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CASE STUDY: EVALUATING PERFORMANCE OUTCOMES OF A TECHNOLOGY CHANGE MANAGEMENT INITIATIVE IN A HEALTH CARE ORGANIZATION

by

DION NATHANIAL JOHNSON

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of requirements

for the degree of

DOCTOR OF PHILOSOPHY

2011

MAJOR: INSTRUCTIONAL TECHNOLOGY

Approved by:

_____

Advisor Date

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DEDICATION

"To God Be the Glory"

"In the name of Jesus, I give honor to God who is the author and finisher of my life".

To complete my PhD has truly been both a blessing and what seemed to be an elusive award that began about fourteen long years ago. God has allowed me to transcend four different committees, five professors who left the university, four committee chairs, nine dissertation proposals, three or four lost sets of populations, three extensions and four employment downsizing (lay-offs) to stand with robe, hood and cap. "God is truly good all the time and truly good all the time God is good".

I would also like to dedicate this dissertation to my mom, Edna Johnson. She is the wind beneath my wings and has prayed for me way into the midnight hours. I love and cherish her for the many sacrifices she had to endure over my life time and by her alone, has raised me to be the man I am. She has been there with me through high school, undergrad both at Grambling and Eastern Michigan, as well as the various levels of graduate school. I thank her for everything, especially how she has stepped in to assist with our two wonderful children, Malcolm and Madison, so Joy and I may have the strength to tackle and complete our doctorates. We may not see eye-to-eye on many things and our realities may be somewhat different, but her genuine love for me always seem to prevail above it all.

Now, I want to express my love and gratitude to my lovely wife, Joy Elizabeth Eleanor Edwina Inniss-Johnson, who has stood by me through all the turbulent waters of my life. She has been my virtuous woman and the love of my life for over sixteen years. She is a wonderful mother and one of the greatest professors Wayne State University has ever had. I owe all my motivation and stick-to-it-ness to her and our wonderful children. God truly gave her to me and

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provided me a great opportunity of stewardship, even though at times I have felt I failed royally. But I hope this great milestone will grant me a new path to travel and position me in a manner that allows me to deliver everything to my deserving a queen. God said "love your wife as Christ loves the church".

To my two beautiful, intelligent, rambunctious, intuitive, genius, and loving children, Malcolm and Madison, God has truly blessed me with you both. I thank you for your unconditional love, smiles, hugs and kisses. To be in your presence, when Daddy is feeling sad and not too fun, has been a pleasure only a father or parent could understand. I love you both so much and hope when you look back on these fourteen years of hard work and tears, that you realize when things go so unimaginably hard, Daddy prayed and kept moving forward. I never gave up, although, many days I wanted and felt I needed to. But through prayer and faith, I now stand before you with the strength of Paul and the faith of Job. May God continue to bless and keep you, let His light shine upon you and give you peace. Never let Him leave your side and He will always be there for you, as well as with you. "I am a witness".

Finally, I want to pay special homage to two people that believed in me since my early undergraduate years at Eastern Michigan University and while serving my tour of duty with the Reserve Officer Training Corps (ROTC) and the United States Army/Army Reserves Military Police Corps, as well as being there and serving in an intricate way during one of the most special days of my life (e.g., my wedding) by allowing his former bride to lend her precious and cherished gown to Joy. I am talking about Dr. Reverend Jimmy T. Wafer and his lovely wife, Angela Wafer. I think we had a double zero budget and a lot of hope. But you guys have been prayer warriors and intercessors during my long educational quest. May God continue to raise

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the both of you up and grant you the strength to reach all your desires and dreams. I love and appreciate you for all that is special within you.

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crossed my path and/or stayed for a while and the following saying sums it up for me, God bless you and may He keep you in the palm of His great hand and give you peace.

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CHAPTER I

INTRODUCTION

This study examined an array of issues surrounding the management of complex change and amount of criticism that became the impetus behind the implementation of Electronic Health Records Management Systems (EHRMS) across the healthcare industry, as well as its long-term transformative effects. In addition, health care services and technology associated with the health care industry is approached from a constructive means to assist professionals in protecting patients, increasing operational performance, lowering costs, and delivering the most efficient and comprehensive services possible to their customers (Hamilton, Jacob, Koch & Quammen, 2004).

According to Kotter and Schlesinger (2008), changes that appear to be 'positive' or 'rational' still reflect some level of loss and doubt. It is believed that individuals or groups can react very differently to change and may range from being very passive then resist, to very aggressive with an attempt to undermine and finally, truly embracing the change. Thus, implementing change requires effective management of organizational counter-forces. Counter-forces to change include negative attitudes among employees, a lack of adequate application of resources to build employee capacity and integrate proper tools into the change procedures, as well as poor communication planning, and the delivery of healthy implementation strategies (Kotter & Schlesinger, 2008).

In a British study, Bird (1992) found high levels of complacency, fear of interaction with IT (Information Technology) and a limited view on the range of potential among managers for its use. Politics, rivalries, relationships between end-users and technologists have all driven many of these IT-related decisions. According to Bird, a new IS (Information System) was often

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designed to redirect information flow and redistribute power, rather than improve organizational-wide performance. Davenport, Prusak & Wilson (2003) added change efforts with an intended target are rarely materialized and launched properly because of the politics embedded in information and lack of proper management to ensure performance objectives are being met. Therefore, many IT applications failed to meet performance goals and human factors were mismanaged.

According to Proctor & Doukakis (2003), the introduction of change into an organization usually raises resistance from those who have the most to lose because of the envisaged change. They posit that the key to successful introduction of change lies in effective communication. In addition, the customary cascading down of information from the top of the organization to the rank and file managers was found to be ineffective when a large-scale structural reorganization program was introduced, which lead to a search for more effective ways of communicating (Proctor & Doukakis, 2003).

When looking for major issues adversely affecting and disrupting organizational life, occupational stress and organizational change lead the way. Vakola and Nikolaou (2005) produced a study that explored the relationship between employees' attitudes toward organizational change and organizational behavior concepts. The two variables addressed by this study were occupational stress and organizational commitment. According to Vakola and Nikolaou examined the results of the *ASSET Survey* completed by 292 participants (Cartwright & Cooper, 2002). The survey tool measured levels of stress in the workplace, organizational commitment and attitudes toward organizational change. The study's outcome was anticipated, as it showed negative correlations between occupational stressors and attitudes toward change. These results indicated high stressed employees may demonstrate a lack of commitment and

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increase their reluctance toward accepting any level of organizational change. However; poor working relationships had the most significant impact on attitudes toward change which emphasized how occupational stressors can inhibit positive attitudes toward change. The relationship between occupational stress and attitudes toward change did not show to be relevant among organizational commitment.

According to McHugh (1997), as change management programs are designed and developed, stress and its side affects should also be included in the preparation for change, as well as offer a designated stress management program to properly address this concern. Armenakis and Bedeian (1999) also believe stress is an obstacle to change planning and implementation. They also posit there are six relevant variables (i.e., receptivity, resistance, commitment, cynicism, stress, and related personal reactions) to consider, when building a successful change program. They suggest such variables, if unattended and not properly addressed during change planning and implementation success will be inhibited. .

Morale, productivity and turnover intentions can be impacted by an employee's attitude towards change (Lacovini, 1993; Eby, Adams, Russell & Gaby, 2000). In one study, results indicated beliefs, perceptions and attitudes are critical to implementing successful changes (Armenakis, Harris & Mossholder, 1993). Unless the majority of staff perceive the organization to have developed supportive organizational mechanisms to change, such as top management commitment, allocation of resources, rewards, training, and participation in planning and implementation (McHugh, 1993), they will not be motivated to support the change effort.

However, change may still be a stressful experience that may result in the creation of negative attitudes toward change, thus making stress an inhibitor to change. According to Vakola and Nikolaou (2005), a negative relationship exists between stress level, sources of stress and

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attitudes toward organizational change. For example, in a review of organization studies Post, DiTomaso, Farris & Cordero (2009), found the extension of work-family conflicts to turnover outcomes is infrequent when compared to the numerous studies examining its effects on job satisfaction. Thus, if stress alone is an inhibitor of change, what is the relationship between stress and organizational commitment (Allen, Herst, Burck & Sutton, 2000)?

Other reviews of change management literature have identified the role that organizational commitment has in terms of change. According to Darwish (2000) and Cordery, Sevastos, Mueller & Parker (1993), such reviews indicate that organizational commitment plays an important role in change being accepted by employees. Next to their union membership Iverson (1996), suggested organizational commitment is the second most important determinant of understanding attitudes toward organizational change. It was also pointed out by Martin, Jones & Callan (2005), a highly committed and loyal employee will accept organizational change more willingly if they can see its benefit. Also a highly loyal and committed employee may resist change, if they feel the change will threaten their well-being and livelihood. Therefore, when you evaluate these two findings together, it is strongly suggested employees attitudes may be influenced by organizational commitment to change.

According to other research, it has indicated job satisfaction is less likely to be a predictor of behavioral intentions than organizational commitment (Iverson, (1996); Iverson & Roy, (1994). This is addressed by both Iverson (1996) and Guest (1987), when they point out that employees with high organizational commitment are more likely to put their all into the change effort and will transition with a more positive attitude towards the organizational change. Equally interesting, Guest (1987) also posits that there is a positive direct causal effect between

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organizational commitment and job security, satisfaction, motivation and success of organizational change.

Vakola and Nikolaou, (2005) referring to a study conducted by Martin, Jones & Callan (2005), hypothesized a positive relationship exists between organizational commitment and attitudes to change. Typically, historical studies (Beer, Eisenstat & Spector, 1990; Kotter, 2006; Pfeffer, 1992) have reported managers are unable to establish a sense of urgency for the need to change. In addition, managers often feel change programs either go too fast or too slow, change objectives are incoherent or too abstract, and leaders are either too powerful or have too little authority.

Many reasons for difficulties that arise during change programs have been identified. For example, much is known about the limitations of bureaucracies (Mintzberg, 1983), innovative and conservative organizational cultures (Schein, 1992), learning in organizations and/or the lack thereof (Argyris & Schon, 1978; Senge, 1990), and resistance to change (Jermier, Knights & Nord, 1984). Resistance to change emanates from many sources (Dalton, Lawrence & Greiner, 1970; Thompson, 1990; Valley & Thompson, 1997), including fear of the unknown, lack of information, threats to status, fear of failure, and lack of perceived benefits. Another reason is people resist being treated as pawns – particularly where an organizational reshuffle is involved; however, organizations continually embark on programs of organizational change.

The American Management Association reported 84% of U.S. companies were in the process of at least one major change initiative and 46% stated they had three or more change initiatives/programs in progress (Peak, 1996). In a study conducted by the United States Bureau of National Affairs (1996), it was found that organizational change was a major concern for more than a third of the 396 participating organizations.

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According to Beer and Nohria (2000), installing new technology, downsizing, restructuring, or trying to change a corporate culture has had astonishingly mediocre levels of success. In fact, only 25% of all change initiatives are successful. Furthermore, failures have been attributed to the rush to implement change in organizations, as many managers end up immersing themselves in an alphabet soup of initiatives. Beer and Nohria (2000) argue that organizations lose focus and become enthralled by all the advice available in print and on-line about reasons companies should change, what they should accomplish, and how they should do it. The proliferation of these recommendation often leads to confusion when change is attempted, which results in most change efforts exerting a heavy toll, both human and economic (Beer & Nohria, 2000).

Organizational change causes individuals to experience a reaction process (Bovey & Hede, 2001; Kyle, 1993), which is (Bovey & Hede, 2001; Scott & Jaffe, 1988) described as consisting of four phases: initial denial, resistance, gradual exploration, and eventual commitment. Resistance is a natural and normal response to change because change often involves going from the known to the unknown (Bovey & Hede, 2001; Goghlan, 1993; Steinburg, 1992; Myers & Robbins, 1991; Nadler, 1981; Zaltman & Duncan, 1977). Moreover, not only do individuals experience change in different ways (Bovey & Hede, 2001; Carnall, 1986), they also differ in their ability and willingness to adapt to change (Bovey, 1993). In a study conducted by Bovey and Hede (2001), the relationship between an individual's cognitive and affective processes and their willingness to adapt to major organizational change was examined. Results indicated that the failure of many corporate change programs is often directly attributable to employee resistance (Bovey & Hede, 2001; Maurer, 1997; Spiker & Lesser, 1995; Regar, Mullane, Gustafson, & DeMarie, 1994; Martin, 1975).

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Bovey and Hede (2001) assert that the topic of employee resistance to change is important. They investigated the relationship between irrational ideas, emotion, and resistance to change. They found irrational ideas are positively correlated with behavioral intentions to resist change. Their findings support Waldersee and Griffith's (1997) longitudinal study that found employee resistance was the most frequently cited problem encountered by management when implementing change. In that study, more than half the participating organizations experienced difficulties with employee resistance.

Successfully managing resistance is a major challenge for change initiators and is arguably of greater importance than other aspects of the change process (Bovey & Hede, 2001; O'Connor, 1993). Management usually focuses on the technical elements of change with a tendency to neglect the equally important human element, which is often crucial to the successful implementation of change (Bovey & Hede, 2001; Levine, 1997; Huston, 1992; Steier, 1989; Arendt, Landis, & Meister, 1995; Tessler, 1989; New & Singer, 1983). Nord and Jermier (1984, as cited in Bovey & Hede, 2001), "expressed resistance is resisted rather than being purposively managed" (p. 372). Therefore, in order to successfully lead an organization through major change it is important for management to balance both human and organization needs (Bovey & Hede, 2001; Spiker & Lesser, 1995; Ackerman, 1986).

Cunningham, Woodward, MacIntosh, Lendrum, Rosenbloom and Brown (2002) examined factors influencing readiness for healthcare organizational change. Six hundred fifty-four, randomly selected hospital staff, completed questionnaires measuring the logistical and occupational risks of change, ability to cope with change and to solve job related problems, social support, measures of active vs. passive job construct (job demand x decision latitude) and readiness for organizational change. Workers in active jobs (Cunningham et al., 2002), afforded

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higher decision latitude and control over challenging tasks reported a higher readiness for organizational change scores. Workers with an active approach to job problem-solving style and job-change self-efficacy reported a higher readiness for change. In this hierarchical regression analysis, active jobs, an active job problem-solving style and job-change self-efficacy contributed independently to the prediction of readiness for organizational change.

Healthcare organizations are undergoing unprecedented changes (Cunningham et al., 2002; Shortell, Gillies, Anderson, Erickson & Mitchell, 1996). Competition, funding reductions, efforts to improve cost-efficiency, mergers and the re-engineering of work processes are placing enormous demands on healthcare organizations and their employees (Cunningham et al., 2002; Woodward, Shannon, Cunningham, McIntosh, Lendrum, Rosenbloom, & Brown, 1999). According to Cunningham et al. (2002) research on individual differences in readiness for organizational change, workplace processes that facilitate change and factors that influence the impact of organizational change on the health and emotional well-being of employees is important to the success of efforts to improve the health service delivery system.

Furthermore, Armenakis, Harris and Mossholder (1993), as cited in Cunningham et al., 2002) ascertain that readiness for change research suggests that the need for change, a sense of one's ability to successfully accomplish change (self-efficacy), and an opportunity to participate in the change process contribute to readiness for organizational change.

Yousef (2000) conducted an investigation of the roles of various dimensions of organizational commitment and job satisfaction in predicting various attitudes toward organizational change in a non-western work setting. This study used a sample of 474 employees in 30 organizations in the United Arab Emirates. The results indicated affective commitment mediates the influences of satisfaction with working conditions, pay, supervision and security, on

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both affective and behavioral tendency attitudes toward change. Continuance commitment (low perceived alternatives) mediates the influences of satisfaction with pay on cognitive attitudes toward change. Furthermore, Yousef (2000) posited that often people resist organizational change for various reasons. For instance, Dawson (1994, as cited in Yousef, 2000) noted resistance to organizational change may result from one or a combination of factors such as substantive changes in job, reduction in economic security, psychological threats, disruption of social arrangements, and lowering of status.

Recently, other western scholars (Iverson, 1996; Lau & Woodman, 1995; Cordery, Sevastos, Mueller & Parker, 1993, as cited in Yousef, 2000) pointed out organizational commitment and job satisfaction, in particular, play a vital role in employee's acceptance of change. Additionally, according to Yousef (2000), western scholars who addressed this area of research treated organizational commitment, job satisfaction and attitudes toward organizational change as one-dimensional variables. Yousef (2000) concluded certain dimensions of organizational commitment directly influence certain attitudes toward organizational change.

