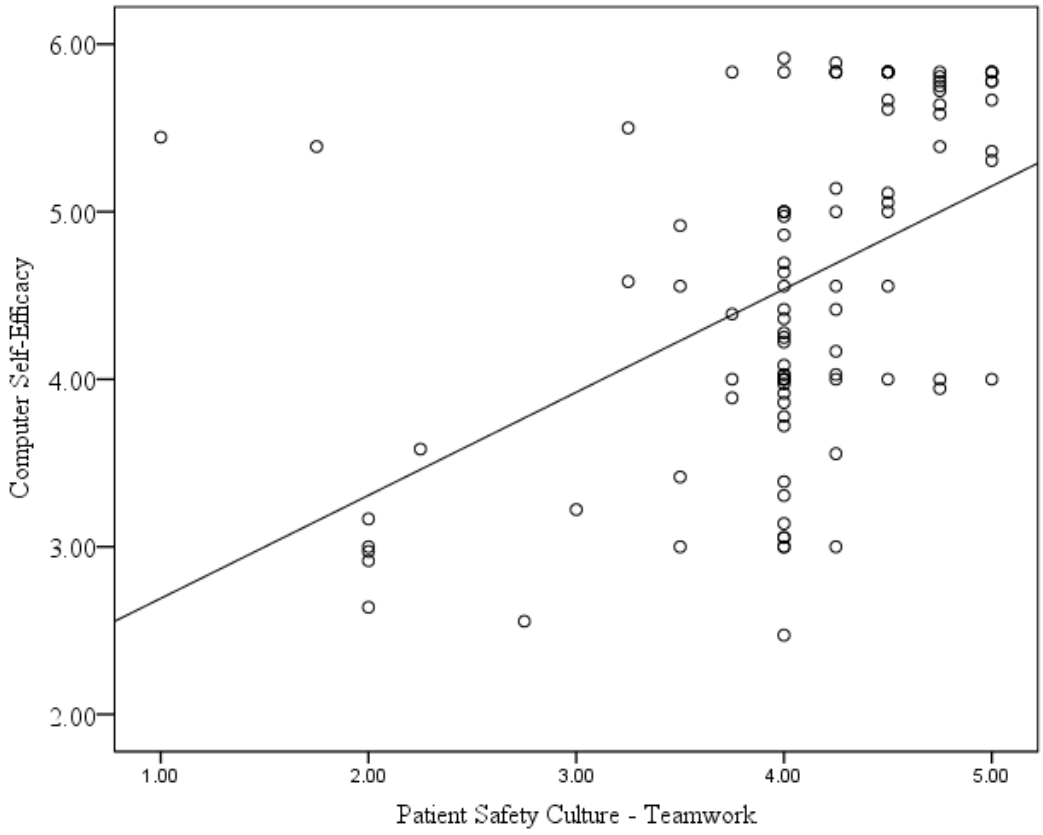

Figure 2. Scatter plot of CSE and HPSC - TEA.

Hypothesis 2.

$H2_0$: There is no correlation between CSE and MAN.

$H2_a$: There is a correlation between CSE and MAN.

None of the assumptions (as discussed above for hypothesis 1) were violated. Thus, Pearson's correlation statistic was used to test this hypothesis as originally planned. Figure 3 is a scatter plot that graphically depicts the relationship between CSE and MAN. The figure gives some evidence of a positive correlation between the two variables. The results of the analysis showed a statistically significant positive correlation between CSE and MAN, $r(98) = .59$; $p < .001$. The null hypothesis was rejected and it was concluded

that there is strong evidence to suggest that nurses who perceive a higher level of MAN tend to have a higher level of CSE.

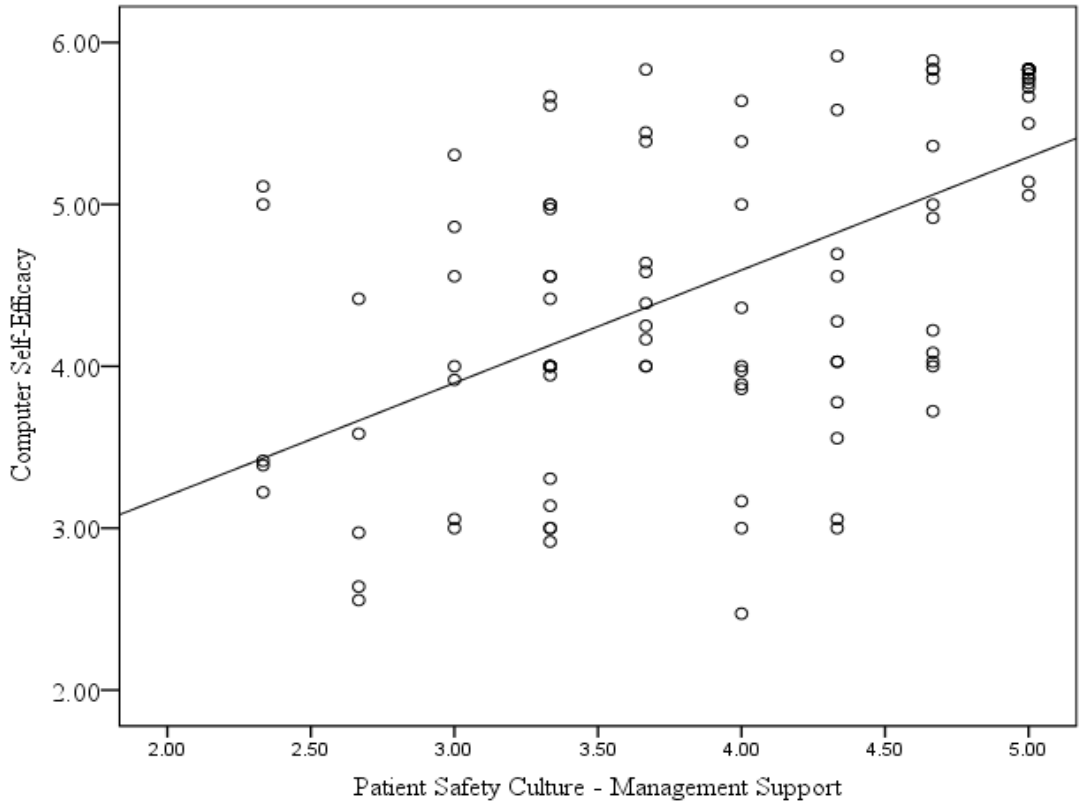

Figure 3. Scatter plot of CSE and HPSC - MAN.

Hypothesis 3.

$H3_0$: There is no correlation between CSE and COM.

$H3_a$: There is a correlation between CSE and COM.

This hypothesis is testing the relationship between PU and BIU of the TAM construct. Testing of the assumptions for Pearson's correlation statistic revealed that the COM score had a non-normal distribution. Specifically, the Kolmogorov-Smirnov (KS) Test of the COM score produced a p-value of .001. This violates one of the assumptions for Pearson's correlation statistic. In addition, Figure 4 is a scatter plot that graphically

depicts the relationship between CSE and COM. There is some evidence to suggest the homogeneity of variances assumption was violated. That is, the variation in CSE appears to change with values of the COM score. As a result, Pearson's correlation statistic was deemed inappropriate for testing this hypothesis, and Spearman's rho statistic was used instead. The results showed a statistically significant positive correlation between CSE and COM, $r_s = .58$; $p < .001$. The null hypothesis was rejected and it was concluded that nurses who perceive a higher level of COM tend to have a higher level of CSE.

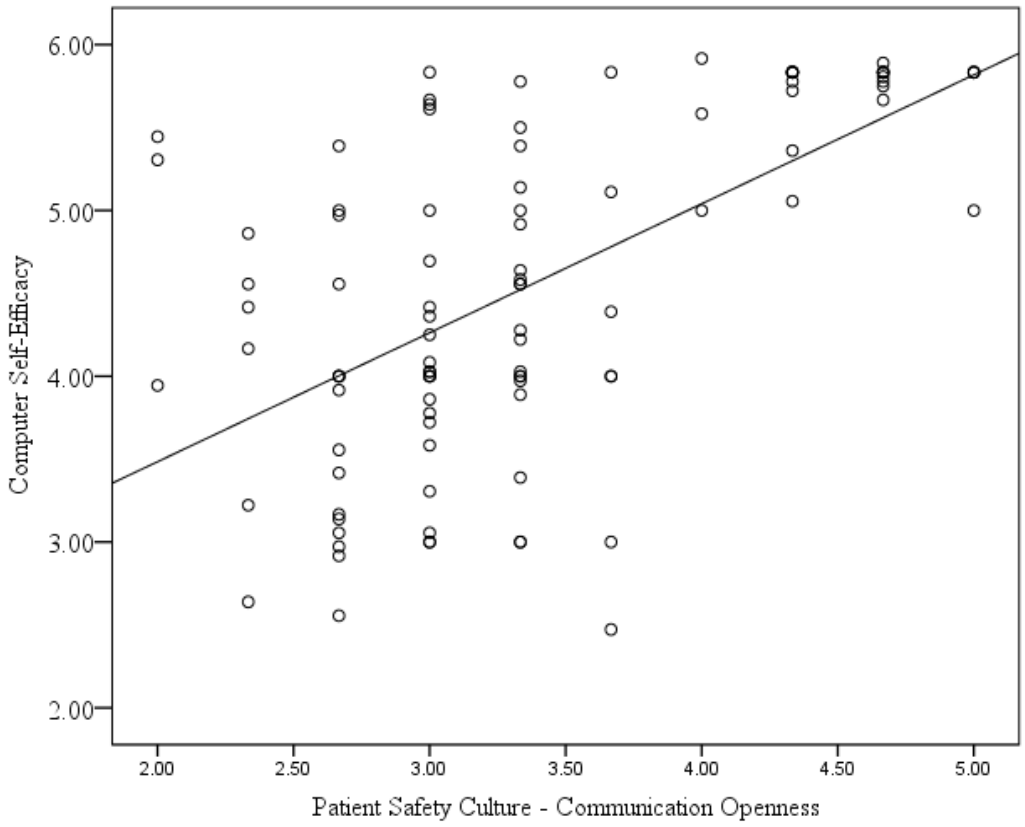

Figure 4. Scatter plot of CSE and HPSC - COM.