Many organizations are restructuring their core operations and systems to deal with the new, lean economy. The impetus to change the way organizations conduct business has never been greater. However, while the impetus may be high, the success rate of organization-wide change initiatives has been low (Dawson & Jones, 2002). Dawson and Jones (2002) report about 75% of all organizational-wide change initiatives fail, largely because employees feel left out of the process and end up lacking the motivational skills and knowledge needed to adopt new systems and procedures.

The value behind a successfully planned and implemented Electronic Health Records Management System (EHRMS) is determined by how well the EHRMS can be deployed

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organization-wide, and how well it will meet the urgency of business' operations. According to Kirkley and Stein (2004), significant change can be unsettling for an employee in any setting and the health care industry is certainly not different.

Organizations in the process of introducing online clinical documentation, electronic medical records management systems, and other health care tools have experienced resistance—at least initially—from staff. Rather than meeting these objections individually, implementing EHRMS requires organization-wide change management initiatives that put the need for automated processes in a global perspective (Kirkley & Stein, 2004). Despite recognition that user response largely determines the success of a technology implementation, and the fact significant resources are spent on strategic programs to promote acceptance, there is very little research in terms of evaluating performance outcomes which make a change management program more successful in health care settings (Kirkley & Stein, 2004).

The electronic health record (EHR) is an evolving concept defined as a longitudinal collection of electronic health information about individual patients and populations. Primarily, it is a mechanism for integrating health care information currently collected in both paper and electronic medical records (EMR) for the purpose of improving quality of care. To broadly examine the potential health and financial benefits of health information technology (HIT), this study compares health care with the use of IT in other industries. It estimates potential savings and costs of widespread adoption of electronic medical record (EMR) systems, assures important health and safety benefits. Effective EMR implementation and networking could eventually save more than $81 billion annually by improving health care efficiency and safety. It may also enhance prevention and management of chronic disease and could eventually increase savings in

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health care (Hillestad, Bigelow, Bower, Girosi, Meili, Scoville, & Taylor, 2005). However, this is unlikely to be realized without related changes to the health care system (Lawton, 2005).

Statement of the Problem

Studies of organizational change seem to be preoccupied with the changes, rather than analyzing the change process (Pettigrew, Ferlie & McKee, 1992). Simply put, there is much more attention for what is being changed in organizations (i.e., content) than for how effective change is being accomplished (i.e., process) (Boonstra, 1997).

Technology consultants primarily driven by sales have contributed largely to organizations investing heavily in capital-intensive expenditures such as new equipment, software and/or technology. Their presentations masquerade themselves as quick fixes to reduced costs, increased productivity and manage patient care. However, through the countless presentations provided by these same consultants and their sales representatives touting these benefits, they rarely can substantiate any real or actual measurable outcomes (Pettigrew, Ferlie & McKee, 1992).

Moreover according to Hornstein (2008), organizations still believe that through technological innovation alone, survival and prosperity can only be obtained. Unfortunately these same technology consultants and sales representatives also use the latter train of thought to manipulate IS/IT managers to sell them a shiny new thing as a panacea to solve all their financial and organizational issues. Hornstein (2008) continues to report, that it is not the "hard" technology acquisitions by themselves that guide organizational success, but the integration of these assets into organizational change management processes that elevate the importance of the human system. That is, the integration really makes the difference. Furthermore, research has shown that most IS/IT interventions are unsuccessful at integrating employee adoption issues and

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effectively resolving resistance to change (The Standish Group International, 2001).While it is inevitable that the current way of managing healthcare organizations is continually changing, this researcher feels an examination of the performance outcomes of change management in healthcare is timely and speaks to the current needs in the healthcare sector. Too often, implementing enterprise-wide information technology neglects the human factor (Martinsons & Chong, 1999; Ives & Olsen, 1984; Willcocks & Mason, 1988). Thus, attention to organizational development and change management in IT implementation has resulted in a positive impact on productivity, job satisfaction, and other work attitudes (The Standish Group International, 2001). To this end, justifying the pursuit of change management effectiveness in most organizational interventions, particularly in IT initiatives that traditionally tend to turn the organization into which they are introduced upside-down, is a far greater support mechanism (Davenport, Eccles & Prusak, 1992).

Therefore, the purpose of this research project is to evaluate the impact (i.e., the patient care experience and efficiency of physician, clinician and technician workflow) of the Electronic Health Records Management System (EHRMS) in an urban metropolitan hospital system located in the Midwest. This research will examine two of the nine St. John Providence Health System's EHRMS (eCare) by determining the impact of a change management initiative. The four research questions this study seeks to answer are:

1. To what degree did the eCare Change Management Initiative improve the quality of the patient care experience?
2. To what degree did the eCare Change Management Initiative improve the efficiency of the providers' and non-providers' workflow?

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3. Will the respondents' demographic characteristics have an impact on their rating of the improvement in efficiency of the providers' and non-providers' workflow?
4. Will the eCare Change Management Initiative improve patient satisfaction (i.e., overall rating of care)?
5. Will the eCare Change Management Initiative meet the objectives of the change management process including preparedness, understanding, and participation?

Significance of the Study

This research sought to evaluate the impact of implementing an EHRMS (e.g., Improve the patient care experience and the efficiency of providers' and non-providers' workflow), which may have contributed to St. John Providence Health System's technology change management initiative. Moreover, such findings may provide additional prescription towards building a roadmap for successful implementation of organization-wide change management programs. Implementation ---of healthcare reform strategies within the field is a major driver for this study.

According to Legris and Collerette (2006), the success rate for information technology (IT) implementation is, in general, quite low. Therefore, with the added organized technological change program, they suggest that for better results, models must incorporate a wide range of attributes such as closely involving stakeholders, paying attention to social factors, and integrating better change management practices**.**

McNish (2002, p. 206-208) conducted a study on the guidelines for managing change and discussed their effects on the implementation of new information technology projects. This research found the actual implementation appeared to be very heavily biased toward technological aspects, while paying little attention to managing the ensuing changes in process,

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structure and culture. This study determined nine factors in three domains which contribute to the change management guidelines. These nine factors were:

Project Structure:

1. Senior management must publicly express their commitment to the change
2. The change must be championed

Project Implementation:

3. People who possess adequate skills must run the implementation process
4. Commitment of success must come from the implementation team
5. Success of the change effort must be publicized
6. Benefits from the change effort must also be publicized
7. The success and changes should also be studied, as well as carefully implemented across other efforts if possible

Project Planning

8. Where practical difficulties arise, resources need to be readily available
9. Affected staff should be well informed about what was expected of them in the new system.

However, only two of the nine guidelines (5 *Success of the change effort must be publicized* and, 9 *Affected staff should be well informed about what was expected of them in the new system*) were primarily responsible for the success or failure of IT projects (McNish, 2002, p. 204).

According to Sherry, Harrison, and David (2000, as cited in McNish, 2002), managers have been known to get so engrossed in the technical and financial details of change that they ignore the more subtle human factors which are associated with it. Boddy and Macbeth (2000, as

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cited in McNish, 2002) argue a more advanced reason that may be due to the fact that managers, who are pursuing new sources of competitive advantage, invest their company resources in novel and even complex technologies, taking for granted or perhaps even ignoring the period of organizational learning required to cope with the new system.

McNish (2002) contends if organizations are to implement successful information technology (IT) projects, they need to use the established change management guidelines illustrated above. McNish (2002) further posits it is evident from the study that the application of the latter guidelines cannot and should not be applied to major change projects in isolation, to do so would more than likely compromise the project's successful outcome, resulting in a waste of corporate resources.

This study will contribute to the field of healthcare management by determining if St. John Providence Health System's technology change management program improved patient care experience and the efficiencies of providers' and non-providers' workflow across its nine hospitals. This study may form the basis for creating a framework for additional experimentation and inquiry in the arena of health care change management initiatives by understanding which attributes contribute to a successful technology change management program in healthcare. Furthermore, it may extend the research base of healthcare organizations through evaluating the impact of a successful technological change management initiatives implemented by healthcare leaders in St. John Providence Health System.

Further, this research may provide a framework for future evaluations of EHRMSs. The quantitative and qualitative responses to the research survey may provide more effective ways to implement future change initiatives. This study may encourage more extensive empirical research in the healthcare field as it relates to technological change management initiatives.

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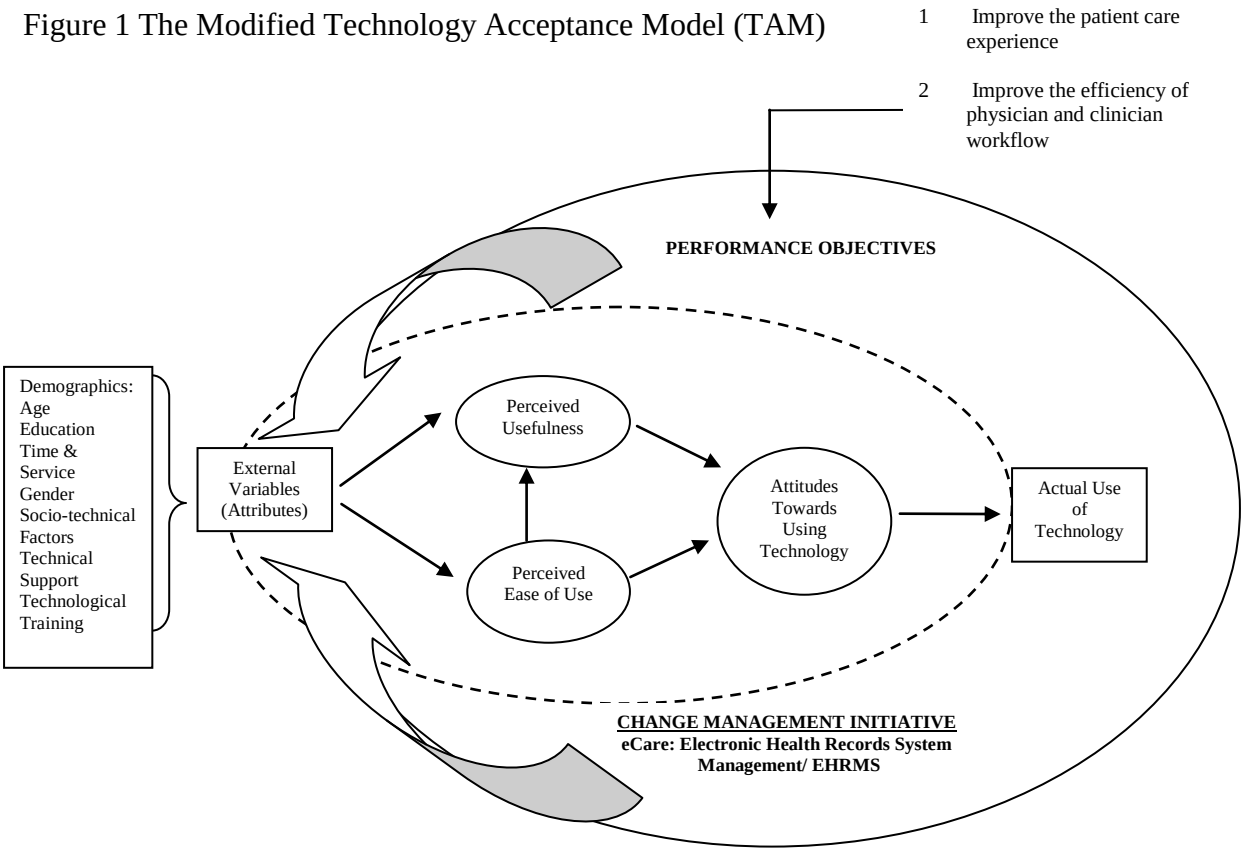
Conceptual Framework

The researcher used the Technology Acceptance Model (TAM, Davis, 1980) and presents it below as a Modified Technology Acceptance version. This Modified TAM model was instrumental in developing three of the research questions. The addition of the large circle encapsulating the TAM model represents attributes of a successful technology change management program. Various attributes have been identified within the literature review as the most common and significant in implementing a successful technological change management effort. Therefore, this study will utilize the Modified TAM model to examine the impact implementing the EHRMS change management program in performance outcomes, as well as external demographic variables valued in driving change. Figure 1 presents the Modified TAM model.

Figure 1 The Modified Technology Acceptance Model (TAM)



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The Performance Objectives listed on Figure 1 were designed by St. John Providence Health System personnel.

Definition of Terms

The following terms are relevant to this study:

Providers

St. John Providence Health System defines providers as physicians, mid-level, physicians assistant, nurse practitioners, nurses, and residents.

Non-Providers

St. John Providence Health System defines non-providers as health unit coordinators, technicians, pharmacists, dietary, therapist, administrators, and medical students.

eCare

eCare (T. Daniel, Ph.D., personal communication, May 31, 2011) is an electronic medical record system containing a set of software solutions including: Inpatient PowerChart, Emergency Department FirstNet, Radiology Department RadNet, preoperative and postoperative Surginet, Pharmacy PharmNet, along with links to laboratory, transcribed documents, and registration systems that enables St. John Providence Health System to provide real time patient information to caregivers. eCare provides:

- Consolidated single electronic patient record,
- Evidence-based medicine,
- Improved efficiency of treatment processes and coordination of care,
- Increasing safe, accurate, and consistent care.

Electronic Health Records Management System (EHRMS)

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According to Edsall and Adler (2008), Electronic Health Records Management System (EHRMS) is a longitudinal electronic record of patient health information generated by one or more encounters in any health care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The EHRMS automates and streamlines the clinician's workflow and has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via an interface, which includes evidence-based decision support, quality management, and outcomes reporting.

Clinical Information Systems (CIS)

According to Sittig, Hazlehurst, Palen, Hsu, Jimison, and Hornbrook (2002), Clinical Information Systems (CIS) consist of information technology that is applied at the point of clinical care. They include electronic medical records, clinical data repositories, decision support programs (i.e., clinical guidelines, drug interaction checking), handheld devices for collecting data and viewing reference material, imaging modalities and communication tools such as electronic messaging systems. Increasingly, care is provided in multiple settings, thus creating a need for clinicians to share data with providers at other locations and to pool them with other clinical data in order to provide a complete picture of an individual patient. Advances in computer networking and wireless communication technology have now made it possible for clinicians to access these data from any location, whether it is in the office, the hospital, at home, or even when traveling out of town.

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Electronic Records Management Systems (ERMS)

According to Harrington (2004), Electronic Records Management Systems (ERMS) is a computer program (or set of programs) used to track and store records. The term is distinguished from imaging and document management systems in that it specializes in paper capture and document management respectively. ERMS systems commonly provide specialized security and auditing functionalities tailored to the needs of records' managers.

Total Quality Management (TQM)

According to Boaden (1987), Total Quality Management (TQM) is a management approach for an organization that is centered on quality, based on the participation of all its members and aimed at long-term success through customer satisfaction, benefits to all members of the organization in particular, and to society in general.

Six Sigma

According to Pande, Neuman, and Cavanaugh (2002), Six Sigma is a measure of quality that strives for near perfection and is a disciplined, data-driven approach with a methodology that eliminates defects (driving towards six standard deviations between the mean and the nearest specification limit) in any process from manufacturing to transactional and from product to service. The statistical representation of Six Sigma describes quantitatively how a process is performing, and it must not produce more than 3.4 defects per million opportunities. A Six Sigma defect is defined as anything outside of customer specifications and an opportunity that is then the total quantity of chances for a defect (p. 6).

Lean Manufacturing

According to Mader (2008), a *Lean Manufacturing* initiative is focused on eliminating all waste in manufacturing processes. Principles of lean include zero waiting time, zero inventories,

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scheduling (internal customer pull instead of push system), batch to flow (cut batch sizes), line balancing and cutting actual process times.

Open Structured Data Entry Application (OpenSDE)

According to Los, van Ginneken, de Wilde, and van der Lei (2004), Open Structured Data Entry Application (OpenSDE) is a method clinicians generally use to record medical narrative data, such as current complaints, physical examination, and progress notes as free text in paper-based medical records. The medical narrative involves heterogeneous and detailed data, which include the description of (multiple) occurrences of medical findings or symptoms that may progress over time. Structured, electronic recording of narrative data would facilitate the use of these data for research. The authors' OpenSDE application supports clinicians with the structured recording of narrative data in both research and care settings. Data entry is enabled, using forms that are generated using domain-specific trees of medical concepts.

Information Technology (IT)

According to Tafti, Mithas and Krishnan (2007), Information Technology (IT) is defined by the Information Technology Association of America (ITAA), as the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware. IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and securely retrieve information.

Assumptions of the Study

Assumptions to be considered in this research study include:

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1. It is expected change management initiatives may have a variety of emotional consequences for the participants.
2. Participants will be able to read and understand the questions asked on the survey.
3. Assurance of anonymity and confidentiality will help participants answer questions freely and honestly.

Limitations of the Study

This case study of the eCare technology change initiative in the St. John Providence Health System considered the following limitations.

1. Healthcare administrators may view the study as a comparison of, or competition between, their organizations rather than a fact-finding method used to document possible attributes for deploying a successful EHRMS initiative, as well as how the study may assist in future change management initiatives. This can be minimized, if each organizational unit is brought in on the study at its infancy to identify requirements that reduce holding of information, stalling, and sabotaging. Much of these activities are by-products of competition.
2. The human element of needing to be perceived as successful in their management positions may result in difficulty for the in-house change management lead or team to give an objective accounting of events and the underlying assumptions of the EHRMS. This is primarily the case when managers feel their jobs are on the line and actually, studies like these have nothing to do with their performance management outcome. This can be minimized by eliminating the "thumb" on the middle manager. Introduce this activity to each manager and staff member directly

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from the top echelon and mandate how these activities will not impact or effect performance evaluations.

3. This study was limited to persons employed by a specific health care organization located in an urban metropolitan area of the State of Michigan and may not be representative of all health care organizations. Generalizations to other populations of health care organizations must be made with caution.
4. This study relied on paper and pencil self-report instruments which are subject to socially desirable responses.
5. There may be unknown factors related to the change management initiative not accounted for in this study.

Summary

Chapter I focused on the value behind a planned and implemented Electronic Health Records Management System (EHRMS). It also addresses the impetus for change and highlights its vulnerability of unsuccessful deployment efforts. Therefore, this study will seek to evaluate the performance outcomes (e.g., Improve the patient care experience and efficiency of physician and clinician workflow efficiency) of an EHRMS change management initiative (eCare) undertaken by St. John Providence Health System.

Chapter II presents a review of pertinent literature and research related to this study. It also provides the necessary support that may lend itself to a more powerful future business case for driving an EHRMS in the health care.

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CHAPTER II

REVIEW OF THE LITERATURE

This chapter introduced relevant research in the health care industry and its reaction to implemented technology used to assist with improving services. Clinician data was reviewed, as well as overall safety, and assistance with transforming the ways in which interactions with patients may occur. This chapter articulates the various pertinent studies, literature, and models that measure acceptance to EHRMS. In addition, change management is defined and elements of its make-up for transforming an organization are reviewed.

Change Process and Model of Acceptance

Change Management

Change management is a way to transform and restructure organizations for addressing the needs of a new fast moving economy. This study will address the impetus of the health care industry to change and improve effectiveness, while relying on deliberate action. Chapter II addresses the discipline of change management and explores its elements through a dual existence or the convergence of psychological and engineering disciplines (Hayes, 2002). Within the convergence of these two highly recognized fields of study, the acceptance of intervention(s) will undoubtedly be a driving force of success, as well as fluid implementation across health care professionals. The Technology Acceptance Model (TAM) plays an important role in smooth and fluid implementation.

Technology Acceptance Model

The technology acceptance model (TAM, Davis, 1989) is a framework that addresses both the operational needs and approval of innovation among recipients of the model. According to the TAM model, perceived usefulness and perceived ease of use are determinants of attitude

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toward using intentions and actual IT usage. Perceived usefulness is defined as the degree to which a person believes that using a particular system will enhance his or her job performance; while perceived ease of use is defined as the degree to which a person believes that using a particular system will be free of effort. Therefore, this study utilizes a modified version of the most widely used model in information technology, the Technology Acceptance Model (TAM), to denote acceptance and associated outcomes.

Health Care and Technology

Many attempts to get clinicians to use electronic health records have failed because of difficulties with data entry (Walsh, 2004; McDonald, 1997; Trace, Naeymi-Rad, Haines, Shanthi, deSouza, Lowell & Evans, 1993; Coulter, Gilbert & Entwistle, 1998**;** Kaplan, 1994). Technology should complement and improve clinical care, not impose extra burdens on already overloaded medical staff. The clinical "usability" of electronic records systems is particularly relevant with the recent appointment of service providers to implement the National Integrated Care Record Service for the National Health Service Policy (NHS, Rosen & Gabbay, 1999), as usability also affects patient care.

Van Ginneken (1996) reports clinicians rejected many computerized medical record systems because they were not based on a story metaphor. Frisse, Schnase, and Metcalfe (1994) argue that using conversations as a central metaphor for handling patient's records to reflect work flow is preferred in a clinical setting. Until recently, shortcomings of medical information systems software, computer-human interfaces, and networks forced upon the healthcare community were a depersonalized notion of "information" centered upon the interaction between the individual and the "system," rather than upon the interaction of human beings with one another (Frisse, Schnase & Metcalfe, 1994).

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A study to evaluate the implementation of an OpenSDE (Structured Data Entry Applications) in pediatrics was conducted at the Department of Pediatrics in Aghia Sophia Children's Hospital in Athens, Greece. According to Roukema, Los Bleeker, Ginneken, Evan, van der Lei & Moll (2008), four pediatricians documented data on eight first-visit patients in the traditional, paper-based medical record and immediately thereafter in OpenSDE (electronic record). The results indicated 44% of all available patient information was not identical in the paper and electronic records. Twenty-five percent of all patient information was documented only in the paper record, and 31% was present only in the electronic record. Differences were found in patient history and physical examination documentation in the electronic record, and more information was missing from the patient history (38%) than for the physical examination (15%). Furthermore, physical examinations contained more ancillary information (39%) than did patient history (21%). Data entry times in OpenSDE questionnaires revealed a positive attitude toward the use of OpenSDE in daily practice (Roukema, Los Bleeker, van Ginneken, Evan, van der Lei & Moll, 2008).

Therefore, OpenSDE seems to be a promising application for the support of physician data entry in general pediatrics. Implementation of electronic medical record (EMR) systems promises significant advances in the quality of patient care, because such systems may enhance readability, availability, and data quality (Roukema, Los Bleeker, van Ginneken, Evan, van der Lei & Moll, 2008).

Despite potential benefits, user acceptance will be the major barrier in implementation of EMR systems, because clinicians will face a change in their practice habits. The advantages of coded data must outweigh the disadvantages of capturing such data for SDE to become successful in clinical practice (Powsner, Wyatt & Wright, 1998). Functionality and the user

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interface will therefore be crucial for successful implementation (Dansky, Gamm, Vasey & Barsukiewick, 1999; Sittig, Kuperman & Fiskio, 1999).

In a study conducted at the Department of Pediatrics at Sophia Children's Hospital and the Department of Informatics at Erasmus Medical Center in Rotterdam, Netherlands (Roukema, Los Bleeker, van Ginneken, Evan, van der Lei & Moll, 2008) the OpenSDE was evaluated for its completeness, uniformity of reporting and usability in general pediatrics. Physical examination was found to be most complete and contained more ancillary information than patient history, which indicates SDE is more suitable for documentation of objective data. The participating physicians had a positive attitude toward the use of a SDE application, a requirement for successful implementation; therefore, OpenSDE seems to also be a promising application for the support of physician data entry in general pediatrics.

A study conducted by DesRoches (2008) discovered why EMRS is being touted as the wave of the future in health care communication, when only 17% of U.S. doctors embraced the technology. This study surveyed 2,758 doctors nationwide concerning their use of electronic medical record systems. The research indicated only 4% reported had a fully functional EMRS. An additional 13% reported they had a basic system. The survey also found primary care doctors and doctors with large practices or those in hospitals or medical centers were more likely to have electronic medical record systems. In addition, doctors in the western region of the United States were more likely to have such systems. Doctors cited a number of barriers for not adopting an electronic medical record system, including concern about cost and returns on their investment (DesRouches, 2008). DesRouches (2008) argues that eventually most doctors will adopt an electronic system. The survey found 40% of those physicians who did not have an operational system, said they had purchased one but had not started to use it, or they planned to buy one.

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According to Schnelle, Simmons, Harrington, Cadogan, Garcia & Bates-Jensen (2004), in a case study of a major Massachusetts medical center, nearly 80 ambulatory practices deployed an electronic medical record (EMR) system. Deploying an EMR system can be a challenge for many healthcare providers, but getting a major regional hospital and its clinics and thousands of users up and running with one is a challenge of another magnitude.

For instance, Boston Medical Center (BMC) is a private, non-profit academic medical center located in Boston's historic South End. The 547-bed hospital is the primary affiliate for the Boston University School of Medicine. With its emphasis on community-based care, BMC is the largest safety net hospital in New England, providing a full spectrum of pediatric and adult health care services, from primary and family medicine to advanced specialty care. In 1996, BMC was formed after the merger of Boston City Hospital and Boston University Hospital. The evolution of these distinct bodies into a single entity spanning 10 city blocks created familiar infrastructure issues, not the least of which was the existence of multiple paper medical records, multiple record rooms, and wide-ranging storage and retrieval policies. Quality of patient care and patient safety drove the decision to implement a centralized EMR system universally used by primary, specialty and subspecialty providers at BMC (Schnelle et al., 2004).

No one could deny the need to transform health care, because of the ability of information to transform health care organizations and deliver measurable value. However, these organizations will have to deploy effective, proactive strategies for managing information and adapting to the opportunities that technology offers (Mahoney, 2002). According to Kirkley and Stein (2004), as more health care organizations seek improvements in patient safety and increases in productivity, others will take the plunge to adopt Clinical Information Systems (CIS). An increasing number of nurse executives face the prospect of getting their staff to use

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information technology (IT) to directly support the workflow of nurses. As aforementioned, significant change can be disturbing in many sectors, and as the problem statement has communicated, the industry of health care is not different. Timmons (2003) found resistance takes a variety of forms and is a complex, multidimensional phenomenon worthy of additional study.

In another study on nurses' opposition to IT in their workplace, Kirkley and Stein (2004) explored the specific reasons behind their resistance. An electronic roundtable was held followed by phone interviews with nurse leaders at four health care organizations, three in the United States and one in the United Kingdom. The goal was to elicit candid opinions and anecdotal evidence from nurse executives on the front lines of technology initiatives. These individuals were nurse leaders in organizations that have successfully made the leap to automated systems, and their experiences provided insight into identifying and circumventing the obstacles that can arise during technological rollouts. Respondents focused on three fundamental questions:

1) Why are some nurses reluctant to adopt CIS?

2) Can you identify the types of nurses who are more or less likely to embrace CIS? And,

3) What are the successful methods to overcome this resistance?

According to Kirkley and Stein (2004), themes emerged from the framework that created the latter set of questions and revealed resistance to technology has less to do with the actual technology and more to do with cultural factors, for example (i.e., lack of time and other historic factors such as used to familiarity with paper documentation).

Comfort and experience with computers are much less an issue now with nurses, since they have injected much of this in their everyday lives and their interaction ranges from

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keyboarding on laptops to making calls on hand held computer driven cell phones, or smart phones and PDAs (Kirkley & Stein, 2004). If these same nurses with the infusion of technological experience can search the web, read on line, and twitter, why are they still so resistant to charting online? According to Kirkley and Stein (2004), respondents and researchers attribute initial resistance to a wide array of factors. Much comes from fear and negative perceptions of the system, even prior to actually using it. These points of resistance are cultural and need a robust change program to completely overcome (Kirkley & Stein, 2004). The literature has shown nurses do not resist technology itself. Nurses are resisting the addition of one more task to complete in their workday.

Misconceptions and poor communications are driving nurse's fears about charting online and that it may take too much additional time. According to Timmons (2003), the top issue concerning nurses about CIS was that it is too time consuming. Fraenkel, Cowie, & Daley (2003) suggest that using technology or the idea that CIS will reduce time a nurse spends on documentation and increase the quality of data and its compliance (Fraenkel et al., 2003).

A study was conducted by Fraenkel et al. (2003) with a focus on the quality benefits and staff perceptions of a CIS. After seven months of implementation, the nursing staff's perceptions and quality of their work was positive. Thus, satisfaction and quality indicators likely improve significantly over time and may represent the growing level of comfort with technology. Although, these technologies and systems (i.e., CIS, EMR, and EHMR) do not always yield instant payoff, the intangible benefits are often felt immediately due to an increased level of capacity building, teaming and desire to transform how clinicians conduct their business.

In an Institute of Medicine (IOM, 2001) study and an oft-cited article by Leape & Berwick (2003), several industry reports raved about the use of automated clinical technology as

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a necessity to improve patient safety and reduce medical errors. Johnson, Pan, Walker, Bates & Middleton (2004) indicated the California Health Care Foundation released a report in 2002 that estimated the state would have saved more than $3.2 billion annually and reduced the yearly number of medication-related injuries by nearly 250,000 statewide if California health care clinics adopted clinical information systems to handle medication ordering and diagnostic tests.

Change Management

According to Hayes (2002), the most effective way to transform and maintain an organization is through change management. Change management relies on deliberate action and its ability to improve performance through a planned approach to change the organization. The major intention of change management is to assist an organization with maximizing the benefits of the collective and minimize the risk of failure. The discipline of change management deals primarily with the human aspect of change; therefore, it is related to psychology and engineering. Thus, according to Hayes (2002), change management creates the perfect elements as a means of ensuring the success of an EHRMS adoption and implementation.

For the purpose of this case study, Fulla (2007) defines change management as the actions of managing adjustments to an organization's culture, chain of command and/or business processes in order to achieve a desired outcome. Furthermore, change management is a process or method that is continually progressing towards organizational transformation and not a series of tools or exercises to solve short-term problems. According to Abdinnour-Helm, Lengnick-Hall, and Lengnick-Hall (2003), there are six stages that drive successful technology implementation: pre-adoption, adoption, pre-implementation, pilot study, implementation, and post-implementation. These stages must be rooted in change management and maintain a consistent process and level of positive energy throughout each of these stages. The ultimate

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goal is to achieve "equilibrium" as quickly as possible and refresh current culture. Therefore, according to Hiatt & Creasy, 2003, change management is the convergence of two very predominant schools of thought; an engineer's approach to improving business performance and a psychologist's approach to managing the human-side of change (Hiatt & Creasey, 2003).

Engineering Perspective

Frederick Winslow Taylor (Taylor, 1911) during the late nineteenth century defined the engineering perspective as a focus on the mechanical system through observable, quantifiable business elements that can be changed or improved, including developing robust business strategies, processes, systems, organizational structures and job roles. Hammer (1990) continues to draw on this perspective and offers an analogy of business being like a clock. Hammer posits that an organization is full of mechanical parts like a clock and can be changed or altered to create an expected or predictable and popular solution (i.e., the clock tells time). This change can be incremental and sustained, as seen in continuous process improvement methods such as the quality movement (i.e., TQM). Moreover, change can also be more radical and is evident by the reengineering methods implemented through six-sigma or lean manufacturing).

When implementing change, Boerstler, Foster, O'Connor, O'Brien, Shortell, Carman, and Hughes (1996) posited the quality movement is very important and because of various tools identified above, the existence of organization-wide change management is used to implement a total system of improvement and not just remnants. In order for these quality programs to be successful, implementation requires change across its people, process, systems and technology; a necessary precondition to achieve improved performance and changes in employee behavior (Brannan, 1998; Lewis & Lamprey, 1992). These concepts and tools are at the heart and focus of

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what change management hopes to positively affect through employee engagement (Brannan, 1998; Lewis & Lamprey, 1992).

Psychology Perspective

The human focus of change is introduced through the psychology perspective of change management and addresses events coupled with how humans react to their environments, as well as how an individual thinks and behaves in a particular situation. According to Hiatt and Creasey (2003), humans undergo extreme change and psychologists have examined its effect and how their work environment pressures of change manipulates their reactions. According to Bridges (1980), change is defined as a shift in the peripheral or external of any situation; a new supervisor, establishing new ground, traveling the unknown, relocation, bereavement and loss of a job or a promotion. By contrast, Bridges (1980) posits that transition is the mental and emotional transformation for people. Consequently, in order for people to relinquish their old arrangements and embrace new things, they must undergo this grieving period to accept the new reality.

An individual's mental and emotional state can undergo high levels or states of trauma (deKlerk, 2007). Transition is a period of moving from one place mentally to another and often there is some level of trauma associated with this movement. According to deKlerk (2007), trauma, with unresolved emotional issues, for many people blocks and inhibits a person from effectively raising their ability to perform. Further, deKlerk (2007) contends higher levels of job performance will not be achieved by workers feeling emotionally hurt and too traumatized to accept change or perform with any level of proficiency.