Hypothesis 4.

$H4_0$: There is no correlation between CSE and ERR.

$H4_a$: There is a correlation between CSE and ERR.

Testing of the assumptions for Pearson's correlation statistic revealed that the ERR score had a non-normal distribution. Specifically, the Kolmogorov-Smirnov (KS) Test of the ERR score produced a p-value of .048. This violates one of the assumptions for Pearson's correlation statistic. In addition, Figure 5 is a scatter plot that graphically depicts the relationship between CSE and ERR. There is some evidence to suggest the homogeneity of variances assumption was violated. That is, the variation in CSE appears to change with values of the ERR score. As a result, Pearson's correlation statistic was deemed inappropriate for testing this hypothesis, and Spearman's rho statistic was used instead. The results showed a statistically significant positive correlation between CSE and ERR, $r_s = .72$; $p < .001$. The null hypothesis was rejected and it was concluded that nurses who perceive a higher level of ERR tend to have a higher level of CSE.

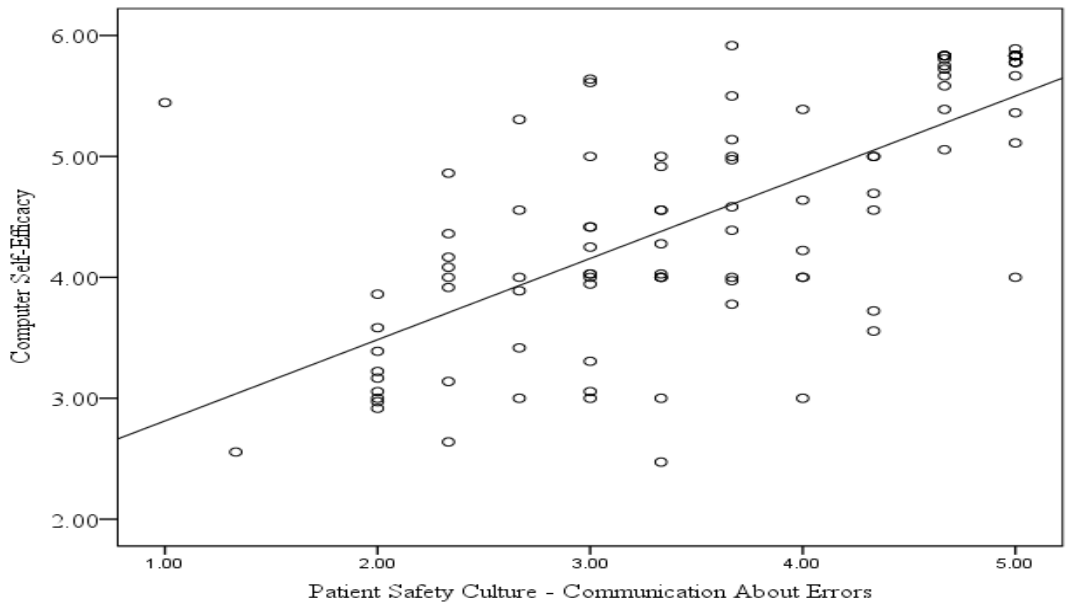

Figure 5. Scatter plot of CSE and HPSC - ERR.

Hypothesis 5.

$H5_0$: Two or more of the independent variables - TEA, MAN, COM, and ERR - do not better predict CSE than any single independent variable alone.

$H5_a$: Two or more of the independent variables - TEA, MAN, COM, and ERR - better predict CSE than any single independent variable alone.

The planned analysis for testing hypothesis 5 was stepwise multiple linear regression analysis. Prior to conducting the analysis, the assumptions for multiple linear regressions were evaluated. The assumption of linearity of relationship between the independent and dependent variables was satisfied by inspection of scatter plots as discussed for hypothesis 1 through 4. The assumption that the error term has a normal distribution with a mean of 0 was confirmed by inspection of a histogram of the regression standardized residuals. Scatter plots of the standardized residuals versus each of the independent variables were inspected to confirm the assumption that the value of the error term for a given case is independent of the values of the variables in the model, and to insure constant variance. The assumption that multicollinearity was not present was confirmed by inspection of the variance inflation factors (VIF). Thus, all of the assumptions for multiple linear regression analysis were assumed to be satisfied.

The dependent variable was the CSE score. The candidate independent variables entered into the stepwise model selection procedure were the HPSC measures: TEA, MAN, COM, and ERR. The overall model was statistically significant: $F(2, 97) = 52.3$; $p < .001$. However, only ERR ($p < .001$) and MAN ($p = .020$) were statistically significant. The R-square for the final model was .52, which means the ERR and MAN aspects of HPSC explained 52% of the total variance in CSE.

The equation of the model was: CSE = 1.55 + .55*ERR + .26*MAN, where CSE = Computer Self-Efficacy, ERR = Communication about Errors, and MAN = Management Support. The interpretation of the model is: when controlling for the MAN score the average CSE score is expected to increase by .55 points for every 1-point increase in the ERR score. When controlling for the ERR score, the average CSE score is expected to increase by .26 points for every 1-point increase in the MAN score. The null hypothesis was rejected and it was concluded that two or more dimensions of HPSC better predict CSE than any single dimension of HPSC alone. Specifically, among the four dimensions of HPSC, COM was the strongest predictor of CSE, followed by MAN as the second strongest predictor of CSE.

Summary

In this study, we identified strong evidence to suggest that all four dimensions of hospital patient safety culture - TEA, MAN, COM, and ERR - positively correlate with CSE. Restated, those nurses who perceive a higher level of any of the four dimensions of HPSC are more likely to report a higher level of CSE. When considering the four dimensions of HPSC collectively, ERR and MAN combine to provide the strongest predictor of CSE. In this Chapter, we detailed the processes for analysis of the data and presented the analysis of the specific data from the conducted research. Chapter 5 contains interpretation of the findings of the conducted research, recommendations for further action, information concerning the limitations and implications of the research, and further recommendations about the practical significance and possibility for broader impact of the study.

CHAPTER V:

DISCUSSIONS

This study was conducted to examine the relationship between HPSC and CSE among nurses working in a hospital setting. The evaluation included a determination of whether a relationship exists between hospital patient safety culture such as TEA, MAN, COM, ERR, and CSE among nurses in a hospital setting. The correlation research design was used to test the hypotheses. The researcher used a non probability sampling method of convenience sampling that involves individuals who are readily available for sampling to acquire enough participants for the study (Leedy & Ormrod, 2005). The target population for the study was nurses currently working in a hospital setting. Participants were informed of the study. This Chapter contains discussion pertaining to the interpretation of the findings; the research questions; the HPSC Models for PEOU, PU, and BIU; the limitations of the study; the study implications, and recommendations for further study.

Interpretation of the Findings

According to Reinard (2006), reliability is "the internal consistency of a measure" (para. 1). Reinard stated that,

> Coefficients above .90 are considered "highly reliable," between .80 and .89 are considered to have "good reliability," between .70 and .79 are considered to have "fair reliability," between .60 and .69 are considered to have "marginal reliability," and coefficients under .60 are considered unacceptable reliability. (para. 2)

The findings of this study indicate strong evidence that nurses who perceive a higher level of TEA related to HSPC tend to have a higher level of CSE. Comparative outcomes between this study and extant data failed to indicate correlation between MAN and CSE, and between COM and CSE. The findings show that nurses who perceive a higher level of ERR related to HPSC tend to have a higher level of CSE. The detailed data are as follows:

1. HPSC and TEA

Hospital Patient Safety Culture for TEA shows reliability with a Cronbach's alpha of α = .88, and correlates positively with the CSE score for TEA, $r_s(98) = .56$; $p < .001$. Comparatively, the extant study on HPSC by Sorra and Nieva (2004) revealed Cronbach's alpha for teamwork within units is .83. Additionally, Ernstmann et al. (2011) conducted a pilot study using HSPC to examine how a German hospital's top management assesses the patient safety culture in the organization. These data are presented in Table 5, on page 66, and indicate Cronbach's alpha for teamwork within units is .77, compared to this (i.e., the present) study which is .88 for TEA. The null hypothesis was rejected and it was concluded that there is strong evidence to suggest that nurses who perceive a higher level of TEA tend to have a higher level of CSE.