Of course, this does not refer to a trauma resulting from a physical hurt or danger, but rather from emotionality. According to Allen, Freeman, Russell, Reizenstein & Rentz (2001), the

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human body is unable to make a distinction between an emotional emergency and physical danger. Emotional trauma can be triggered by some "psychological emergencies" and the body or mind looks upon these crises as significant. Moreover, organizational trauma affects all those who are both directly and directly involved. This is illustrated by the number of survivors and witnesses, who often report being a close to the victim and experiencing similar levels of trauma as the original victim (Allen, Freeman, Russell, Reizenstein & Rentz, 2001).

The broad impact of a workplace downsizing and organizational restructuring is a great example of trauma in the business sector, as well as how such interventions could devastate or negatively impact the emotional state of employees. According to deKlerk (2007), it is surprising how often organizations want employees to immediately embrace change and quickly move toward optimal function again. Baruch and Hind (2000) posits that trauma originates at the individual and not the organizational level; the trauma can have great influence if it is injected into a larger organizational system with great intensity. Furthermore, if the trauma occurs across the organization in a broad spectrum, others in the organization may also identify with the trauma and ultimately lead to a group trauma effect. If this trauma spreads to other groups and reaches multiple parts of the organization, it can become like a deadly virus and become very destructive (deKlerk, 2007).

According to Hiatt and Creasey (2003), the psychology perspective is very important to the existence of successful organization-wide change management efforts because the tone is set around creating high levels of behavioral modification, and progressive demanding management strategies assist with driving consistent organizational cultural transformation. Hiatt and Creasey (2007) created a table showing the evolution of two schools of thought about change management (engineering and psychology) and how they have emerged. A modification by Hiatt

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and Creasey's (2007) is presented in Figure 2. It contrasts the engineering and psychological approaches in terms of focus, business practice, measures of success and perspective on change.

Figure 2 Two- Schools of Thought: The Evolution of Change Management*

	Engineering	Psychology
Focus	Process, systems, structure	People
Business Practice	Business Process Reengineering, Total Quality Management, ISO 9000, Quality	Human Resources, Organization Development
Starting Point	Business issues or opportunities	Personal change, employee resistance (or potential for resistance)
Measure of Success	Business performance, financial and statistical	Job satisfaction, turnover, productivity loss
Perspective on Change	Institute the programmatic and operational initiatives without a formalized training plan to build capacity or competency	Create imbedded transparency by building developmental capacity and competence as part of the deployment or continuous improvement strategy for the change initiatives.

*adapted from Hiatt & Casey (2007)

Hiatt and Creasey (2003) emphasized business changes life by the extreme application of either the engineering or the psychology school of thought. An exclusive "engineering" approach to business issues or opportunities often results in effective solutions that are seldom adequately implemented, while an exclusively "psychological" approach often results in a business being receptive to new things without an appreciation or understanding for what must change for the business to succeed. Therefore, contributions from both the engineering and psychology fields are producing a convergence of thought that is crucial for successful design and implementation of a change management effort.

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Technology Acceptance Model (TAM)

Conceptual Framework of (TAM)

According to Balogun and Johnson (2004), technology acceptance is a concept that communicates a level of approval, favorable acceptance and the level of approval. Some favorable reception and continuous use of newly introduced systems and devices is critical to operations. Thus, directing attention toward the most widely used model in information technology, the Technology Acceptance Model (TAM) is warranted.

The Technology Acceptance Model (TAM) predicts the user acceptance of either implemented or future implementation of technology by specifying causal relationships among selected belief and attitudinal constructs that mediate the influence of the external variables on usage behavior (Hubona & Kennick, 1996). In 1980, Fred Davis introduced a widely accepted model of information technology usage (Prabhaker & Litecky, 1997). The TAM is an adaptation of the Theory of Reasoned Action (TRA, Fishbein, 1967) specifically tailored for modeling user acceptance and/or intended usage of information systems. The TRA provides a framework to study attitudes toward behaviors. According to the theory, the most important determinant of a person's behavior is behavior intent. The individual's intention to perform a behavior is a combination of attitude toward performing the behavior and subjective norm (Ajzen & Fishbein, 1980).

In 1967, Fishbein (as cited by Randall, 1989) introduced the TRA. Randall explains the theory is based on the notion that a person's behavior is determined by what information the person happens to have available to them. This theory states a person's behavior is determined by their behavioral intentions and these intentions are a function of two different factors. The first factor is attitude toward the behavior, which Chang (1998) defined as the product of one's salient

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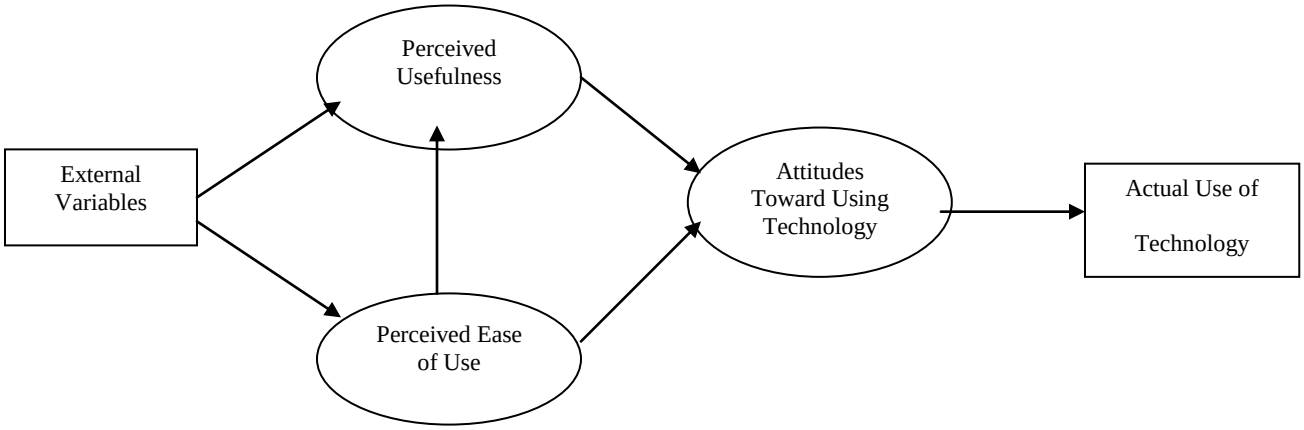
belief that performing the behavior will lead to certain outcomes, and an evaluation of the outcomes (i.e., rating of the desirability of the outcome).

The second factor is subjective norm, which is a function of the product of one's normative belief that is the person's belief that the salient referent thinks he should (or should not) perform the behavior, and his/her motivation to comply with that referent (Chang, 1998). To put the definition of TRA into simpler terms, a person's behavior is predicted by their attitude toward the particular behavior and how they think other people would view them if they did the actual behavior. Both of those factors determine a person's behavior intention, which leads to whether the behavior is implemented or not. The TAM model is shown in Figure 3.

Figure 3 TAM Model



According to Davis (1989), the TAM's perceived usefulness and perceived ease of use are determinants of attitude toward using intentions and actual use of technology (Davis, 1989). Davis posits perceived usefulness is defined as the level a person believes he/she will use a particular system would better their performance on the job, while perceived ease of use is the degree which they believe using that particular system would be easy to use and/or without any difficulty (Davis, 1989).

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With support from various theories and models (Davis, 1989), such as expectancy theory, self-efficacy theory, cost-benefit research, innovation research, etc., the TAM model postulated actual technology usage behavior was determined by behavioral intention to use a system, which was jointly determined by a person's attitude towards using the system and its perceived usefulness. This attitude reflects feelings of both favorableness and un-favorableness toward using the technology or system. These feelings are also jointly determined by perceived usefulness and perceived ease of use. Perceived usefulness, in turn, is influenced by perceived ease of use and external variables (Davis, 1989).

According to Davis (1989), all other factors not explicitly included in the model are expected to impact interventions and usage through perceived ease of use and perceived usefulness. These external variable or factors might include system design features, environmental, training, etc. Thus, according to TAM model, the easier the technology is to use, and more useful it is perceived to be, the more positive are one's attitude and intention toward using the technology. Correspondingly, the usage of the technology and the system increases.

Empirical Change Management Research

A study conducted Washington & Hacker's (2005) examined the relationship between managers' understanding of a specific organizational change process and their attitudes toward implementing change. The original empirical research was conducted by administering a survey to 296 managers from the Botswana Government. Examination of the results found managers who understand why the change effort is conducted are less likely to be resistant to the change. Specifically, as more and more managers understand the change, it was evident more would be excited about the change and have less failures of implementation (Washington & Hacker, 2005). Thus, overall results suggested a strong relationship between respondent's who

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understood the change and their feelings about the change. This study provided answers to the original research question: Are individuals that state they do not understand organizational change more likely to resist the organizational change than individuals that state they do understand the change? These findings showed it was more likely for a respondent to be more excited about the change, less likely to allow it to fail or wish the change had never occurred, if they understood the purpose for the change effort from the start (Washington & Hacker, 2005).

Gilley, Dixon, & Gilley (2008) explored leadership effectiveness in driving change and innovation along with the precursory skills necessary to do so. The respondent population was 48.4% male, 50.6% female, with 1% not reporting gender. The industry type was 10.42% manufacturing, 54.46% service, 15.77% education, 11.61% professional, 6.55% government, and 0.89% other. When specified, the category 'other' included medical, consultant, technicians, doctoral candidates, and senior research specialists. Of the respondents, 62.09% indicated their immediate supervisor was male, while 37.31% listed their direct manager as female. According to Gilley et al. (2008), numerous variables impact a leader's effectiveness. Specifically, the ability to communicate appropriately and motivate others significantly influenced a leader's ability to effectively implement change and drive innovation (Gilley et al., 2008). The findings confirmed previously identified low rates of organizational success with change and point to skill deficiencies as a cause.

Furthermore, Gilley et al.'s (2008) research made two distinct contributions dealing with the leader's ability to manage change and drive innovation, as they increase their skills and capacities for understanding how to properly deploy employees within their organization. First, the findings indicated employees, at all organizational levels, held a somewhat negative perception of their leader's ability to effectively implement change and innovation. Nearly 76%

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of respondents reported their leaders never, rarely, or only sometimes effectively implement change. Leadership is often cited as a significant barrier to or resister of change (Gilley, 2005; Schiemann, 1992) despite self-reports to the contrary (Gilley et al., 2008).

Second, the research (Gilley et al.,) revealed a four-component model of skills necessary for leaders to master if they are to successfully drive change and innovation, and it identified two skills as critical. Other studies (Gill, 2003; Gilley, 2005; Sims, 2002) indicated coaching, rewarding, communicating, motivating, involving others, and building teams, among others, as necessary for leading change and innovation. The data from these studies support earlier research with respect to linkages between specific skills and leadership effectiveness. Leader's ability with respect to each of these skills (variables) is highly and positively related to their overall ability to effectively implement change and drive innovation. However, additional findings revealed four specific talents (communications, motivation, involving others, and coaching) have a significant impact on a leader's ability to drive change and innovation, although communications and the ability to motivate- are the most critical for the organization's success (Gilley et al., 2008).

In a study (Beer, 2003) examining employee resistance to organizational change, the managerial influence tactics and leader-member exchange was evaluated. Although effective change management represents a critical organizational competency, most change efforts fail to reach their intended objectives (Beer, 2003). According to Furst & Cable (2008), successful change efforts require managers to overcome employee resistance to change. Although, much has been written about the ways in which managers can reduce employee resistance, results regarding the utility of these suggestions vary across studies. A study (Furst & Cable, 2008) used the attribution theories, which suggest an employee's reaction to managerial influence attempts

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may reflect the quality of the interpersonal relationship he/she has with the manager. Indeed, this research on leader-member exchange (LMX) suggested employees develop unique relationships with their managers through an ongoing series of interpersonal exchanges. This relationship shapes the expected behaviors of both parties. These relationships are characterized by loyalty, emotional support, mutual trust, and liking (Dienesch & Liden, 1986; Graen & Scandura, 1987; Furst & Cable, 2008).

Furst & Cable (2008) posit employees may use the quality of their relationship with managers to interpret the meaning and intent of their manager's influence tactics. Moreover, Furst & Cable (2008) suggest their findings support the fact that employees interpret influence tactics in a way that reinforces their existing perceptions of the manager-employee relationship. Employees who enjoy a positive relationship with their manager may attribute the use of sanctions and legitimization tactics to situational factors, which reduce the likelihood that they would resist such efforts. Thus, employees in low LMX relationships, accustomed to antagonistic exchanges with their managers, may view the use of influence tactics suspiciously and be more likely resist the requested behavior.

Furst & Cable's study (2008) extends existing research on attributes that drive successful change management programs by demonstrating employee resistance to change may not only reflect the type of influence tactics used by their managers, but also the nature of the relationship between the employee and manager. According to Furst & Cable (2008), these results may help explain why certain management behaviors, such as the use of sanctions or force, reduce resistance to change efforts, whereas others find similar approaches increase resistance. Because change has become a fixture in many organizations, understanding the source of employee

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resistance is particularly important to managers faced with the daunting task of facilitating change efforts.

A total of 117 individuals participated in a study conducted by Walker, Armenakis, and Bernerth (2007) that identified factors influencing organizational change efforts. Overall results led to the acceptance of a model indicating change context mediated the relationship between individual differences and change process and content. Similarly, change content and process mediated the relationship between change context and organizational change commitment. The goal of this study was to investigate the integrative effect of the factors common to all change efforts. It was suggested change efforts are influenced by content, contextual, and process issues as well as the individual differences that exist among change targets. Identifying the nature in which these factors interact will add to the understanding of employee responses to change and ultimately aid in accomplishing one of the most important goals of any change effort—ensuring employee commitment to change (Walker et al., 2007).

As industries become more competitive, organizational change efforts are more important to long-term survival of many firms. While these changes can take different forms (e.g., restructuring, introduction of new technology, mergers, or acquisitions) change success hinges on management's ability to consider all change factors (i.e., content, process, context, and individual differences) when planning change efforts. Walker et al. (2007) also suggest relationships are dependent upon an individual's level of cynicism and the contextual environment of the organization. Practically, this finding emphasizes the need for change agents to carefully plan change efforts. Change agents should be conscious of prior change attempts that have been implemented in the organization. An organization's change history has the potential to influence the cynicism level among employees (Reichers, Wanous & Austin, 1997; Walker, et

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al., 2007) and the change beliefs held by employees. Walker et al. (2007) contend expectations of cynicism mediate the relationship between other individual characterizes and management's attempt to prepare employees for change. Change beliefs were also found to mediate the relationship between cynicism and commitment. Walker et al.'s (2007) study identified cynicism has a negative direct relationship with commitment, and change beliefs have a positive direct relationship with commitment.

Another probable explanation of low commitment among the change target was a lack of participation in the change implementation. Employees were simply told of the impending change and not given the opportunity to become directly involved. According to Walker et al. (2007), these findings suggest process has the potential to counteract the negative consequences of employee cynicism. Properly preparing individuals for change is important for everyone particularly for individuals high in cynicism. Conversely, individuals low in cynicism will likely resist committing to change if management has not properly prepared them for change. Other studies (Armenakis & Bedeian, 1999; Walker et al. 2007) have demonstrated the necessary steps management teams need to take in order to successfully implement organizational change. However, little research has attempted to identify and integrate the factors common to all successful change efforts (Walker et al., 2007).

In a study conducted by Turner Parish, Cadwallader & Busch (2008), the role employee commitment plays in the success of organizational change initiatives was examined. The results indicated fit with vision, employee-manager relationship quality, job motivation, and role autonomy all influence commitment to change. Notably, affective commitment, which in turn influences employee perceptions about improved performance, implement success, and individual learning regarding the changes, had the greatest impact. Furthermore, this study had

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237 participants, the majority of respondents (73%) indicated the changes they described occurred within the past nine months and considered the change significant. Another study (Sinclair, Tucker, Cullen & Wright, 2005) generally supported the premise that employee commitment to organizational change has important consequences as it relates to successful change management deployment.

Work places are faced with endless change (Herscovitch & Meyer, 2002), and effective management of that change is an important competency currently required by an organization (Paton & McCalman, 2000). The growing frequency and complexity of workplace change requires employees to adapt to change without disruption; however, resistance to change is the more common reaction (Caldwell, Herold & Fedor, 2004). As managers make decisions for coping with change, they must consider not only how the organization performs but also how employees will be affected. There is a growing interest in understanding how change is experienced by individual employees (Judge, Thoresen, Pucik & Welbourne, 1999; Turner Parish et al., 2008). Moreover, researchers (Herscovitch & Meyer, 2002) continue to investigate the role of employee commitment in organizational change situations. Herscovitch & Meyer (2002) found commitment is linked to successful change management programming, and top management must strive to understand how commitment to change plays a critical role in successful change.