2. HPSC and MAN

Data for HPSC for MAN show low reliability with a Cronbach's alpha of α =.63. Comparative data for MAN from the extant studies indicate a Cronbach's alpha of .63 for Sorra and Nieva (2004), and .83 for Ernstmann et al. (2011). While the data in the German study by Ernstmann et al. indicate a higher score and thus a high reliability and consistency for MAN, the data in the present study, along with the data in the study by

Sorra and Nieva reveal that MAN does not correlate to CSE.

3. HSPC and COM

Hospital Patient Safety Culture for COM has low reliability with a Cronbach's alpha of $\alpha = .37$. Sorra and Nieva (2004) identified a Cronbach's alpha of .72 for COM, and Ernstmann et al. (2011) found a Cronbach's alpha of .64 for COM. These data indicate a higher score and high reliability for COM in the Sorra and Nieva study, and lower reliability for the present study and the study by Ernstmann et al. Thus, we concluded that there is no correlation between COM and CSE.

4. HPSC and ERR

Hospital Patient Safety Culture for ERR has the highest reliability with a Cronbach's alpha of $\alpha = .90$, and shows statistically significant positive correlation between ERR and the CSE score for ERR, $r_s(98) = .72$; $p = .048$. Sorra and Nieva (2004) identified a Cronbach's alpha of .78 for ERR, and Ernstmann et al. (2011) found a Cronbach's alpha of .79 for ERR. Comparatively, the present study proved the highest reliability and consistency for ERR. The null hypothesis was rejected and it was concluded that nurses who perceive a higher level of ERR related to HPSC tend to have a higher level of CSE.

Table 5

Reliability of 12-Day Safety Culture Dimensions, Comparative Data

German Data Compared with United States Data for the HPC Dimensions and Outcomes

Dimension	No. of items	Cronbach's alpha United States data for staff	Cronbach's alpha German data for management
Safety Culture Dimensions			
Teamwork across hospital units	4	.80	.78
Teamwork within units		.83	.77
Hospital management support for patient safety	3	.83	.87
Supervisor/manager expectations/actions	4	.75	.69
Communication openness	3	.72	.64
Feedback and communication about error	3	.78	.79

Note. Adapted from the results in the German pilot study,"Psychometric properties of the Hospital Survey on Patient Safety Culture for hospital management (HSOPS_M)," by Ernstmann et al., 2011, *BMC Health Services Research, 11*(165).

The results of the present study show that the HPSC for MAN and COM scores have low reliability, with Cronbach's alpha below .70, therefore the observed correlation between MAN and COM related to CSE are questionable. However, we determined the correlation and reliability for TEA and ERR with confidence, given the highest scores (i.e., Cronbach's alpha) for TEA of $\alpha = .88$, and ERR of $\alpha = .90$. The correlation between overall TEA and ERR with CSE is the strongest finding in this study because TEA and ERR both have high reliability and consistency, and correlate positively.

The results of this study suggest that the patient safety culture dimensions of TEA within hospital units and ERR can significantly improve HIT / EMR. To improve

adherence to CSE application, hospitals could re-evaluate and develop their patient safety culture, while nurses could make an assessment of their own values and behaviors regarding HIT /EMR and how it influences patient safety culture relative to their (i.e., the nurses) practice. If hospital organizations focus on building TEA and providing ERR, the hospitals may well enhance the patient safety culture by fostering a commitment to CSE procedures and reducing medication errors. Building TEA is an important concept that determines the behavioral intention to use CSE and promotes improved overall performance to the satisfaction of both nurses and patients. This approach can permit nurses to assist one another when information technology fails, or when there is difficulty using specific technology. If nurses adhere to such procedures and proactively engage HIT, the system will become beneficial as opposed to being an impediment to the nurses' flow of work.

Results for this study show positive correlations between CSE and TEA (r_s (98) = .56; $p < .001$), CSE and MAN (r_s (98) = = .59; p < .001), CSE and COM (r_s (98) =.58; p < .001), and CSE and ERR (r_s (98) = .72; p < .001).

Research Questions

Research Question 1

1. What, if any correlation exists between CSE and the perceived TEA among nurses working in the hospital setting?

The results of the analysis show that CSE and the perceived TEA are statistically significant. There is strong positive correlation between CSE and TEA, $r_s(98) = .56$; $p < .001$. Therefore, the null hypothesis was rejected and it was concluded that nurses who receive a higher level of TEA in a hospital setting, tend to report a higher level of CSE.

As a result they tend to work together to complete job related tasks, treat each other with respect, provide improved work performance, and enhance the patient safety culture relative to their practice.

Research Question 2

2. What, if any correlation exists between CSE and the perceived MAN among nurses working in the hospital setting?

The results of the analysis show CSE and the perceived MAN are statistically significant. There is a positive correlation between CSE and MAN, $r_s(98) = .59$; $p < .001$. Therefore, the null hypothesis was rejected and it was concluded that if nurses receive a higher level of MAN in a hospital setting, they tend to report a higher level of CSE. As a result, they tend to cooperate and coordinate well among one another, provide improved work performance, and enhance patient satisfaction. A limitation for this analysis is the measurement of MAN that has relatively low reliability.

Research Question 3

3. What, if any correlation exists between CSE and the perceived COM among nurses working in the hospital setting?

The results of the analysis shows CSE and the perceived COM are statistically significant. There is positive correlation between CSE and COM, r_s (98) =.58; $p < .001$. Therefore, the null hypothesis was rejected and it was concluded that if nurses have a higher level of COM related to their hospital setting, they tend to have a higher level of CSE. As a result, they tend to feel free (i.e., confident) to provide improved job performance, which leads to improved patient satisfaction. A limitation of this analysis is the measurement of COM that has low reliability.

Research Question 4

4. What, if any correlation exists between CSE and the perceived ERR among nurses working in the hospital setting?

The results of the analysis show CSE and the perceived ERR are statistically significant. There is a positive correlation between CSE and ERR, r_s (98) =.72; $p < .001$. Therefore, the null hypothesis was rejected and it was concluded that nurses who have a higher level of ERR in the hospital setting, tend to have a higher level of CSE. This finding is consistent with the conclusion that nurses who have less fear about repercussions from making mistakes tend to feel a higher level of CSE. This factor results in improved job performance, and improved patient safety.

Research Question 5

5. Do two or more of the independent variables - TEA, MAN, COM, and ERR - better predict CSE among nurses working in the hospital setting than any single independent variable alone?

The dependent variable was the CSE score. The candidate independent variables entered into the stepwise model selection procedure were the HPSC measures (i.e., TEA, MAN, COM, and ERR). The overall model is statistically significant, F(2, 97) = 52.3; $p < .001$. The null hypothesis was rejected and it was concluded that two or more dimensions of HPSC better predict CSE than any single dimension of HPSC alone. Specifically, among the four dimensions of HPSC, ERR is the strongest predictor of CSE, followed by MAN as the second strongest predictor of CSE. A limitation of this analysis is the low reliability of the COM and MAN scores. Thus, further study is needed to validate these findings.

Hospital Patient Safety Culture and Perceived Ease of Use Model

Perceived ease of use was defined in this study as the nurse's belief that there is teamwork between the clinicians, along with management support, which provides freedom from mental efforts when addressing tasks. The questions pertaining to TEA, and MAN in the HSPSC were used to measure PEOU. The data show that the reliability of the dimension of MAN is represented by a Cronbach's alpha below .70 ($\alpha = .63$), which is "considered to have marginal reliability" (Reinard, 2006). Therefore, the results for MAN in this study are questionable. Despite this limitation, the correlation analysis showed that MAN was statistically significant and had a positive correlation between CSE and MAN, $r_s(98) = .59$; $p < .001$. These data suggest that nurses who continue to experience MAN in their practice may consider that CSE is useful to provide them (i.e., the nurses) freedom from mental efforts when addressing tasks. Additionally, it was found that TEA was statistically significant, as the reliability of the dimension of TEA within units for patient safety culture had a high Cronbach's alpha ($\alpha = .88$), $r_s(98) = .56$; $p < .001$, which is considered "highly reliable in predicting CSE perceived usefulness. Thus, we concluded that there is measurable evidence that providing nurses with TEA in their practice may lead them to experience increased PEOU in regards to CSE. This outcome suggests that TEA among nurses in a hospital setting reinforces the notion that CSE is useful to enhance their job performance, and provide freedom from mental efforts when accomplishing tasks.

Hospital Patient Safety Culture and Perceived Usefulness Model

In this study, PU was defined as the nurse's belief that including COM and ERR in their practice could enhance their job performance. This study showed evidence to

suggest COM is correlated with CSE. However, the reliability of the dimension of COM for HPSC revealed a low Cronbach's alpha ($\alpha = 0.37$), which is "considered to be unacceptable reliability" (Reinard, 2006). Thus, the results for COM in this study are questionable. The HSPSC measure, ERR proved statistically significant, with a Cronbach's alpha above .70 ($\alpha = .90$), and ERR as $r_s(98) = .72$; $p < .001$, which is considered highly reliable in predicting CSE perceived usefulness. These data indicate measurable evidence that providing nurses with HSPSC with a higher level of ERR may increase their perceived usefulness of CSE. In other words, this study provides some evidence to suggest when errors are communicated to nurses; it may increase their level of computer self-efficacy.

Hospital Patient Safety Culture and Behavioral Intention to Use Model

As stated in the previous Chapter, BIU is "a measure of the strength of one's intention to perform a specified behavior" (Davis, 1989, p. 321). In this (i.e., present) study, BIU was defined as the nurse's intention to use HIT or CSE systems in their hospital. Behavioral intention to use was measured by using the CSESA, which was the dependent variable. We determined that the reliability of the dimension of the CSESA has a Cronbach's alpha of $\alpha = .99$; $p < 0.001$ which is measurably above .70 and "considered highly reliable" (Reinard, 2006) in predicting BIU for CSE / HIT in the nurses' practice. It is concluded from these data that nurses will intend or expect to use CSE / HIT applications if they are adopted or implemented in their facilities.

Limitations

The findings of this study are limited by certain elements of investigating BIU, the location for the sample and degree of sample participation, and the restricted number

of dimensions analyzed. The researcher did not have enough time to investigate the actual usage behavior. We determined specific difficulty in obtaining IRB approval, and the necessary resources for an observational study, and precluded the challenge posed by recruitment. Moreover, studies have shown that the BIU technology determines the actual usage behavior (Davis, 1989).

The survey used to collect generalized knowledge and to recruit participants for this study was conducted at only one hospital, which is HHC - Metropolitan Hospital Center. It is notable that the analysis and results of the study could be improved by expanding the study to additional hospitals instead of one particular hospital in the New York Metropolitan Area. The nurses at HHC - Metropolitan Hospital Center were from many different units, such as the Emergency Department, Intensive Care, and Pediatrics. Not all nurses at HHC - Metropolitan Hospital were given the opportunity to participate in the study, as the nurses were occupied with ongoing tasks. This limiting factor of participation is one of the reasons COM and MAN results do not have high reliability and consistency in this study.

Another limitation pertains to the fact that only four of the total available patient safety culture dimensions were used for this study. It is recommended that future studies include all of these patient safety culture dimensions to determine whether or not a relationship exists or is correlated with the nurses using the EMR systems. We recommend including other studies that address the incorporation of new technologies into the nurses' workflow. The overall findings of this study were consistent and reliable despite these noted limitations. The patient safety culture dimensions, TEA, and ERR are predictive of CSE, PEOU, PU, and BIU for CSE /HIT.

Recommendations for Further Study

We recommend replication of this study using MAN and COM, given the outcomes for proving the research questions pertaining to TEA and ERR on improving CSE among nurses in the hospital setting. The reason for this recommendation is that the two scale scores, MAN and COM, have shown low reliability. Replication of the study for these two scores could allow accurate measurement of the level of patient safety culture and CSE. Significant gains might be achieved if this study is replicated with outcomes determining higher scale scores for MAN and COM, which will complement the results of the replicated study (e.g., as addressed in the discussion about the limitations of the study). It is worth noting that one disadvantage in using the Internet for surveys exists in the possibility respondents will provide answers based on their perceptions beyond the scope intended by the researcher, and may give subjective opinions that are inclined towards their own self-interests.

Widespread belief exists that studies are unethical if the respective sample size is not large enough to ensure adequate power (Bacchetti, McCulloch, Segal, & Wolf, 2005). Bacchetti, McCulloch, Segal, and Wolf (2005) stated that “the balance between the burdens that participants accept, and the clinical or scientific value that a study can be expected to produce” is resolved in a larger sample size (para. 1). We assert that this present study might be more desirable and acceptable with a larger sample size. This implies that this study may well be more ethical in design if the projected value reached larger numbers of participants or a larger-sized sample.

Conclusion

The purpose of this study was to examine if there is a correlation between the level of computer skills among nurses working in a hospital setting and the HPSC in order to promote successful ERM in the nursing practice. Hospital organizations can promote the proper use of CSE by nurses by identifying and addressing the factors influencing the BIU for CSE. Doing so will enhance the nurses' job performance, and increase patient safety and satisfaction. The development of targeted change and tailored interventions focused on patient safety initiatives - including nurses' job performance and patient satisfaction - are related to understanding the integrated relationships in HPSC. This study evidences the correlation between CSE for EMR and HPSC, with specified limitations that must be investigated to refine the framework across the spectrum of patient care for continuous improvement (e.g., accuracy in treatment, and reductions in costs through comprehensive and integrated EMR). These data are especially important given the exponential advancement of technology and its ongoing applications in EMR, and the measure of nursing care respective to HPSC.

By exploring the dimensions of HPSC, this study uniquely fills the knowledge gap between CSE among nurses and the evidence linking nurses' intentions to adhere to CSE procedures. The present research was precipitated by factors leading to the worldwide need for healthcare reform to meet the needs of a largely aging population, and to meet the challenges associated with increases in chronic disease, along with rising costs for providing care (Wilson, Whitaker, and Whitford, 2012). We have asserted and identified that nurses' CSE and use of HIT correlate to specific aspects of HPSC, specifically proving high relevancy concerning TEA and ERR. We found that these

factors are important for nurses within their work environment, and directly determine their confidence and efficacy for using EMR. The practical significance of these findings is the facilitation of the secure and potentially instant sharing of patient information between different providers and organizations in a hospital setting. Effective EMR has the capacity to enhance the delivery and safety of healthcare while reducing costs and eliminating potential dangerous medical errors caused by physicians.

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APPENDIX A:

Frequency Tables for all Survey Questions

Do you agree to participate in the study?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	100	100.0	100.0	100.0

What is your primary work area or unit in this hospital?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	6	6.0	6.0	6.0
	Many different Hospital Units/ No specific Unit	16	16.0	16.0	22.0
	Medicine (non-surgical)	10	10.0	10.0	32.0
	Surgery	4	4.0	4.0	36.0
	Obstetrics	5	5.0	5.0	41.0
	Pediatrics	10	10.0	10.0	51.0
	Emergency Department	12	12.0	12.0	63.0
	Intensive Care Unit (any type)	10	10.0	10.0	73.0
	Psychiatry/mental health	5	5.0	5.0	78.0
	Rehabilitation	9	9.0	9.0	87.0
	Pharmacy	3	3.0	3.0	90.0
	Laboratory	4	4.0	4.0	94.0
	Radiology	4	4.0	4.0	98.0
	Intensive Care Unit (any type)	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Primary work area if other.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		94	94.0	94.0	94.0
	Ambulatory	2	2.0	2.0	96.0
	Ambulatory clinic	2	2.0	2.0	98.0
	outpatient clinic	1	1.0	1.0	99.0
	Regulatory Affairs	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

People support one another in this unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	7	7.0	7.0	9.0
	Agree	58	58.0	58.0	67.0
	Strongly Agree	33	33.0	33.0	100.0
	Total	100	100.0	100.0	

We have enough staff to handle the workload

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	11	11.0	11.0	12.0
	Unsure	9	9.0	9.0	21.0
	Agree	62	62.0	62.0	83.0
	Strongly Agree	17	17.0	17.0	100.0
	Total	100	100.0	100.0	

When a lot of work needs to be done quickly, we work together as a team to get the work done

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	4.0	4.0	4.0
	Disagree	8	8.0	8.0	12.0
	Unsure	5	5.0	5.0	17.0
	Agree	56	56.0	56.0	73.0
	Strongly Agree	27	27.0	27.0	100.0
	Total	100	100.0	100.0	

In this unit, people treat each other with respect

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	7	7.0	7.0	8.0
	Unsure	4	4.0	4.0	12.0
	Agree	64	64.0	64.0	76.0
	Strongly Agree	24	24.0	24.0	100.0
	Total	100	100.0	100.0	

Staff in this unit work longer hours than is best for patient care

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	3.0	3.0	3.0
	Disagree	11	11.0	11.0	14.0
	Unsure	11	11.0	11.0	25.0
	Agree	51	51.0	51.0	76.0
	Strongly Agree	24	24.0	24.0	100.0
	Total	100	100.0	100.0	