A research study (Post et al., 2009) evaluated competing models of the direct and indirect effects of work interference with family (WIF) and family interference with work (FIW) on two turnover intentions relevant to scientists and engineers: (1) leaving R& D for non-R&D work within the same organization, and (2) leavings one's organization for another one. According to Post et al.'s (2009), findings supported the fact that FIW indirectly (but not directly) affected the

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intent to change in the organization's work dissatisfaction due to these change efforts. However, contrary to expectations from the stress management model, they found there neither direct nor indirect relationships between WIF and turnover intentions. The implications of this study suggest organizations that help employees manage the effects of FIW on work dissatisfaction may be able to reduce the turnover among their technical workforce, thus the organization shows little or less resistance.

In a case study identifying resistance in managing change, Trader-Leigh (2002) examined stakeholder attitudes about change and resistance to change in a management initiative within the United States' State Department. The survey interview population consisted of 38 state department and federal agency executives and senior foreign affairs officers. Of those interviewed, 23 (65%) were state department employees and one former State Department Under-Secretary and 11 (32%) were federal agency personnel. A total of 600 survey questionnaires were distributed to 35 embassies in six global regions as defined by the United States' State Department's global database (Europe, Near East, Africa, Asia, South Asia, and Western Hemisphere). Trader-Leigh (2002) posits resistance to change may be an obstacle to successful implementation of reinvention initiatives based on how individuals and organizations perceived their goals will be affected by the change. He also suggests this study improved identification and understanding of the underlying factors of resistance, and may improve implementation outcomes. Therefore, according to Trader-Leigh (2002), major organizational changes or innovations can anticipate resistance, especially if proposed changes alter values and visions related to the existing order. Programs that satisfy one group often reduce satisfaction of other groups because of the survival of one set of values and visions may be at the expense of the other. Trader-Leigh (2002) identified constructs and dynamics of resistance that can undermine

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organizational change and suggests that resistance effects should be assessed and managed as a part of the implementation strategy.

According to Van Dam, Oreg, and Schyns (2008), in the last decade, researchers have started to investigate the psychological processes that are involved in employees' experiences of organizational change. Van Dam et al. (2008) examined how characteristics of the daily work context related to employees' resistance to change through aspects of the change process. The results supported the research model, showing that the relationships of leader-member exchange and perceived development climate with employees' resistance to a merge were fully mediated by three change process characteristics (i.e., information, participation, and trust in management). In addition, two individual-level characteristics (i.e., openness to job changes, and organizational tenure) showed significant relationships with resistance to change. However, the employee's role was not related to resistance. Together, the results suggest a number of ways in which organizations can increase the effectiveness of their change efforts.

Piderit (2000) investigated employees' thoughts concerning organizational changes in a large housing corporation in the Netherlands. At the time of the study, employees were experiencing several organizational changes as a result of a merger between two housing corporations. Five hundred questionnaires were distributed and 235 usable responses (47%) were received. Results indicated resistance to change can severely hamper the change process Resistance to change has been associated with negative outcomes such as reduced satisfaction, productivity, and psychological well-being, and increased theft, absenteeism, and turnover (Bordia, Hunt, Paulsen, Tourish & DiFonso, 2004) resulting in a growing interest in the psychological processes that are involved in employees' experiences of organizational change (Oreg, 2006; Schyns, 2004; Stanley, Meyer & Topolnystsky, 2005; Van Dam, 2005).

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Wanberg & Banas (2000) examined how characteristics of the daily work context are related to employees' attitudes towards a large-scale organizational change. Examination of Wanberg & Banas's (2000) results tied employees' reactions to change to characteristics of the change process, such as management's provision of information concerning change, and the extent to which employees participate. Less attention has been given to the daily work context within which change takes place. However, the daily context may be crucial for the success of change efforts because this is ultimately where the implementation of change programs takes place and where leaders, as change agents, face their followers (Bommer, Rich & Rubin, 2005). Context characteristics, such as leadership and organizational climate, are likely to affect how change is implemented, and consequently, how employees react to change.

While the failure of a planned organizational change may be due to many factors, few are as important as employees' reactions to the change (Coch & French, 1948; Van Dam, Oreg & Schyns, 2008). Thus, change efforts that take employees' reactions into account may prevent resistance to the change from developing, while at the same time may enhance employees' psychological well-being (Bordia, Hunt, Paulsen, Tourish & DiFonzo, 2004; Fugate, Kinicki & Scheck, 2002).

Nevertheless, empirical research on the psychological processes involved in organizational change typically took a macro systems oriented approach (Judge, Thoresen, Pucik & Welbourne, 1999; Van Dam et al., 2008). In the last decade researchers have begun to study the psychological process of change using a variety of approaches to understanding employees' reactions to change. Some researchers focused on employees' resistance to organizational change (Oreg, 2006; Stanley, Meyer & Topolnytsky, 2005), while others focused on openness to proposed changes (Wanberg & Banas, 2000).

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According to Van Dam's et al. (2008) review of earlier empirical research reveals that resistance to change has been conceptualized in three ways: (1) as a cognitive state, (2) as an emotion, and (3) as a behavioral intention (Piderit, 2000). For example, one study indicated employees may develop a negative posture towards organizational change, thus forming negative interpretations of the change (Stanley, Meyer & Topolnytsky, 2005). Further observations by Van Dam et al. (2008) posit other studies addressed employees' affective reactions, such as feeling agitated, anxious and even depressed as a result of planned organizational changes (Bordia, Hunt, Paulsen, Tourish & Difonzo, 2004). Finally, Piderit (2000) identified a range of various overt behavioral resistances to change, ranging from expressions of concern to their peers or supervisors, to more severe actions such as slowdowns, strikes, or sabotage by employees. Each of these different conceptualizations has its merits, because they consider resistance to change to be a multidimensional attitude consisting of cognitive, affective, and behavioral components. A multidimensional view of resistance encompasses both employees' behavioral responses to change and their internal (i.e., cognitive and affective) reactions, and thus provides for an inclusive assessment of resistance (Van Dam et al., 2008).

According to Oreg (2006), current thinking about change management emphasizes that employee acceptance of change is enhanced by characteristics of the change process. The timely and accurate provision of information, opportunities for participation, and the diffusion of trust in management's vision underlying the change have all been noted as potential alleviators of employees' resistance to change (Bordia, Hunt, Paulsen, Tourish & Difonzo, 2004).

Trust in those leading change is also considered to be an important aspect of the change process, and a prerequisite for employees' cooperation with the change (Kotter, 2006). Trust has been widely recognized as a vital component of effective and satisfactory relationships among

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employees, and a critical element for an organization's success (Caldwell & Clapham, 2003; Rouseau, Sitkin, Burt & Camerer, 1998) Empirical research (Dirks & Ferrin, 2002) has demonstrated the effects of trust on a variety of employee behaviors, including organizational citizenship behavior and performance. With respect to organizational change, it is repeatedly emphasized employees need to have confidence in management's reliability and integrity, and need to accept management's vision for change efforts to succeed (Li, Boehm, & Osterwell, 2006). If employees have little faith in those who are responsible for the change, they may alienate themselves from the change and react with fear and resistance (Kotter, 2006; Dribben, 2000).

Accordingly, two studies (Oreg, 2006; Stanley, Meyer & Topolnytsky, 2005) have found significant relationships between employee trust and reactions to organizational change. Thus, characteristics of the change process appear to play a key role in shaping employee's reactions to change. Employees may be more open to change when they receive timely and accurate information about the change and its implications, when they have opportunities for participation in the implementation of the change, and when they experience trust in those managing the change.

Summary

The literature continues to tout how change management is the way to transform the health care industry and becomes the necessary deliberate action to encourage, as well as ensure implementation is more palatable for clinicians, doctors and health care professionals to accept. Finally, Levy and Merry (1986) posit successful change management programs are distinguished and considered successful by their attributes, as well as by their commitment to addressing the difference between change, transition and transformation. Consequently, deploying a

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transformational change management initiative with robust and comprehensive attributes will continue to eliminating barriers to full EHRMS implementation.

This chapter provided a review of the change literature in health care and various types of EHRMS technology. It also introduced several issues surrounding technological change management implementation, its failures, as well as shortcomings of technology among clinicians, doctors and other health care professionals. Studies were reviewed to showcase plausible benefits and successes that would disprove the notion that technology is the inhibitor to broad usage among this population. The major barriers in implementation were presented as a result of the changes in the clinicians' normal practice habits, and how technology failed to support work flow and cultural factors such as lack of time or what Kirkley and Stein (2004) suggest is loyalty to the historic model of paper documentation. It was also noted comfort and/or experience with technology is less of an issue now since clinicians have more experience with computer technology. Thus, Leape and Berwick (2003) argue that numerous industry reports heralding the use of automated clinical technology are necessary to improving patient safety and reduce medical errors.

Chapter III describes the research design, description of topic examined, and description of the setting, population and sample. The design and implementation of the pilot study and procedures, focus group sessions,, research questions to be examined, and data analyses to be used in this study are presented.

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CHAPTER III

METHODOLOGY

This chapter detailed the research design, process of the study, participants and setting, procedures and context of the study, focus group sessions, research questions, and data collection and analysis procedures. This study sought to evaluate performance outcomes (e.g., Improved the patient care experience and Improved the efficiency of providers and non-providers workflow), which contributed to the implementation of an Electronic Health Records Management System (EHRMS) technological change management initiative in a healthcare organization located in an urban metropolitan area of Michigan.

Research Design

A survey and focus group-based design was planned to create both a qualitative and quantitative description and evaluate existing phenomena (i.e., performance outcomes, affect of demographic characteristics of respondents), to identify problems and/or justify current conditions and practices in the field of technology implementation, and to make recommendations for future research and practice in performance improvement. Due to unforeseen circumstances, employees were not made available to participate in focus group discussion. A contingency plan was implemented to capture qualitative data including recommendations and comments from the survey respondents. A survey-based design lent itself to descriptive purposes (Robson, 2002) and provided predictions (Borland, 2001). Resulting data was used to generalize from the sample population so that inferences could be drawn from their responses (Creswell, 2003). Further, according to Copeland, (2007, p. 66) “surveys allow for the collection of a significant amount of data in the shortest time possible. Finally, this method

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offered the most cost-effective way to collect a large amount of data from a large number of participants while maintaining participant anonymity".

This study used descriptive statistics relying on composite scores across participant work categories and sites, as well as qualitative questions allowing for comments/recommendations by respondents.

Setting

The setting for this study was a healthcare organization (St. John Providence Health System) located in a large urban metropolitan area of Michigan. There were nine medical affiliates in the Tri-county area of Detroit (St. John Hospital & Medical Center (SJHMC), Providence Hospital & Medical Center (PHMC), Providence Park Hospital (PPH), St. John Detroit Riverview Hospital (SJDRH), St. John Macomb Hospital (SJMH), St. John Oakland Hospital (SJOH), St. John River District Hospital (SJRDH), St. John North Shores Hospital (SJNSH) and St. John New Hospital (SJNH), with an approximate employee population of 9,440. This organization was deploying an Electronic Health Records Management System called (eCare) change management initiative. Selection of the healthcare organization for this study was based on the following criteria:

- Used some formal set of methods, frameworks, and tools;
- Located within the State of Michigan;
- A minimum of two years time involved in the initiative;
- Had measurable results; and
- Similar organization-wide implementation across each affiliate.

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Participants

This study included only two of the nine medical affiliates, Providence Hospital & Medical Center (PHMC) and Providence Park Novi (PPN), and work categories participating in the EHRMS change management initiative (eCare) implemented by St. John Providence Health System. The total population from these two sites was approximately 2831 employees of the St. John Providence Health System. The sample for this research study was 400 employees. Participants were randomly selected from each of the two sites and work categories was based on recommendation of an appropriate size of random samples with a 5% margin of error and a 95% confidence level assuming a population proportion of 50% by Royse, Thyer, Padgett & Logan (2006, p. 224).

Pilot Study

A pilot test of the criterion instrument, specifically designed for this study by the researcher was conducted. The pilot test determined each criterion instrument's ease of use and understanding. The pilot test was administered to 20 participants selected randomly with expectation of similar characteristics of the target population, and reflected as close as possible, the research environment conditions and procedures. The total number of pilot study participants was based on 5% of the estimated sample size (400). Changes in clarity and wording to the final research instrument were made to reflect the results and suggestions from the pilot test respondents. Figure 3 presents the pilot study evaluations by the respondents.

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Figure 3 Pilot Evaluations by Respondents

Action Item	Disposition	Issues/Concerns	Level of Criticality for Deploying Survey*
Informed Consent Form	Overall the group felt this document was useful. Commented it was rather lengthy and too detailed.	Retain the title of study, purpose, benefits, principal investigator, compensation, confidentiality, voluntary participation & questions.	1
Informed Consent Form	Ensure organization is properly identified	Change the health system to St. John Providence Health System	1
Informed Consent Form	Make changes Providence Park Novi (PPN) to Providence Park Hospital (PPH)	Need to ensure respondents can properly identify themselves	1
Demographic Questionnaire	Make changes under job classification	Eliminate medical students from Providers job classification and add to Non-Provider job classification. Add nurses to the Provider job classification area.	1
Demographic Questionnaire	Make changes to Providence Park Novi (PPN) to Providence Park Hospital (PPH) and	Ensure survey population can properly identify themselves	1
Demographic Questionnaire & Informed Consent	Want consideration for expanding population to include Administrative Areas	Add location on both the informed consent and demographic questionnaire (i.e., Corporate Services Building)	3
Research Survey	Liked the personal language written in questions 1-3. Continue the same theme for questions 4-7	Ensure each question could be owned and made personable by respondents.	1
Research Survey	Combine questions 4 & 5 the wording was primarily the same.	Consensus was to combine Questions 4 & 5.	1
Research Survey	Add contextual preamble to the questions.	Language was added to address introduction of the global imitative, software and operation of eCare	1

*Scale: 1 = “Must be Corrected”, 2 = “Needed Clarity”, 3 = “Not Critical to Change”

Twenty employees of St. John Providence Health System responded to the pilot study. The final data analysis does not reflect the data collected in the pilot test study. The pilot

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evaluation was conducted over a two-hour period in a conference room located in the Corporate Services Building of the health system complex. There was a cross-sectional representation of both Providers and Non-providers. Several of the respondents had been closely involved in the eCare implementation. The respondents appeared mixed in their level of motivation to participate in the pilot study. Generally, a consensus was obtained in all areas of evaluation.

Research Procedures

Prior to beginning the study, the VP for Research and VP for Process Improvement and Care Design announced to the service chiefs that a study would be conducted by a Doctoral Candidate from Wayne State University. Service chiefs were directed to announce the study to their staff members. Instructions concerning anonymity, time allotment to complete survey and procedures for research survey distribution and data collection were provided to the service chiefs.

The investigator randomly distributed the *Demographic Form* and *Research Survey* packet in the departmental mailboxes. Participants were instructed to complete the forms and place them in the marked collection container near the mailboxes. The investigator retrieved the collection boxes from each department. In order to promote prime return of distributed surveys, a tear-off entry was included in each survey packet. After completing the survey packet, respondents were encouraged to complete and deposit the tear-off entry blank in a separate marked container. At the conclusion of the research study, 20% of the respondents' entries were drawn. The respondents whose names were drawn received a one time cash gift in the amount of $50.00, $25.00 or $5.00.

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Criterion Instruments

Demographic Form

The *Demographic Form* developed by the researcher for this study contained nine fixed-choice questions. This demographic information (i.e., age group, gender, race/ethnicity, level of education, level of computer expertise or usage, personal access to computers, job classification, date of implementation of eCare, employment location) was used to describe the sample and to determine correlations between demographic information and the eCare change management initiative process.

Research Survey

The *Research Survey* was developed by the investigator specifically for this study. It contained ten (10) questions to be rated using a 5-point Likert scale from 1 = "Not at all" to 5 = "Very Much". The pilot study was used to established reliability for the document. Figure 4 details the research question/instrument question relationship.