We are actively doing things to improve patient safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	10	10.0	10.0	12.0
	Unsure	7	7.0	7.0	19.0
	Agree	45	45.0	45.0	64.0
	Strongly Agree	36	36.0	36.0	100.0
	Total	100	100.0	100.0	

We use more agency/temporary staff than is best for patient care

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	5.0	5.0	5.0
	Disagree	30	30.0	30.0	35.0
	Unsure	30	30.0	30.0	65.0
	Agree	25	25.0	25.0	90.0
	Strongly Agree	10	10.0	10.0	100.0
	Total	100	100.0	100.0	

Staff feel like their mistakes are held against them

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	26	26.0	26.0	26.0
	Disagree	28	28.0	28.0	54.0
	Unsure	16	16.0	16.0	70.0
	Agree	22	22.0	22.0	92.0
	Strongly Agree	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Mistakes have led to positive changes here

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	10	10.0	10.0	12.0
	Unsure	10	10.0	10.0	22.0
	Agree	53	53.0	53.0	75.0
	Strongly Agree	25	25.0	25.0	100.0
	Total	100	100.0	100.0	

It is just by chance that more serious mistakes don't happen around here

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	29.0	29.0	29.0
	Disagree	25	25.0	25.0	54.0
	Unsure	15	15.0	15.0	69.0
	Agree	23	23.0	23.0	92.0
	Strongly Agree	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

When one area in this unit gets really busy, others help out

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	3.0	3.0	3.0
	Disagree	8	8.0	8.0	11.0
	Unsure	4	4.0	4.0	15.0
	Agree	58	58.0	58.0	73.0
	Strongly Agree	27	27.0	27.0	100.0
	Total	100	100.0	100.0	

When an event is reported, it feels like the person is being written up, not the problem.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	24	24.0	24.0	24.0
	Disagree	30	30.0	30.0	54.0
	Unsure	14	14.0	14.0	68.0
	Agree	24	24.0	24.0	92.0
	Strongly Agree	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

After we make changes to improve patient safety, we evaluate their effectiveness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	10	10.0	10.0	12.0
	Unsure	8	8.0	8.0	20.0
	Agree	47	47.0	47.0	67.0
	Strongly Agree	33	33.0	33.0	100.0
	Total	100	100.0	100.0	

We work in "crisis mode" trying to do too much, too quickly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	33	33.0	33.0	33.0
	Disagree	29	29.0	29.0	62.0
	Unsure	8	8.0	8.0	70.0
	Agree	23	23.0	23.0	93.0
	Strongly Agree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

Patient safety is never sacrificed to get more work done

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	8.0	8.0	8.0
	Disagree	27	27.0	27.0	35.0
	Unsure	7	7.0	7.0	42.0
	Agree	35	35.0	35.0	77.0
	Strongly Agree	23	23.0	23.0	100.0
	Total	100	100.0	100.0	

Staff worry that mistakes they make are kept in their personnel file

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	34	34.0	34.0	34.0
	Disagree	26	26.0	26.0	60.0
	Unsure	8	8.0	8.0	68.0
	Agree	21	21.0	21.0	89.0
	Strongly Agree	11	11.0	11.0	100.0
	Total	100	100.0	100.0	

We have patient safety problems in this unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	37	37.0	37.0	37.0
	Disagree	26	26.0	26.0	63.0
	Unsure	8	8.0	8.0	71.0
	Agree	21	21.0	21.0	92.0
	Strongly Agree	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Our procedures and systems are good at preventing errors from happening

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	17	17.0	17.0	18.0
	Unsure	21	21.0	21.0	39.0
	Agree	31	31.0	31.0	70.0
	Strongly Agree	30	30.0	30.0	100.0
	Total	100	100.0	100.0	

My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	7	7.0	7.0	8.0
	Unsure	15	15.0	15.0	23.0
	Agree	55	55.0	55.0	78.0
	Strongly Agree	22	22.0	22.0	100.0
	Total	100	100.0	100.0	

My supervisor/manager seriously considers staff suggestions for improving patient safety.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	8	8.0	8.0	9.0
	Unsure	16	16.0	16.0	25.0
	Agree	56	56.0	56.0	81.0
	Strongly Agree	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	15.0	15.0	15.0
	Disagree	37	37.0	37.0	52.0
	Unsure	24	24.0	24.0	76.0
	Agree	17	17.0	17.0	93.0
	Strongly Agree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

My supervisor/manager overlooks patient safety problems that happen over and over

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	12.0	12.0	12.0
	Disagree	37	37.0	37.0	49.0
	Unsure	21	21.0	21.0	70.0
	Agree	18	18.0	18.0	88.0
	Strongly Agree	12	12.0	12.0	100.0
	Total	100	100.0	100.0	

We are given feedback about changes put into place based on event reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	15	15.0	15.0	16.0
	Unsure	36	36.0	36.0	52.0
	Agree	18	18.0	18.0	70.0
	Strongly Agree	30	30.0	30.0	100.0
	Total	100	100.0	100.0	

Staff will freely speak up if they see something that may negatively affect patient care

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	20	20.0	20.0	22.0
	Unsure	29	29.0	29.0	51.0
	Agree	26	26.0	26.0	77.0
	Strongly Agree	23	23.0	23.0	100.0
	Total	100	100.0	100.0	

We are informed about errors that happen in this unit.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	3.0	3.0	3.0
	Disagree	21	21.0	21.0	24.0
	Unsure	27	27.0	27.0	51.0
	Agree	24	24.0	24.0	75.0
	Strongly Agree	25	25.0	25.0	100.0
	Total	100	100.0	100.0	

Staff feel free to question the decisions or actions of those with more authority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	8.0	8.0	8.0
	Disagree	27	27.0	27.0	35.0
	Unsure	26	26.0	26.0	61.0
	Agree	29	29.0	29.0	90.0
	Strongly Agree	10	10.0	10.0	100.0
	Total	100	100.0	100.0	

In this unit, we discuss ways to prevent errors from happening again.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	4.0	4.0	4.0
	Disagree	16	16.0	16.0	20.0
	Unsure	21	21.0	21.0	41.0
	Agree	26	26.0	26.0	67.0
	Strongly Agree	33	33.0	33.0	100.0
	Total	100	100.0	100.0	

Staff are afraid to ask questions when something does not seem right.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	28	28.0	28.0	28.0
	Disagree	28	28.0	28.0	56.0
	Unsure	24	24.0	24.0	80.0
	Agree	13	13.0	13.0	93.0
	Strongly Agree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

Hospital management provides a work climate that promotes patient safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.0	2.0	2.0
	Disagree	8	8.0	8.0	10.0
	Unsure	6	6.0	6.0	16.0
	Agree	41	41.0	41.0	57.0
	Strongly Agree	43	43.0	43.0	100.0
	Total	100	100.0	100.0	

Hospital units do not coordinate well with each other.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	39	39.0	39.0	39.0
	Disagree	21	21.0	21.0	60.0
	Unsure	16	16.0	16.0	76.0
	Agree	20	20.0	20.0	96.0
	Strongly Agree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

Things “fall between the cracks” when transferring patients from one unit to another

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	42	42.0	42.0	42.0
	Disagree	26	26.0	26.0	68.0
	Unsure	10	10.0	10.0	78.0
	Agree	18	18.0	18.0	96.0
	Strongly Agree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

There is good cooperation among hospital units that need to work together

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	3.0	3.0	3.0
	Disagree	9	9.0	9.0	12.0
	Unsure	10	10.0	10.0	22.0
	Agree	46	46.0	46.0	68.0
	Strongly Agree	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

Important patient care information is often lost during shift changes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	28	28.0	28.0	28.0
	Disagree	28	28.0	28.0	56.0
	Unsure	17	17.0	17.0	73.0
	Agree	20	20.0	20.0	93.0
	Strongly Agree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

It is often unpleasant to work with staff from other hospital units.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	27	27.0	27.0	27.0
	Disagree	31	31.0	31.0	58.0
	Unsure	18	18.0	18.0	76.0
	Agree	15	15.0	15.0	91.0
	Strongly Agree	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

Problems often occur in the exchange of information across hospital units.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	30	30.0	30.0	30.0
	Disagree	32	32.0	32.0	62.0
	Unsure	14	14.0	14.0	76.0
	Agree	15	15.0	15.0	91.0
	Strongly Agree	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

The actions of hospital management show that patient safety is a top priority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	8.0	8.0	8.0
	Unsure	12	12.0	12.0	20.0
	Agree	31	31.0	31.0	51.0
	Strongly Agree	49	49.0	49.0	100.0
	Total	100	100.0	100.0	

Hospital management seems interested in patient safety only after an adverse event happens

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	23	23.0	23.0	23.0
	Disagree	35	35.0	35.0	58.0
	Unsure	12	12.0	12.0	70.0
	Agree	24	24.0	24.0	94.0
	Strongly Agree	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

Hospital units work well together to provide the best care for patients.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.0	1.0	1.0
	Disagree	8	8.0	8.0	9.0
	Unsure	6	6.0	6.0	15.0
	Agree	42	42.0	42.0	57.0
	Strongly Agree	43	43.0	43.0	100.0
	Total	100	100.0	100.0	