Figure 4 Research Question/Survey Test Question Matrix

Research Question #	Survey Test Question:
1	1. I feel the eCare system has improved patient safety.
1	2. I feel the eCare system has improved clinical outcomes and clinical service.
2	3. I find the eCare system practical in accomplishing my job responsibilities.
2	4. Using the eCare system enables me to accomplish tasks more quickly.
2	5. Using the eCare system improves my ability to complete tasks more effectively.
2	6. Using the eCare system enhances the quality of my work.
2	7. Overall, I feel the eCare sytem has improved the organization of my workflow.
5	8. I feel I was adequately prepared or trained to participate in the eCare initiative.
5	9. I actively participated in sharing information for the eCare initiative.
5	10. I feel my knowledge and understanding of the eCare initiative is adequate.

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Research Questions

The purpose of this research project was to evaluate the impact (i.e., the patient care experience and efficiency of providers and non-providers workflow) of the Electronic Health Records Management System (EHRMS) in an urban metropolitan hospital system located in the Midwest. This research examined two of the nine medical affiliates of the St. John Providence Health System's EHRMS by determining the impact of an effective change management initiative (eCare). The five research questions this study seeks to answer are:

1. To what degree did the eCare Change Management Initiative improve the quality of the patient care experience?
2. To what degree did the eCare Change Management Initiative improve the efficiency of the providers' and non-providers' workflow?
3. Will the respondents' demographic characteristics have an impact on their rating of the improvement in efficiency of the providers' and non-providers' workflow?
4. Will the eCare Change Management Initiative improve patient satisfaction (i.e., overall rating of care)?
5. Will the eCare Change Management Initiative meet the objectives of the change management process including preparedness, understanding, and participation?

Respondents were given the opportunity to provide written recommendations and comments concerning the change management initiative. Responses to this qualitative question was analyzed through coding techniques and reflected in the recommendations for improvement in the existing system, and development of future change management initiatives. Table 5 details the research questions analyses.

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Figure 5 Research Questions Analyses

Research Question	Data Collection	Data Analysis
1. To what degree did the eCare Change Management Initiative improve the quality of the patient care experience?	Research Survey Responses	Descriptive statistics to determine mean and standard deviation. Qualitative data was examined to determine similarity in responses and estimation of causal factors.
2. To what degree did the eCare Change Management Initiative improve the efficiency of the provider's and non-providers workflow?	Research Survey Responses	Descriptive statistics to determine mean and standard deviation. Qualitative data was examined to determine similarity in responses and estimation of causal factors.
3. Will the respondents' demographic characteristics have an impact on their rating of the improvement in efficiency of the provider's and non-providers workflow?	Research Survey Responses	Pearson's chi-square statistic to determine the linear association between the respondents' demographic characteristics and their rating of the eCare's improvement in efficiency of their workflow.
4. Will the eCare Change Management Initiative improve patient satisfaction (i.e., overall rating of care)?	Pre-and-post eCare patient satisfaction (i.e., overall rating of care) figures provided by Hospital Consumer Assessment of Health Providers and Systems (HCAHPS).	A *t*-test for independent samples to compare means for the pre-and-post scores for patient satisfaction (i.e., overall rating of care) will be utilized.
5. Will the eCare Change Management Initiative meet the objectives of the change management process including preparedness, understanding, and participation?	Research Survey Responses	Descriptive statistics to determine mean and standard deviation. Qualitative data was examined to determine similarity in responses and estimation of causal factors.

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Data Collection

Data collection occurred during the winter semester of 2011. All data gathered was with explicit permission from the participants and in full compliance with both Wayne State University's Human Investigation Committee (HIC) and St John Health System's Internal Review Board (IRB) guidelines.

The Principal Investigator randomly distributed 2000 survey packets via employee mailboxes. A physical survey document, with additional tear-off sheet for raffle participation, an informed consent was included in each survey packet. Lock boxes and a separate box for collection of survey packets and raffle sheet were provided.

In order to promote prime return of distributed surveys, a tear-off entry for a raffle will be included in each survey packet. After completing the survey packet, respondents will be encouraged to complete and deposit the tear-off entry blank in a separate marked container. At the conclusion of the research study, 20% of the respondents' entries were drawn. The respondents whose names were drawn received a one time cash gift in the amount of $50.00, $25.00 or $5.00.

Data Analysis

Data was analyzed to determine the differential effects of participating in a change management initiative. The data analysis is separated into three sections. All statistical analysis was conducted utilizing IBM-SPSS for Windows (Version 19.0, IBM, Corp., 2010) computer program, and tested at an alpha of .05. Section one included descriptive statistics including frequency distributions for the nominally scaled demographic characteristics (i.e., age group, gender, race/ethnicity, level of education, level of computer expertise or usage, personal access to computers, job classification, employment location) to provide a profile of the sample.

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Descriptive statistics determined the assumption of approximate normal distribution, measures of central tendency (mean, median, and mode), and measures of variability (variance and standard deviation) was performed.

Section two used descriptive statistics to determine mean and standard deviation. Qualitative data was examined to determine similarity in responses and estimation of causal factors for Research Questions #!, 2, and 5. Research Question #3 utilized Pearson's chi-square statistic to determine the linear association between the respondents' demographic characteristics and their level of satisfaction with the eCare system.

Section three analyzed Research Question #4 utilizing a *t*-test for independent samples to compare means for the pre-and-post scores (provided by Hospital Consumer Assessment of Health Providers and Systems (HCAHPS) for patient satisfaction (i.e., overall rating of care). It is assumed any significant difference in response is due to the eCare Change Management Initiative.

Section four examined qualitative data from the recommendation/comments question on the *Research Survey*. A descriptive table was created to summarize the qualitative data. This data was used in the discussion and recommendations for future research sections of Chapter V.

Study Limitations

Classical survey research had a number of limitations. According to (Fink, 1995) the most serious weakness or concerns lie with validity and reliability of responses obtained by questions. Surveys provided both verbal descriptions of what respondent's say they do or how they feel about something. However, no matter the level of intention to accurately capture a respondents true intent, responses of a survey cannot accurately capture true intent and thus, continuing the limitations. Fink (1995) says this is particularly true for behavior contrary to

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generally accepted norms of society. He says that respondents are unwilling many times to indicate they have engaged in behavior not accepted by their group. Researchers must remind themselves of this serious limitation as they prepare items and interpret their results.

Moreover, Fowler (1993) posited surveys are inflexible and required the initial study design (the instrument and its administration of the instrument) remained unchanged throughout the data collection. Secondly, the researcher must ensure that a large number of the selected sample responds to the surveys. Fowler believed participants may find it hard to recall information or tell the truth about a controversial question. Finally, as opposed to direct observation, survey research (excluding some interview approaches) can seldom deal with "context" appropriately (Southwest Educational Development Laboratory, 2004).

Summary

This chapter provided a description of research design and conceptual framework driving the context for the survey procedure. Also, this chapter reviewed the criterion instrument and the research questions used in the data collection, as well as described the participants and setting for the pilot and research studies. Moreover, this chapter highlighted the type of analysis to be used to examine the data and the procedure for collecting both anecdotal and qualitative responses. Chapter IV presents the research design, settings used, description of the participants, research questions, and results of the statistical analyses and description of the findings from the data collected for this study.

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CHAPTER IV

RESULTS

This chapter presents the research design, settings used, description of the participants, research questions, and results of the statistical analyses and description of the findings from the data collected for this study. All statistics were examined using an alpha level of .05.

Research Design

A survey-based design was used to create both a quantitative and qualitative description and evaluate existing phenomena (i.e., performance outcomes, affect of demographic characteristics of respondents), to identify problems and/or justify current conditions and practices in the field of technology implementation, and to make recommendations for future research and practice in performance improvement. This study used descriptive statistics relying on composite scores across participant work categories and sites, as well as qualitative questions allowing for comments/recommendations by respondents.

Settings and Description of Participants

The setting for this study was a healthcare organization (St. John Providence Health System) located in a large urban metropolitan area of Michigan. Two of the nine affiliates of St. John Providence Health System Providence Hospital & Medical Center (PHMC) and Providence Park Hospital (PPH), served as settings for this study.

Demographic Characteristics

The sample consisted of 547 employees of St. John Providence Health System. Table 1 presents the distribution of respondents by hospital location.

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Table 1

Distribution of Respondents by Hospital Location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PHMC	252	46.1	46.1	46.1
	PPH	295	53.9	53.9	100.0
	Total	547	100.0	100.0	

Respondents by hospital location shows a *N* = 252 at PHMC, which provided a 46.1% participation rate and a *N* = 295 at PPH with a 53.9% participation rate and a cumulative percentage total of 100% or 27% representation of the total expected research population of 2000 employees of St. John Providence Health System. Table 2 presents the distribution of respondents by age group.

Table 2

Distribution of Respondents by Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25 yrs.	38	6.9	7.0	7.0
	26-35 yrs.	168	30.7	30.8	37.8
	36-45 yrs.	186	34.0	34.1	71.9
	46-55 yrs.	110	20.1	20.2	92.1
	56+ yrs.	43	7.9	7.9	100.0
	Total	545	99.6	100.0	
Missing	System	2	.4		
Total		547	100.0		

Respondents reporting their age group designation were *N* = 545 employees from two St. John Providence Health System facilities with an age range of: 18-25 years (*N* = 38, 6.9%), 26-35 years (*N* = 168, 30.7%), 36- 45 years (*N* = 186, 34.0%), 46-55 years (*N* = 110, 20.1%), and 56+ years (*N* = 43, 7.9%). An *N* = 2 (.4%) did not respond to the question relating to age group. Table 3 presents the distribution of respondents by gender.

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Table 3

Distribution of Respondents by Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	.5	.6	.6
	Male	170	31.1	31.3	31.8
	Female	371	67.8	68.2	100.0
	Total	544	99.5	100.0	
Missing	System	3	.5		
Total		547	100.0		

Respondents reporting their gender designation was *N* = 544 employees from two St. John Providence Health System facilities. Males represented an *N* = 170 (31.1%) and Females represented an *N* = 371 (67.8%). An *N* = 3 (.5%) did not respond to the question relating to gender. Table 4 presents distribution of respondents by job classification.

Table 4

Distribution of Respondents by Job Classification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Providers	292	53.4	53.4	53.4
	Non-Providers	255	46.6	46.6	100.0
	Total	547	100.0	100.0	

Respondents reporting their job classification designation was *N* = 547 employees from two St. John Providence Health System facilities. Providers represented an *N* = 292 (53.4%) and Non-Providers represented an *N* = 255 (46.6%). Table 5 presents distribution of respondents by race.

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Table 5

Distribution of Respondents by Race

	Frequency	Percent
White	336	61.4
Black	85	15.5
Hispanic	45	8.2
Asian or Pacific Islander	53	9.7
American Indian	7	1.3
Did Not Answer	19	3.5
Total	547	100.0

Respondents reporting their race designation were *N* = 547 (100%) employees from two St. John Providence Health System facilities. Respondents designated their race as White *N* = 336 (61.4%), Black *N* = 85 (15.5%), Hispanic *N* = 45 (8.2%), Asian or Pacific Islander *N* = 53 (9.7%), and American Indian *N* = 7 (1.3%). An *N* = 19 (3.5%) did not respond to the question relating to race. Table 6 presents distribution of respondents by level of education.

Table 6

Distribution of Respondents by Level of Education

		Frequency	Percent
	HS/GED	59	10.8
	Associates	5	.9
	Bachelors	281	51.4
	Masters	87	15.9
	Ed.Spec.	7	1.3
	Ph.D./Ed.D	31	5.7
	M.D./D.O.	69	12.6
	Total	542	99.1
Missing	System	5	.9
Total		547	100.0

Respondents reporting their level of education designation were *N* = 542 (99.1%) employees from two St. John Providence Health System facilities. Respondents designated their level of education as HS/GED (*N* = 59, 10.8%), Associates (*N* = 5, .9%), Bachelors (*N* = 281,

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51.4%), Masters (*N* = 87, 15.9%), Ed. Spec. (*N* = 7, 1.3%), Ph.D./Ed.D. (*N* = 31, 5.7%), and M.D./D.O. (*N* = 69, 12.6). An *N* = 5 (.9%) did not respond to the question relating to level of education.

Demographic Questions 7-9 depicts level of training on computers and years of actual use for either personal or professional purposes as reported by the respondents. Descriptive statistics to determine measures of variability (variance and standard deviation) are reported in Table 7.

Table 7

Descriptive Statistics for Demographic Questions 7-9

	N	Mean	Std. Error	Std. Deviation	Variance
Demographic Question #7: Have you received training on using computers?	542	1.03	.008	.190	.036
Demographic Question #8: How many years have you used the computer for personal use?	546	4.42	.041	.957	.915
Demographic Question #9: How many years have you used the computer for professional use?	546	3.99	.046	1.085	1.178
Valid N (listwise)	541				

Total number of respondents designating information concerning computer training were *N* = 542 (*M* = 1.03, *SE* = .008. *SD* = .190, *VAR* = .036). Total number of respondents designating information concerning personal computer usage *N* = 546 (*M* = 4.42, *SE* = .041, *SD* = .957, *VAR* = .915). Total number of respondents designating information concerning professional computer usage *N* = 546 (*M* = 3.99, *SE* = .046, *SD* = 1.085, *VAR* = 1.178).

Research Questions and Results

The purpose of this research project was to evaluate the impact (i.e., the patient care experience and efficiency of providers and non-providers workflow) of the Electronic Health Records Management System (EHRMS) in an urban metropolitan hospital system located in the

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Midwest. This research examined two of the nine medical affiliates of the St. John Providence Health System's EHRMS to determine the impact of an effective change management initiative (eCare).

Research Question #1:

Research Question #1 asked: To what degree did the eCare Change Management Initiative improve the quality of the patient care experience? Research Survey Questions #1 and 2 were used to answer this question. Table #8 presents the means and standard deviations for Research Survey Questions #1 and 2.

Table # 8

Descriptive Statistics for Research Survey Questions #1 & 2

	N	Mean	Std. Deviation
Research Survey Question#1: I feel the eCare system has improved patient safety.	547	3.229	1.106
Research Survey Question#2: I feel the eCare system has improved clinical outcomes and clinical services.	546	3.255	1.102
Valid N (listwise)	546		

Total number of respondents designating information concerning Research Question #1 was N = 547 (*M* = 3.229, *SD* = 1.106). Total number of respondents designating information concerning Research Question #2 was N = 546 (*M* = 3.255, *SD* = 1.102).

Descriptive statistics to determine the Quality of the Patient Care Experience overall mean and standard deviation were calculated and are presented in Table 9.

Table 9

Descriptive Statistics for Quality of the Patient Care Experience

	N	Mean	Std. Deviation
Quality of the Patient Care Experience	547	3.239	1.058
Valid N (listwise)	547		

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Total number of respondents designating information concerning Quality of the Patient Care Experience were *N* = 547 (*M* = 3.239, *SD* = 1.058). Therefore, based on the Likert scale of 1 “Not at all”, 2 “Some”, 3 “Neutral”, 4 “Mostly”, and 5 “Very Much” used, the sample as a whole rated the degree as neutral in improvement of the quality of the Patient Care Experience.

Research Question #2:

Research Question #2 asked: To what degree did the eCare Change Management Initiative improve the efficiency of the providers’ and non-providers’ workflow? Research Survey Questions #3, 4, 5, 6, and 7 were used to answer this question. Table #10 presents the means and standard deviations for Research Survey Questions #3, 4, 5, 6, and 7.

Table 10

Descriptive Statistics for Research Survey Questions #3, 4, 5, 6 & 7

	N	Mean	Std. Deviation
Research Survey Question#3: I find the eCare system practical in accomplishing my job responsibilities.	546	3.256	1.140
Research Survey Question#4: Using the eCare system enables me to accomplish tasks more quickly.	546	3.152	1.282
Research Survey Question#5: Using the eCare system improves my ability to complete tasks more effectively.	546	3.288	1.281
Research Survey Question#6: Using the eCare system enhances the quality of my work.	547	3.250	1.260
Research Survey Question#7: Overall, I fee the eCare system has improved the organization of my workflow.	547	3.252	1.256
Valid N (listwise)	545		

Total number of respondents designating information concerning Research Question #3 was N = 546 (*M* = 3.256, *SD* = 1.140). Total number of respondents designating information concerning Research Question #4 was N = 546 (*M* = 3.152, *SD* = 1.282). Total number of respondents designating information concerning Research Question #5 was N = 546 (*M* = 3.288,

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SD = 1.140). Total number of respondents designating information concerning Research Question #6 was N = 547 (*M* = 3.250, *SD* = 1.260). Total number of respondents designating information concerning Research Question #7 was N = 547 (*M* = 3.252, *SD* = 1.256).

Descriptive statistics to determine the Quality of the Patient Care Experience overall mean and standard deviation were calculated and are presented in Table 11.