Shift changes are problematic for patients in this hospital.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	18.0	18.0	18.0
	Disagree	33	33.0	33.0	51.0
	Unsure	21	21.0	21.0	72.0
	Agree	22	22.0	22.0	94.0
	Strongly Agree	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to set up a computer connection to the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	16	16.0	16.0	16.0
	I Mostly Agree	16	16.0	16.0	32.0
	I Somewhat Agree	33	33.0	33.0	65.0
	I Somewhat Disagree	28	28.0	28.0	93.0
	I Mostly Disagree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

I feel confident using a computer operating system (such as Windows or Apple).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	36	36.0	36.0	36.0
	I Mostly Agree	20	20.0	20.0	56.0
	I Somewhat Agree	26	26.0	26.0	82.0
	I Somewhat Disagree	15	15.0	15.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident knowing how to download files from the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	34	34.0	34.0	34.0
	I Mostly Agree	21	21.0	21.0	55.0
	I Somewhat Agree	27	27.0	27.0	82.0
	I Somewhat Disagree	16	16.0	16.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident knowing how to read an Internet address.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	34	34.0	34.0	34.0
	I Mostly Agree	17	17.0	17.0	51.0
	I Somewhat Agree	30	30.0	30.0	81.0
	I Somewhat Disagree	16	16.0	16.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident copying information from the computer drive to an external flash drive.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	31	31.0	31.0	31.0
	I Mostly Agree	18	18.0	18.0	49.0
	I Somewhat Agree	30	30.0	30.0	79.0
	I Somewhat Disagree	18	18.0	18.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident using software to learn how to do new things on a computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	28	28.0	28.0	28.0
	I Mostly Agree	22	22.0	22.0	50.0
	I Somewhat Agree	25	25.0	25.0	75.0
	I Somewhat Disagree	19	19.0	19.0	94.0
	I Mostly Disagree	5	5.0	5.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident in saving or deleting information using a floppy disk.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	30	30.0	30.0	30.0
	I Mostly Agree	19	19.0	19.0	49.0
	I Somewhat Agree	29	29.0	29.0	78.0
	I Somewhat Disagree	20	20.0	20.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident knowing how to set up an electronic mail (email) account on the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	35	35.0	35.0	35.0
	I Mostly Agree	17	17.0	17.0	52.0
	I Somewhat Agree	26	26.0	26.0	78.0
	I Somewhat Disagree	17	17.0	17.0	95.0
	I Mostly Disagree	4	4.0	4.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident using a computer keyboard.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	36	36.0	36.0	36.0
	I Mostly Agree	19	19.0	19.0	55.0
	I Somewhat Agree	26	26.0	26.0	81.0
	I Somewhat Disagree	17	17.0	17.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to use a personal identification number (PIN) to access an Internet account on the computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	34	34.0	34.0	34.0
	I Mostly Agree	18	18.0	18.0	52.0
	I Somewhat Agree	26	26.0	26.0	78.0
	I Somewhat Disagree	14	14.0	14.0	92.0
	I Mostly Disagree	7	7.0	7.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to send attachments to others over the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	37	37.0	37.0	37.0
	I Mostly Agree	19	19.0	19.0	56.0
	I Somewhat Agree	28	28.0	28.0	84.0
	I Somewhat Disagree	15	15.0	15.0	99.0
	I Mostly Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to maintain personal information on the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	36	36.0	36.0	36.0
	I Mostly Agree	17	17.0	17.0	53.0
	I Somewhat Agree	26	26.0	26.0	79.0
	I Somewhat Disagree	17	17.0	17.0	96.0
	I Mostly Disagree	3	3.0	3.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident using the Universal Serial Bus (USB) port on a computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	32	32.0	32.0	32.0
	I Mostly Agree	20	20.0	20.0	52.0
	I Somewhat Agree	26	26.0	26.0	78.0
	I Somewhat Disagree	16	16.0	16.0	94.0
	I Mostly Disagree	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

I feel confident setting up a computer network in my home.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	8	8.0	8.0	8.0
	I Mostly Agree	20	20.0	20.0	28.0
	I Somewhat Agree	28	28.0	28.0	56.0
	I Somewhat Disagree	33	33.0	33.0	89.0
	I Mostly Disagree	10	10.0	10.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident about inserting a compact disc (CD) into the proper computer drive.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	35	35.0	35.0	35.0
	I Mostly Agree	15	15.0	15.0	50.0
	I Somewhat Agree	27	27.0	27.0	77.0
	I Somewhat Disagree	19	19.0	19.0	96.0
	I Mostly Disagree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

I feel confident using a printer to make copies of my work on the computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	37	37.0	37.0	37.0
	I Mostly Agree	17	17.0	17.0	54.0
	I Somewhat Agree	25	25.0	25.0	79.0
	I Somewhat Disagree	19	19.0	19.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident about installing a software program correctly.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	29	29.0	29.0	29.0
	I Mostly Agree	17	17.0	17.0	46.0
	I Somewhat Agree	32	32.0	32.0	78.0
	I Somewhat Disagree	20	20.0	20.0	98.0
	I Mostly Disagree	1	1.0	1.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident using computer software (such as Excel) to analyze data (numbers).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	31	31.0	31.0	31.0
	I Mostly Agree	21	21.0	21.0	52.0
	I Somewhat Agree	29	29.0	29.0	81.0
	I Somewhat Disagree	16	16.0	16.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident setting up a new computer system right out of the box.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	26	26.0	26.0	26.0
	I Mostly Agree	19	19.0	19.0	45.0
	I Somewhat Agree	24	24.0	24.0	69.0
	I Somewhat Disagree	25	25.0	25.0	94.0
	I Mostly Disagree	4	4.0	4.0	98.0
	I Completely Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to manage cookies (small personal files) on the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	30	30.0	30.0	30.0
	I Mostly Agree	13	13.0	13.0	43.0
	I Somewhat Agree	32	32.0	32.0	75.0
	I Somewhat Disagree	19	19.0	19.0	94.0
	I Mostly Disagree	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

I feel confident understanding typical computer words for hardware, such as plug-and-play (PnP) devices.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	27	27.0	27.0	27.0
	I Mostly Agree	18	18.0	18.0	45.0
	I Somewhat Agree	26	26.0	26.0	71.0
	I Somewhat Disagree	23	23.0	23.0	94.0
	I Mostly Disagree	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

I feel confident in knowing how to use a computer to search for information at the library.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	37	37.0	37.0	37.0
	I Mostly Agree	15	15.0	15.0	52.0
	I Somewhat Agree	30	30.0	30.0	82.0
	I Somewhat Disagree	14	14.0	14.0	96.0
	I Mostly Disagree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

I feel confident about shutting down a computer system.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	39	39.0	39.0	39.0
	I Mostly Agree	15	15.0	15.0	54.0
	I Somewhat Agree	28	28.0	28.0	82.0
	I Somewhat Disagree	15	15.0	15.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident using computer software to add or delete information from a file I have created.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	33	33.0	33.0	33.0
	I Mostly Agree	19	19.0	19.0	52.0
	I Somewhat Agree	27	27.0	27.0	79.0
	I Somewhat Disagree	16	16.0	16.0	95.0
	I Mostly Disagree	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

I feel confident using the menu options from within a software program.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	31	31.0	31.0	31.0
	I Mostly Agree	24	24.0	24.0	55.0
	I Somewhat Agree	28	28.0	28.0	83.0
	I Somewhat Disagree	15	15.0	15.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident using the computer to go online.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	37	37.0	37.0	37.0
	I Mostly Agree	18	18.0	18.0	55.0
	I Somewhat Agree	28	28.0	28.0	83.0
	I Somewhat Disagree	15	15.0	15.0	98.0
	I Mostly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

I feel confident using an Internet browser (such as Internet Explorer) to access the World Wide Web (WWW).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	34	34.0	34.0	34.0
	I Mostly Agree	22	22.0	22.0	56.0
	I Somewhat Agree	26	26.0	26.0	82.0
	I Somewhat Disagree	14	14.0	14.0	96.0
	I Mostly Disagree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

I feel confident using antivirus software on a computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	33	33.0	33.0	33.0
	I Mostly Agree	20	20.0	20.0	53.0
	I Somewhat Agree	24	24.0	24.0	77.0
	I Somewhat Disagree	21	21.0	21.0	98.0
	I Mostly Disagree	1	1.0	1.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident playing games on a computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	30	30.0	30.0	30.0
	I Mostly Agree	20	20.0	20.0	50.0
	I Somewhat Agree	24	24.0	24.0	74.0
	I Somewhat Disagree	21	21.0	21.0	95.0
	I Mostly Disagree	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

I feel confident responding to a dialog box within a software program.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	32	32.0	32.0	32.0
	I Mostly Agree	16	16.0	16.0	48.0
	I Somewhat Agree	30	30.0	30.0	78.0
	I Somewhat Disagree	15	15.0	15.0	93.0
	I Mostly Disagree	6	6.0	6.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident using a computer mouse to point or click on the computer screen.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	35	35.0	35.0	35.0
	I Mostly Agree	20	20.0	20.0	55.0
	I Somewhat Agree	25	25.0	25.0	80.0
	I Somewhat Disagree	17	17.0	17.0	97.0
	I Mostly Disagree	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

I feel confident using a computer modem to connect a computer to the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	33	33.0	33.0	33.0
	I Mostly Agree	17	17.0	17.0	50.0
	I Somewhat Agree	28	28.0	28.0	78.0
	I Somewhat Disagree	16	16.0	16.0	94.0
	I Mostly Disagree	5	5.0	5.0	99.0
	I Completely Disagree	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

I feel confident using a search engine (such as Google) to find information on the Internet.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	38	38.0	38.0	38.0
	I Mostly Agree	14	14.0	14.0	52.0
	I Somewhat Agree	30	30.0	30.0	82.0
	I Somewhat Disagree	13	13.0	13.0	95.0
	I Mostly Disagree	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

I feel confident starting or quitting a computer software program.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	32	32.0	32.0	32.0
	I Mostly Agree	17	17.0	17.0	49.0
	I Somewhat Agree	29	29.0	29.0	78.0
	I Somewhat Disagree	18	18.0	18.0	96.0
	I Mostly Disagree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

I feel confident using a computer software program (such as Word) to write a report.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I Completely Agree	33	33.0	33.0	33.0
	I Mostly Agree	18	18.0	18.0	51.0
	I Somewhat Agree	25	25.0	25.0	76.0
	I Somewhat Disagree	20	20.0	20.0	96.0
	I Mostly Disagree	4	4.0	4.0	100.0
	Total	100	100.0	100.0	

I feel confident using computer software to manage file storage on a computer hard drive.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I Completely Agree	32	32.0	32.0	32.0
	I Mostly Agree	17	17.0	17.0	49.0
	I Somewhat Agree	23	23.0	23.0	72.0
	I Somewhat Disagree	21	21.0	21.0	93.0
	I Mostly Disagree	5	5.0	5.0	98.0
	I Completely Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

APPENDIX B:

Hospital Survey on Patient Safety

Instructions

This survey asks for your opinions about patient safety issues, medical error, and event reporting in your hospital and will take about 10 to 15 minutes to complete.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

- *An **"event"** is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm.*
- ***"Patient safety"** is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.*

SECTION A: Your Work Area/Unit

In this survey, think of your "unit" as the work area, department, or clinical area of the hospital where you spend *most* of your work time or provide *most* of your clinical services.

What is your primary work area or unit in this hospital? Select ONE answer.

- ☐ a. Many different hospital units/No specific unit
- ☐ b. Medicine (non-surgical)
- ☐ c. Surgery
- ☐ d. Obstetrics
- ☐ e. Pediatrics
- ☐ f. Emergency department
- ☐ g. Intensive care unit (any type)
- ☐ h. Psychiatry/mental health
- ☐ i. Rehabilitation
- ☐ j. Pharmacy
- ☐ k. Laboratory
- ☐ l. Radiology
- ☐ m. Anesthesiology
- ☐ n. Other, please specify:

Please indicate your agreement or disagreement with the following statements about your work area/unit.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
1. People support one another in this unit.....	☐1	☐2	☐3	☐4	☐5
2. We have enough staff to handle the workload...	☐1	☐2	☐3	☐4	☐5
3. When a lot of work needs to be done quickly, we work together as a team to get the work done.....	☐1	☐2	☐3	☐4	☐5
4. In this unit, people treat each other with respect.....	☐1	☐2	☐3	☐4	☐5
5. Staff in this unit works longer hours than is best for patient care...	☐1	☐2	☐3	☐4	☐5

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
6. We are actively doing things to improve patient safety...	☐1	☐2	☐3	☐4	☐5
7. We use more agency/temporary staff than is best for patient care.	☐1	☐2	☐3	☐4	☐5
8. Staff feels like their mistakes are held against them...	☐1	☐2	☐3	☐4	☐5
9. Mistakes have led to positive changes here...	☐1	☐2	☐3	☐4	☐5
10. It is just by chance that more serious mistakes don't happen around here.....	☐1	☐2	☐3	☐4	☐5
11. When one area in this unit gets really busy, others help out....	☐1	☐2	☐3	☐4	☐5
12. When an event is reported, it feels like the person is being written up, not the problem...	☐1	☐2	☐3	☐4	☐5
13. After we make changes to improve patient safety, we evaluate their effectiveness...	☐1	☐2	☐3	☐4	☐5
14. We work in "crisis mode" trying to do too much, too quickly.	☐1	☐2	☐3	☐4	☐5
15. Patient safety is never sacrificed to get more work done...	☐1	☐2	☐3	☐4	☐5

16. Staff worry that mistakes they make are kept in their personnel file	☐1	☐2	☐3	☐4	☐5
17. We have patient safety problems in this unit.	☐1	☐2	☐3	☐4	☐5
18. Our procedures and systems are good at preventing errors from happening...	☐1	☐2	☐3	☐4	☐5

SECTION B: Your Supervisor/Manager

Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures .	☐1	☐2	☐3	☐4	☐5
2. My supervisor/manager seriously considers staff suggestions for improving patient safety.	☐1	☐2	☐3	☐4	☐5
3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts.	☐1	☐2	☐3	☐4	☐5
4. My supervisor/manager overlooks patient safety problems that happen over and over.	☐1	☐2	☐3	☐4	☐5

SECTION C: Communications

How often do the following things happen in your work area/unit?

Think about your hospital work area/unit…	Never ▼	Rarely ▼	Some-times ▼	Most of the time ▼	Always ▼
1. We are given feedback about changes put into place based on event reports.	☐1	☐2	☐3	☐4	☐5
2. Staff will freely speak up if they see something that may negatively affect patient care.	☐1	☐2	☐3	☐4	☐5
3. We are informed about errors that happen in this unit.	☐1	☐2	☐3	☐4	☐5
4. Staff feel free to question the decisions or actions of those with more authority.	☐1	☐2	☐3	☐4	☐5
5. In this unit, we discuss ways to prevent errors from happening again.	☐1	☐2	☐3	☐4	☐5
6. Staff is afraid to ask questions when something do not seem right.	☐1	☐2	☐3	☐4	☐5

SECTION D: Frequency of Events Reported

In your hospital work area/unit, when the following mistakes happen, *how often are they reported?*

Think about your hospital…	**Strongly Disagree** ▼	**Disagree** ▼	**Neither** ▼	**Agree** ▼	**Strongly Agree** ▼
1. Hospital management provides a work climate that promotes patient safety...	☐1	☐2	☐3	☐4	☐5
2. Hospital units do not coordinate well with each other.	☐1	☐2	☐3	☐4	☐5
3. Things "fall between the cracks" when transferring patients from one unit to another.	☐1	☐2	☐3	☐4	☐5
4. There is good cooperation among hospital units that need to work together.	☐1	☐2	☐3	☐4	☐5

SECTION E: Patient Safety Grade

Please give your work area/unit in this hospital an overall grade on patient safety.

☐	☐	☐	☐	☐
A	B	C	D	E
Excellent	Very Good	Acceptable	Poor	Failing

SECTION F: Your Hospital

Please indicate your agreement or disagreement with the following statements about your hospital.

Think about your hospital…	**Strongly Disagree**	**Disagree** ▼	**Neither** ▼	**Agree** ▼	**Strongly Agree** ▼
1. Hospital management provides a work climate that promotes Patient safety.	☐1	☐2	☐3	☐4	☐5
2. Hospital units do not coordinate well with each other...	☐1	☐2	☐3	☐4	☐5
3. Things "fall between the cracks" when transferring patients from one unit to another.	☐1	☐2	☐3	☐4	☐5
4. There is good cooperation among hospital units that need to work together.	☐1	☐2	☐3	☐4	☐5
5. Important patient care information is often lost during shift changes.	☐1	☐2	☐3	☐4	☐5
6. It is often unpleasant to work with staff from other hospital unit.	☐1	☐2	☐3	☐4	☐5
7. Problems often occur in the exchange of information across hospital units.	☐1	☐2	☐3	☐4	☐5

8. The actions of hospital management show that patient safety is a top priority.	☐1	☐2	☐3	☐4	☐5
9. Hospital management seems interested in patient safety only after an adverse event happens.	☐1	☐2	☐3	☐4	☐5
10. Hospital units work well together to provide the best care for patients	☐1	☐2	☐3	☐4	☐5
11. Shift changes are problematic for patients in this hospital.	☐1	☐2	☐3	☐4	☐5

SECTION G: Number of Events Reported

In the past 12 months, how many event reports have you filled out and submitted?