Table #11

Descriptive Statistics for Efficiency of Workflow

	N	Mean	Std. Deviation
Efficiency of Workflow	547	2.035	.383
Valid N (listwise)	547		

Total number of respondents designating information concerning Efficiency of Workflow were *N* = 547 (*M* = 2.035, *SD* = .383). Therefore, based on the Likert scale of 1 "Not at all", 2 "Some", 3 "Neutral", 4 "Mostly", and 5 "Very Much" used, the sample as a whole rated the degree of improvement as some in Efficiency of Workflow.

Research Question #3:

Research Question #3 asked: Will the respondents' demographic characteristics have an impact on their rating of the improvement in efficiency of the providers' and non-providers' workflow? Pearson's chi-square statistic to determine the linear association between the respondents' demographic characteristics and their rating of the eCare's improvement in efficiency of their workflow were performed. Descriptive Statistics for Efficiency of Workflow and Respondents' Demographic Characteristics means and standard deviations are presented in Table 12.

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Table 12

Descriptive Statistics for Respondents' Efficiency of Workflow and Respondents' Demographic Characteristics

	N	Mean	Std. Deviation
Efficiency of Workflow	547	2.04	.383
Hospital Location	547	1.54	.499
Age Group	545	2.91	1.048
Gender	544	1.68	.480
Job Classification	547	1.47	.499
Race/Ethnicity	547	1.83	1.321
Level of Education	542	2.79	1.581
Valid N (listwise)	537		

Descriptive statistics for respondents' demographic characteristics are Hospital Location, M = 1.54(SD = .499), Age Group, M = 2.91(SD = 1.04), Gender, M = 1.68(SD = .480), Job Classification, M = 1.47(SD = .499), Race/Ethnicity, M = 1.83(SD = 1.321), and Level of Education, M = 2.79(SD = 1.581). Efficiency of Workflow mean is 2.04(SD = .383).

Pearson's chi-square tests were performed to determine the relationship between the respondent's demographics and efficiency of workflow data. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Hospital Location are presented in Table 13.

Table 13

Pearson's Chi-Square Test Efficiency of Workflow by Hospital Location

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.664[a]	19	.005
N of Valid Cases	547		

a. 20 cells (50.0%) have expected count less than 5. The minimum expected count is .46.

The relationship between Efficiency of Workflow and Hospital Location was X^2 (df = 19, N = 547) = 38.664, p = .005. Twenty cells (50.0%) had an expected count less than 5. The minimum expected count was .46. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable.

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Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Hospital Location. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Age are presented in Table 14.

Table 14

Pearson's Chi-Square Test Efficiency of Workflow by Age

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	229.847[a]	76	.000
N of Valid Cases	545		

a. 69 cells (69.0%) have expected count less than 5. The minimum expected count is .07.

The relationship between Efficiency of Workflow and Age was X^2 (df = 76, N = 545) = 229.847, p = .000. Sixty-nine cells (69.0%) had an expected count less than 5. The minimum expected count was .07. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable. Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Age. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Gender are presented in Table 15.

Table 15

Pearson's Chi-Square Test Efficiency of Workflow by Gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.463[a]	36	.771
N of Valid Cases	544		

a. 38 cells (66.7%) have expected count less than 5. The minimum expected count is .01.

The relationship between Efficiency of Workflow and Gender was X^2 (df = 36, N = 544) = 29.463, p = .771. Thirty-eight cells (66.7%) had an expected count less than 5. The minimum

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expected count was .01. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable. Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Gender. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Job Classification are presented in Table 16.

Table 16

Pearson Chi-Square Test Efficiency of Workflow by Job Classification

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.826[a]	19	.203
N of Valid Cases	547		

a. 20 cells (50.0%) have expected count less than 5. The minimum expected count is .47.

The relationship between Efficiency of Workflow and Job Classification was X^2 (df = 19, N = 547) = 23.826, p = .203. Twenty cells (50.0%) had an expected count less than 5. The minimum expected count was .47. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable. Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Job Classification. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Race/Ethnicity are presented in Table 17.

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Table 17

Pearson's Chi-Square Test Efficiency of Workflow by Race/Ethnicity

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	574.598[a]	114	.000
N of Valid Cases	547		

a. 114 cells (81.4%) have expected count less than 5. The minimum expected count is .00.

The relationship between Efficiency of Workflow and Race/Ethnicity was X^2 (df = 114, N = 547) = 574.598, p = .000. One hundred fourteen cells (81.4%) had an expected count less than 5. The minimum expected count was .00. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable. Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Race/Ethnicity. Results of the Pearson's chi-square statistic for Efficiency of Workflow by Level of Education are presented in Table 18.

Table 18

Pearson's Chi-Square Test Efficiency of Workflow by Level of Education

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	481.796[a]	112	.000
N of Valid Cases	542		

a. 108 cells (79.4%) have expected count less than 5. The minimum expected count is .01.

The relationship between Efficiency of Workflow and Level of Education was X^2 (df = 112, N = 542) = 481.796, p = .000. One hundred eight cells (79.4%) had an expected count less than 5. The minimum expected count was .01. Since the expected frequencies were above 20%, approximation to the chi-square distribution broke down and is not normally acceptable.

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Since some of the Efficiency of Workflow and Demographic Characteristics expected frequencies were above 20% for all of the Pearson's Chi-square tests, the approximation to the chi-square distributions broke down and is not normally acceptable (Runyon & Haber, 1988). Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results. Therefore, no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Demographic Characteristics data. Research Question #3 remains unanswered.

Research Question #4

Research Question #4 asked: Will the eCare Change Management Initiative improve patient satisfaction (i.e., overall rating of care)? A *t*-test for independent samples to compare means for the pre-and-post scores for patient satisfaction (i.e., overall rating of care) was proposed for this study. Due to unforeseeable circumstances (i.e., change-over to new vendor responsible for gathering data), pre-and-post eCare patient satisfaction (i.e., overall rating of care) figures could not be provided by the research site. Therefore, research question #4 remains unanswered.

Research Question #5

Research Question #5 asked: Will the eCare Change Management Initiative meet the objectives of the change management process including preparedness, understanding, and participation? Means for Research Survey Questions #8-10 were calculated to determine Respondents' Preparedness overall mean and standard deviation statistics. Results of this calculation are presented in Table 19.

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Table 19

Descriptive Statistics for Respondents' Preparedness

	N	Mean	Std. Deviation
Respondents' Preparation	547	3.390	.986
Valid N (listwise)	547		

Total number of respondents designating information concerning Respondents' Preparedness were N = 547 (M = 3.390, SD = .986). Therefore, based on the Likert scale of 1 "Not at all", 2 "Some", 3 "Neutral", 4 "Mostly", and 5 "Very Much" used, the sample as a whole rated the degree of preparedness, understanding, and participation in the eCare Change Management Initiative as neutral.

Research Questions Symmetric Analyses

Symmetric measures (Pearson's and Spearman's test of correlations) were performed to determine if there were statistically significant relationships between the Respondents' Demographic Characteristics and their answers on the Demographic Questions and Research Survey Questions. Following is a description of the statistically significant Pearson r and Spearman r_s correlations for the analyses of the Respondents' Demographic Characteristics and their answers on the Research Survey Questions.

Research Survey Question #1

Pearson r and Spearman r_s correlations determined there were statistically significant relationships between Age Group, Job Classification and Respondents' answers on Research Survey Question #1. Table 20 presents the Descriptive Statistics for Age Group and Job Classification by Research Survey Question #1.

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Table 20

Descriptive Statistics Age Group & Job Classification by Research Survey Question #1

Research Survey Question #1: I feel the eCare system has improved patient safety.						
Age Group	Not at All	Some	Neutral	Mostly	Very Much	Total
18-25 yrs.	0	6	9	18	5	38
% within Research Survey Question #1	.0%	4.8%	10.7%	6.9%	13.9%	7.0%
26-35 yrs.	8	43	28	80	9	168
% within Research Survey Question #1	19.0%	34.7%	33.3%	30.9%	25.0%	30.8%
36-45 yrs.	10	42	23	103	8	186
% within Research Survey Question #1	23.8%	33.9%	27.4%	39.8%	22.2%	34.1%
46-55 yrs.	15	25	20	42	8	110
% within Research Survey Question #1	35.7%	20.2%	23.8%	16.2%	22.2%	20.2%
56+ yrs.	9	8	4	16	6	43
% within Research Survey Question #1	21.4%	6.5%	4.8%	6.2%	16.7%	7.9%
Total	42	124	84	259	36	545
% within Research Survey Question #1	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Job Classification	Not at All	Some	Neutral	Mostly	Very Much	Total
Providers	34	63	44	136	15	292
% within Research Survey Question #1	81.0%	50.8%	52.4%	52.1%	41.7%	53.4%
Non-Providers	8	61	40	125	21	255
% within Research Survey Question #1	19.0%	49.2%	47.6%	47.9%	58.3%	46.6%
Total	42	124	84	261	36	547
% within Research Survey Question #1	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Respondents in the 36-45 yr. (34.1%) Age Group and providers (53.4%) Job Classification rated Research Question #1 more frequently in the “mostly” category concerning their feelings that the eCare system had improved patient safety. Table 21 presents the results of the correlation analyses of Age Group and Job Classification by Research Survey Question #1.

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Table 21

Symmetric Measures Age Group & Job Classification by Research Survey Question #1

Age Group		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.103	.045	-2.417	.016[c]
Ordinal by Ordinal	Spearman Correlation	-.079	.045	-1.851	.065[c]
N of Valid Cases		545			

Job Classification		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.105	.042	2.469	.014[c]
Ordinal by Ordinal	Spearman Correlation	.093	.042	2.188	.029[c]
N of Valid Cases		547			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

The correlations were statistically significant for Age Group (r=-.103, p=.016, r_s=-.079, p=.065) and Job Classification (r=-.105, p=.014, r_s=-.093, p=.029) by Research Survey Question #1. The strength of the associations for Age Group and Job Classification by Research Survey Question #1 are considered small and weak (Rosenthal, 2001). Figure 6 & 7 presents pictorial descriptions of the distribution of Respondents Age Group and Job Classification by Research Survey Question #1.

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Figure 6 Descriptive Statistics Age Group by Research Survey Question #1

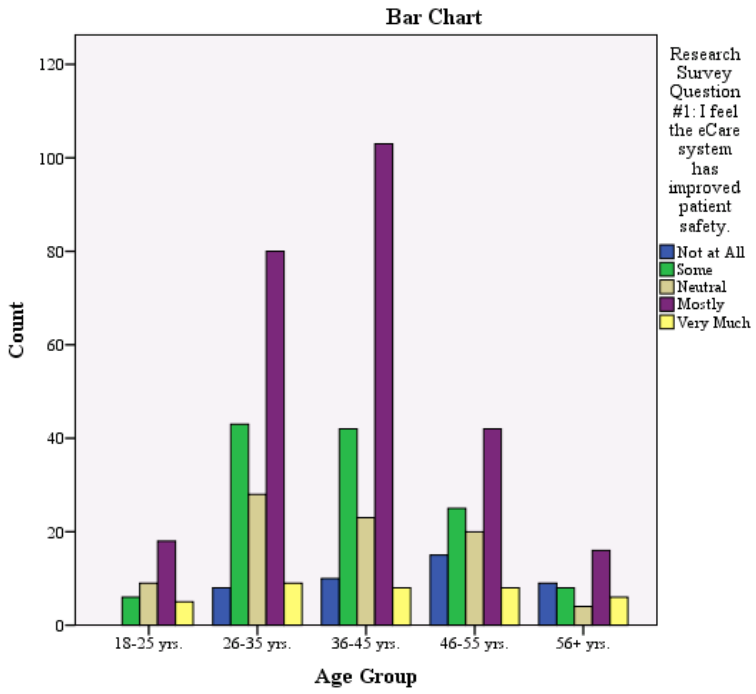
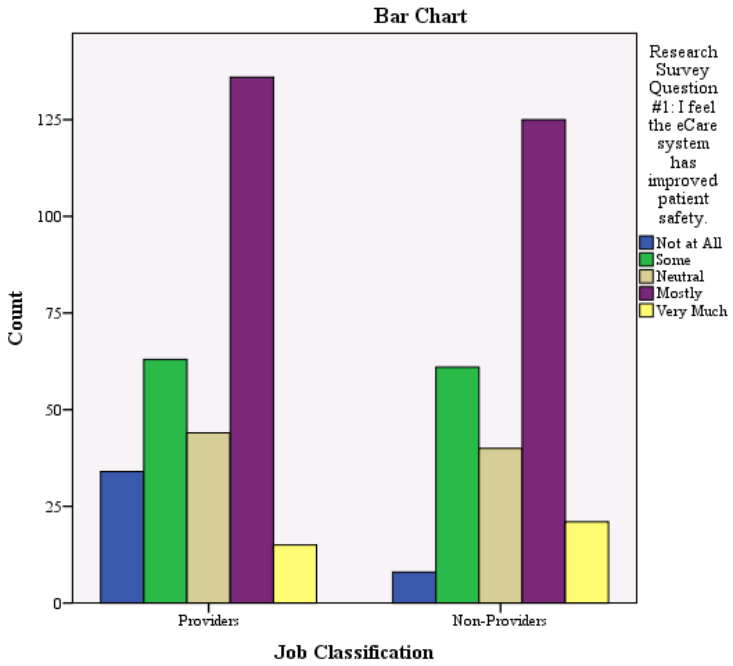


Figure 7 Descriptive Statistics Job Classification by Research Survey Question #1



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Research Survey Question #2

Pearson r and Spearman r_s correlations determined there was a statistically significant relationship between Job Classification and Respondents' answers on Research Survey Question #2. Table 22 presents the Descriptive Statistics for Job Classification by Research Survey Question #2.

Table 22

Descriptive Statistics Job Classification by Research Survey Question #2

	Research Survey Question #2: I feel the eCare system has improved clinical outcomes and clinical services.					
Job Classification	Not at All	Some	Neutral	Mostly	Very Much	Total
Providers	25	72	49	124	21	291
% within Research Survey Question #2	71.4%	55.8%	55.1%	50.0%	46.7%	53.3%
Non-Providers	10	57	40	124	24	255
% within Research Survey Question #2	28.6%	44.2%	44.9%	50.0%	53.3%	46.7%
Total	35	129	89	248	45	546
% within Research Survey Question #2	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Respondents in the providers (50.0%) Job Classification rated Research Question #2 more frequently in the "mostly" category concerning their feelings that the eCare system had improved clinical outcomes and clinical services. Table 23 presents the results of the correlation analyses of Job Classification by Research Survey Question #2.

Table 23

Symmetric Measures Job Classification by Research Survey Question #2

Job Classification		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.100	.042	2.352	.019[c]
Ordinal by Ordinal	Spearman Correlation	.096	.042	2.249	.025[c]
N of Valid Cases		546			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

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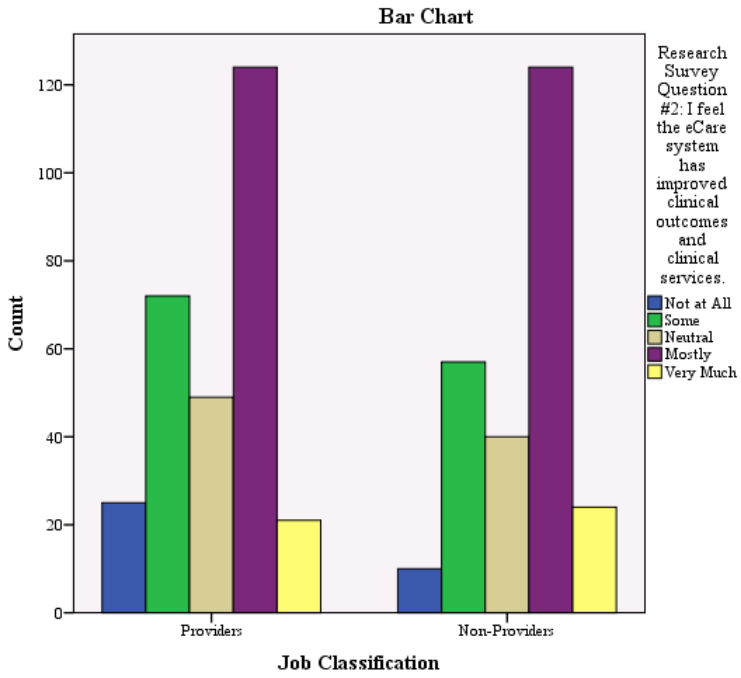
The correlations were statistically significant for Job Classification (r=.100, p=.019, r_s=-.096, p=.025) by Research Survey Question #2. The strength of the association for Job Classification by Research Survey Question #2 is considered small and weak (Rosenthal, 2001). Figure 8 presents a pictorial description of the distribution of Respondents by Job Classification by Research Survey Question #2.