☐ a. No event reports
☐ b. 1 to 2 event reports
☐ c. 3 to 5 event reports
☐ d. 6 to 10 event reports
☐ e. 11 to 20 event reports
☐ f. 21 event reports or more

SECTION H: Background Information

This information will help in the analysis of the survey results.

1. How long have you worked in this hospital?

☐ a. Less than 1 year
☐ b. 1 to 5 years
☐ c. 6 to 10 years
☐ d. 11 to 15 years
☐ e. 16 to 20 years
☐ f. 21 years or more

2. How long have you worked in your current hospital work area/unit?

☐ a. Less than 1 year
☐ b. 1 to 5 years
☐ c. 6 to 10 years
☐ d. 11 to 15 years
☐ e. 16 to 20 years
☐ f. 21 years or more

3. Typically, how many hours per week do you work in this hospital?

☐ a. Less than 20 hours per week
☐ b. 20 to 39 hours per week
☐ c. 40 to 59 hours per week
☐ d. 60 to 79 hours per week
☐ e. 80 to 99 hours per week
☐ f. 100 hours per week or more

4. What is your staff position in this hospital? Select ONE answer that best describes your staff position.

☐ a. Registered Nurse
☐ I. Unit Assistant/Clerk/Secretary

☐ b. Physician Assistant/Nurse Practitioner

☐ c. LVN/LPN

☐ d. Patient Care Asst/Hospital Aide/Care Partner

☐ e. Attending/Staff Physician

☐ f. Resident Physician/Physician in Training

☐ g. Pharmacist

☐ h. Dietician

☐ j. Respiratory Therapist

☐ k. Physical, Occupational, or Speech Therapist

☐ l. Technician (e.g., EKG, Lab, Radiology)

☐ m. Administration/Management

☐ n. Other, please specify:

5. In your staff position, do you typically have direct interaction or contact with patients?

☐ a. YES, I typically have direct interaction or contact with patients.

☐ b. NO, I typically do NOT have direct interaction or contact with patients.

6. How long have you worked in your current specialty or profession?

☐ a. Less than 1 year

☐ b. 1 to 5 years

☐ c. 6 to 10 years

☐ d. 11 to 15 years

☐ e. 16 to 20 years

☐ f. 21 years or more

SECTION I: Your Comments

Please feel free to write any comments about patient safety, error, or event reporting in your hospital.

THANK YOU FOR COMPLETING THIS SURVEY.

APPENDIX C:

Dr. James H. Brown Permission Letter for CSESA survey Instrument

James H. Brown, Ph.D.
2043 Carter Street
Racine, WI 53402
jhbrown@uwm.edu

October 24, 2014

Re: Permission to use CSESA Instrument
Jean Marc Joseph
PhD Candidate in Biomedical Informatics
Address: 133-07 Francis Lewis BLVD
Laurelton, NY 11413

Dear Committee Members and Interested Parties:

I am pleased to grant Mr. Jean Marc Joseph my permission to use the Computer Self-Efficacy Survey for Adults (CSESA) instrument which I developed for research. He is free to make use of this instrument in his research study and to make modifications to it if he sees fit, provided he properly documents and validates the changes. As is the case with many technology-related instruments, it can become outdated in some of its terms or usage. Modifications to fix these problems may be needed and are permitted, subject to the approval of the committee overseeing his work.

I have provided him with a copy of the original instrument and the technical manual which describes how I developed, evaluated, and administered it.

If there are any further questions, please feel free to contact me at the address or email given.

Sincerely,

James H. Brown

James H. Brown, Ph.D.
University of Wisconsin-Milwaukee
Director, North Shore School for Seniors (NSSS)
Whitefish Bay, WI 53217
www.nss4s.org

APPENDIX D:

IRB Approval Letter

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY eIRB ELECTRONIC INSTITUTIONAL REVIEW BOARD

** This is an auto-generated email. Please do not reply to this email message.
The originating e-mail account is not monitored.
If you have questions, please contact your local IRB office or log into
eIRB.Rutgers.edu **

DHHS Federal Wide Assurance Identifier: FWA00003913
IRB Chair Person: Robert Fechtner
IRB Director: Carlotta Rodriguez
Effective Date: 11/26/2014

eIRB Notice of Approval-REVISED

STUDY PROFILE

Study ID:	Pro20140000878
Title:	A Correlational Study Between Hospital Patient Safety Culture and Computer Self-Efficacy among Nurses in a Hospital Setting.

Principal Investigator:	Jean Marc Joseph	**Study Coordinator:**	Shankar Srinivasan
Co-Investigator(s):	Shankar Srinivasan		
Sponsor:	Department Funded	**Approval Cycle:**	Not Applicable
Risk Determination:	Minimal Risk		

Review Type:	Exempt	**Exempt Category:**	2
Subjects:	500		

CURRENT SUBMISSION STATUS

Submission Type:	Research Protocol/Study	**Submission Status:**	Approved
Approval Date:	11/24/2014		

Pregnancy Code:	No Pregnant Women as Subjects	**Pediatric Code:**	No Children As Subjects	**Prisoner Code:**	No Prisoners As Subjects

Protocol:	Jean Marc Protocol Guidance-Summary.docx	**Consent:**	Consent Form for the survey.doc.pdf	**Other Materials:**	Recruiting Email.doc Recruitment Flyer.doc Survey

* Study Performance Sites:

Rutgers Department of Health Informatics 65 Bergen Street, Room 350 Newark, NJ 07107-3001

HHC - Metropolitan Hospital Center	1901 1st Ave, New York, NY 10029
Principal Investigator Address	133-07 Francis Lewis BLVD Laurelton, NY 11413

ALL APPROVED INVESTIGATOR(S) MUST COMPLY WITH THE FOLLOWING:

1. Conduct the research in accordance with the protocol, applicable laws and regulations, and the principles of research ethics as set forth in the Belmont Report.

2. **Amendments/Modifications/Revisions**: If you wish to change any aspect of this study, including but not limited to, study procedures, consent form(s), investigators, advertisements, the protocol document, investigator drug brochure, or accrual goals, you are required to obtain IRB review and approval prior to implementation of these changes unless necessary to eliminate apparent immediate hazards to subjects.

3. **Unanticipated Problems**: Unanticipated problems involving risk to subjects or others must be reported to the IRB Office (45 CFR 46, 21 CFR 312, 812) as required, in the appropriate time as specified in the attachment online at: http://rbhs.rutgers.edu/hsweb

4. **Protocol Deviations and Violations**: Deviations from/violations of the approved study protocol must be reported to the IRB Office (45 CFR 46, 21 CFR 312, 812) as required, in the appropriate time as specified in the attachment online at: http://rbhs.rutgers.edu/hsweb

5. **Completion of Study:** Notify the IRB when your study has been stopped for any reason. Neither study closure by the sponsor or the investigator removes the obligation for submission of timely continuing review application or final report.

6. **Consent:** Documentation of informed consent has been waived by the IRB in accordance with 45 CFR 46.117

7. The Investigator(s) did not participate in the review, discussion, or vote of this protocol.

8. **Revision:** Approval notice is being re-issued to add more specific language regarding the consent process (see number 6 above).

APPENDIX E:
Recruitment Email

Date: 11-15-2014

FROM: Jean Marc Joseph

Objective: Recruitment Email

Dear Registered Nurses,

I would like to invite you to voluntarily participate in a study that will examine about the relationship between hospital patient safety culture and computer self-efficacy among nurses within a hospital setting. Please if you are a clinician using HIT/EMR in your hospital, I'm asking you to complete this 10 to 15 minutes survey.

The objectives of using this research are to:

- Examine if the patient safety culture dimensions and perceived ease of use of teamwork, management Support, and communication predicts that you are more likely feeling that you need help to use the HIT systems in your hospital.
- Examine if the patient safety culture dimensions and perceived usefulness of teamwork, management Support, and communication predicts that you are more likely feeling that you need help to use the HIT systems in your hospital.

The results of the study could assist the hospitals to reevaluate and enhance their patient safety culture, which could lead to better understand and use the HIT systems.

The completion of the survey is voluntary. If you choose to complete the survey, please use this link (https://www.surveymonkey.com/s/K58GYF7) that will automatically redirect you to the online survey using survey monkey. Now regardless if you choose to participate in the online survey, if you would like to see a summary of the research findings or if you have any questions, do not hesitate to contact me using the phone number below.

Thank you so much

Jean Marc Joseph

PhD Candidate at Rutgers University

Phone: 347-694-9666

Email: josephje@shrp.rutgers.edu

APPENDIX F:
Recruitment Flyer

Recruitment Flyer

**** To All Registered Nurses****

You are invited to participate in a research study by completing a survey regarding Hospital Patient Safety Culture and Computer Self-efficacy among nurses. Please below is the survey link that will get you to that survey using surveymonkey.com.
https://www.surveymonkey.com/s/K58GYF7

For any questions, please don't hesitate to contact Jean Marc Joseph at 347-694-9666 or Email me @ josephje@shrp.rutgers.edu