Figure 8 Descriptive Statistics Job Classification by Research Survey Question #2



Research Survey Question #3

Pearson r and Spearman r_s correlations determined there were statistically significant relationships between Age Group, Demographic Question #7 and Respondents' answers on Research Survey Question #3. Table 24 presents the Descriptive Statistics for Age Group and Demographic Question #7 by Research Survey Question #3.

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Table 24

Descriptive Statistics Age Group & Demographic Question #7 by Research Survey Question #3
Research Survey Question #4: Using the eCare system enables me to accomplish tasks more quickly.

Age Group	Not at All	Some	Neutral	Mostly	Very Much	Total
18-25 yrs.	2	5	2	19	10	38
% within Research Survey Question #3	5.7%	3.5%	2.7%	8.0%	17.9%	7.0%
26-35 yrs.	9	43	21	82	13	168
% within Research Survey Question #3	25.7%	30.5%	28.0%	34.6%	23.2%	30.9%
36-45 yrs.	8	56	24	80	18	186
% within Research Survey Question #3	22.9%	39.7%	32.0%	33.8%	32.1%	34.2%
46-55 yrs.	11	33	17	40	9	110
% within Research Survey Question #3	31.4%	23.4%	22.7%	16.9%	16.1%	20.2%
56+ yrs.	5	4	11	16	6	42
% within Research Survey Question #3	14.3%	2.8%	14.7%	6.8%	10.7%	7.7%
Total	35	141	75	237	56	544
% within Research Survey Question #3	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Demographic Question #7*	**Not at All**	**Some**	**Neutral**	**Mostly**	**Very Much**	**Total**
Missing	0	0	0	0	2	2
% within Research Survey Question #3	.0%	.0%	.0%	.0%	3.6%	.4%
Yes	32	132	70	234	53	521
% within Research Survey Question #3	97.0%	93.6%	94.6%	98.7%	94.6%	96.3%
No	1	9	4	3	1	18
% within Research Survey Question #3	3.0%	6.4%	5.4%	1.3%	1.8%	3.3%
Total	33	141	74	237	56	541
% within Research Survey Question #3	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Have you received training on using computers?

Respondents in the 36-45 yr. (33.8%) Age Group rated Research Question #3 more frequently in the "mostly" category concerning their feelings that the eCare system was practical in accomplishing their job responsibilities. Respondents who answered "yes" (98.7%) for Demographic Question #7 and received training on using computers rated Research Question #3 as "mostly" concerning their feelings that the eCare system was practical in accomplishing their job responsibilities. Table 25 presents the results of the correlation analyses of Age Group and Demographic Question #7 by Research Survey Question #3.

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Table 25

Symmetric Measures Age Group & Demographic Question #7 by Research Survey Question #3

Age Group		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.098	.044	-2.287	.023[c]
Ordinal by Ordinal	Spearman Correlation	-.103	.044	-2.407	.016[c]
N of Valid Cases		544			

Demographic Question #7		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.122	.041	-2.848	.005[c]
Ordinal by Ordinal	Spearman Correlation	-.128	.041	-2.993	.003[c]
N of Valid Cases		541			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

The correlations were statistically significant for Age Group (r=-.098, p=.023, r_s=-.103, p=.016) and Demographic Question #7 (r=-.122, p=.005, r_s=-.128, p=.003) by Research Survey Question #3. The strength of the associations for Age Group and Demographic Question #7 by Research Survey Question #3 are considered small and weak (Rosenthal, 2001). Figure 9 & 10 presents pictorial descriptions of the distribution of Respondents by Age Group and Demographic Question #7 by Research Survey Question #3.

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Figure 9 Descriptive Statistics Age Group by Research Survey Question #3

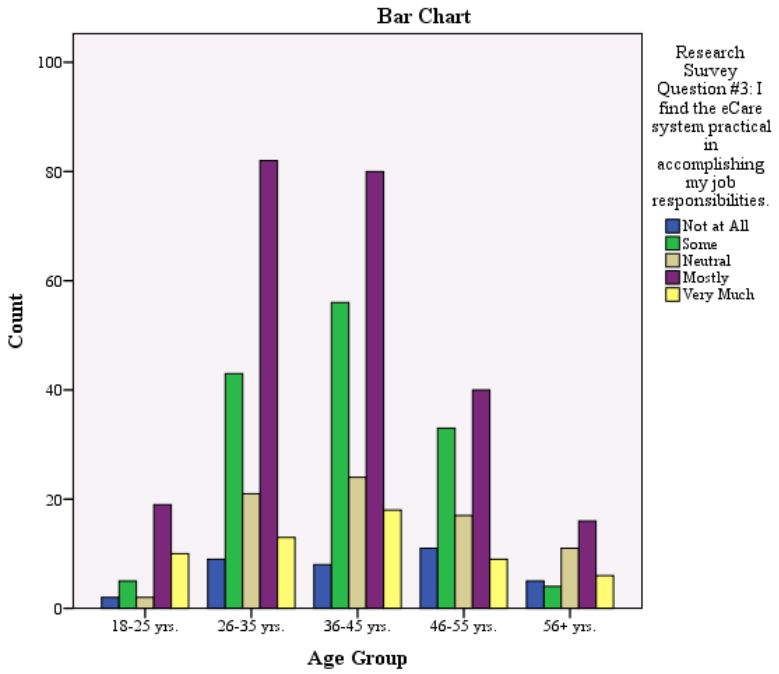
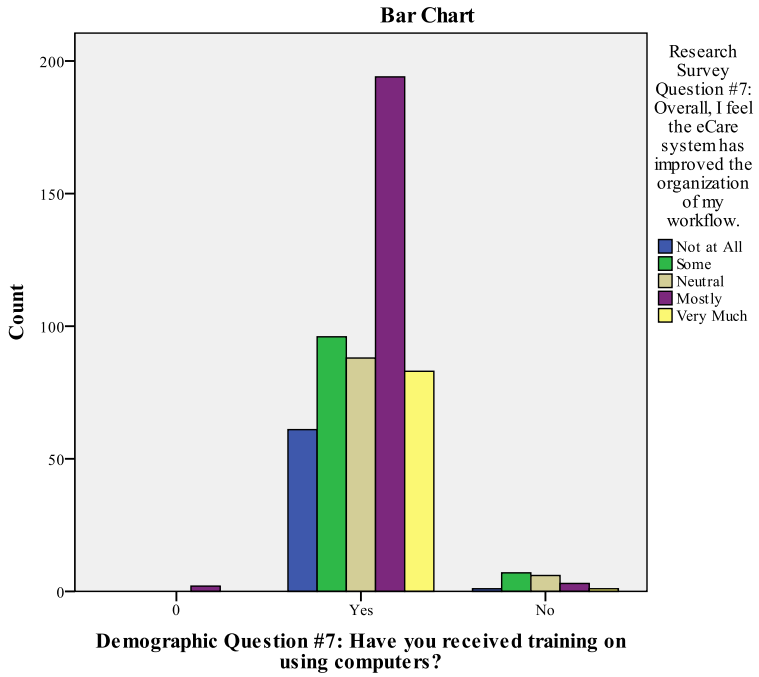


Figure 10 Descriptive Statistics Demographic Question #7 by Research Survey Question #3



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Research Survey Question #4

Pearson r and Spearman r_s correlations determined there was a statistically significant relationship between Age Group and Respondents' answers on Research Survey Question #4. Table 26 presents the Descriptive Statistics for Age Group by Research Survey Question #4.

Table 26

Descriptive Statistics Age Group by Research Survey Question #4

Research Survey Question #4: Using the eCare system enables me to accomplish tasks more quickly.

Age Group	Not at All	Some	Neutral	Mostly	Very Much	Total
18-25 yrs.	2	5	4	14	13	38
% within Research Survey Question #4	2.9%	4.2%	3.9%	8.4%	15.1%	7.0%
26-35 yrs.	19	36	39	56	18	168
% within Research Survey Question #4	27.5%	30.0%	38.2%	33.5%	20.9%	30.9%
36-45 yrs.	19	52	28	55	32	186
% within Research Survey Question #4	27.5%	43.3%	27.5%	32.9%	37.2%	34.2%
46-55 yrs.	20	23	22	30	15	110
% within Research Survey Question #4	29.0%	19.2%	21.6%	18.0%	17.4%	20.2%
56+ yrs.	9	4	9	12	8	42
% within Research Survey Question #4	13.0%	3.3%	8.8%	7.2%	9.3%	7.7%
Total	69	120	102	167	86	544
% within Research Survey Question #4	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Respondents in the 26-35 yr. (38.2%) Age Group rated Research Question #4 more frequently in the "neutral" category concerning their feelings that the eCare system enabled them to accomplish tasks more quickly. Table 27 presents the results of the correlation analyses of Age Group by Research Survey Question #4.

Table 27

Symmetric Measures Age Group by Research Survey Question #4

Age Group		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.087	.044	-2.038	.042[c]
Ordinal by Ordinal	Spearman Correlation	-.080	.044	-1.857	.064[c]
N of Valid Cases		544			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

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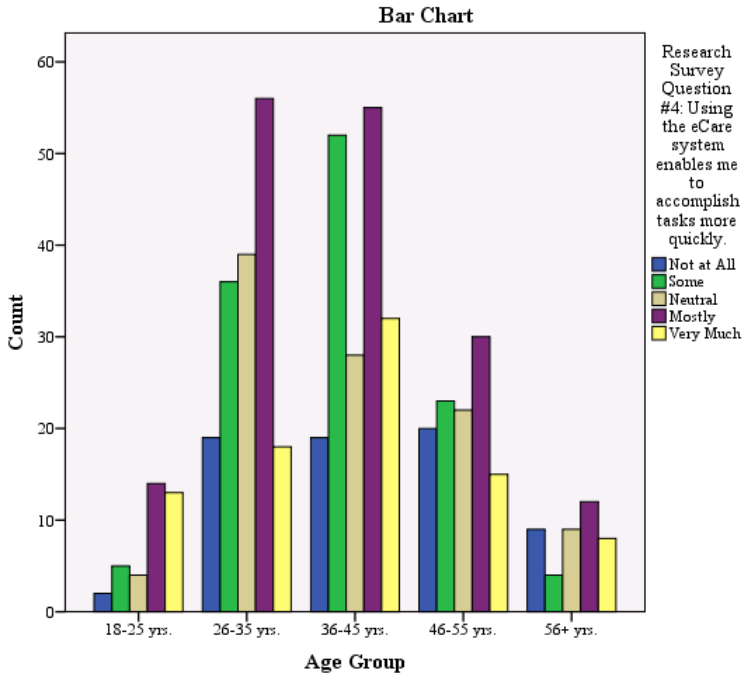
The correlations were statistically significant for Age Group (r=-.087, p=.042, r_s=-.080, p=.064) for Research Survey Question #4. The strength of the association of Age Group by Research Survey Question #4 is considered small and weak (Rosenthal, 2001). Figure 11 presents a pictorial description of the distribution of Respondents by Age Group by Research Survey Question #4.

Figure 11 Descriptive Statistics Age Group by Research Survey Question #4



Research Survey Question #5

Pearson r and Spearman r_s correlations determined there were no statistically significant relationships between Respondents' Demographic Characteristics and their answers on the Demographic Questions, Research Survey Questions and Respondents' answers on Research Survey Question #5.

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Research Survey Question #6

Pearson r and Spearman r_s correlations determined there was a statistically significant relationship between Age Group and Respondents' answers on Research Survey Question #6. Table 28 presents the Descriptive Statistics for Age Group by Research Survey Question #6.

Table 28

Descriptive Statistics Age Group by Research Survey Question #6

Research Survey Question #6: Using the eCare system enhances the quality of my work.						
Age Group	Not at All	Some	Neutral	Mostly	Very Much	Total
18-25 yrs.	1	4	6	17	10	38
% within Research Survey Question #6	1.5%	4.3%	5.7%	8.8%	11.8%	7.0%
26-35 yrs.	20	25	38	63	22	168
% within Research Survey Question #6	29.4%	26.9%	36.2%	32.5%	25.9%	30.8%
36-45 yrs.	17	42	35	58	34	186
% within Research Survey Question #6	25.0%	45.2%	33.3%	29.9%	40.0%	34.1%
46-55 yrs.	22	16	20	42	10	110
% within Research Survey Question #6	32.4%	17.2%	19.0%	21.6%	11.8%	20.2%
56+ yrs.	8	6	6	14	9	43
% within Research Survey Question #6	11.8%	6.5%	5.7%	7.2%	10.6%	7.9%
Total	68	93	105	194	85	545
% within Research Survey Question #6	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Respondents in the 26-35 yr. Age Group (45.2%) rated Research Question #6 more frequently in the "mostly" category concerning their feelings that the eCare system enhanced the quality of their work. Table 29 presents the results of the correlation analyses of Age Group by Research Survey Question #6.

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Table 29

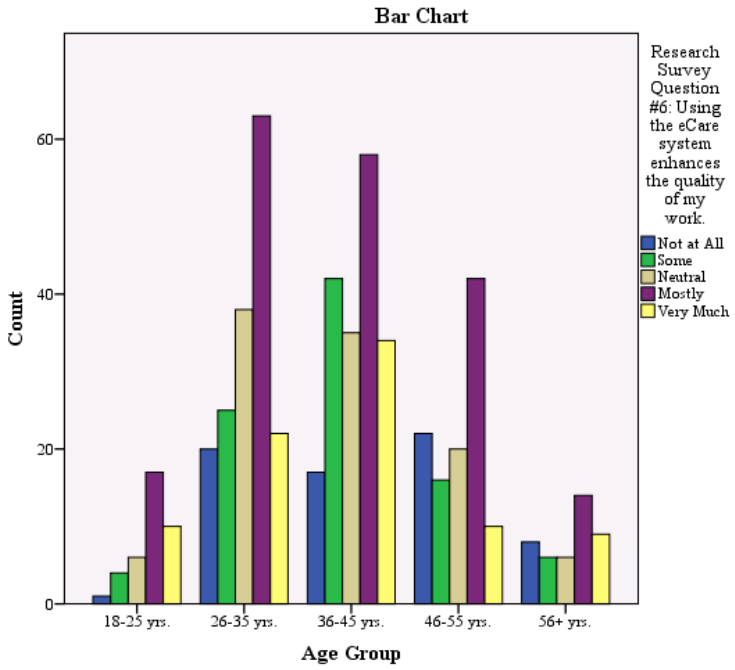
Symmetric Measures Age Group by Research Survey Question #6

Age Group		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.097	.043	-2.282	.023[c]
Ordinal by Ordinal	Spearman Correlation	-.087	.043	-2.034	.042[c]
N of Valid Cases		545			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

The correlations were statistically significant for Age Group (r=-.097, p=.023, r_s=-.087, p=.042) for Research Survey Question #6. The strength of the association of Age Group by Research Survey Question #6 is considered small and weak (Rosenthal, 2001). Figure 12 presents a pictorial description of the distribution of Respondents by Age Group by Research Survey Question #6.

Figure 12 Descriptive Statistics Age Group by Research Question #6



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Research Survey Question #7

Pearson r and Spearman r_s correlations determined there were no statistically significant relationships between Respondents' Demographic Characteristics and their answers on the Demographic Questions, Research Survey Questions and Respondents' answers on Research Survey Question #7.

Research Survey Question #8

Pearson r and Spearman r_s correlations determined there were no statistically significant relationships between Respondents' Demographic Characteristics and their answers on the Demographic Questions, Research Survey Questions and Respondents' answers on Research Survey Question #8.

Research Survey Question #9

Pearson r and Spearman r_s correlations determined there were no statistically significant relationships between Respondents' Demographic Characteristics and their answers on the Demographic Questions, Research Survey Questions and Respondents' answers on Research Survey Question #9.

Research Survey Question #10

Pearson r and Spearman r_s correlations determined there were no statistically significant relationships between Respondents' Demographic Characteristics and their answers on the Demographic Questions, Research Survey Questions and Respondents' answers on Research Survey Question #10.

Qualitative Data

Respondents were given the opportunity to write comments/recommendations concerning eCare at the conclusion of the Research Survey. This qualitative data was analyzed by reading

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through the responses, developing codes or themes, numbering the codes/themes, by making connections between discrete pieces of qualitative data (Williams, 2007). Coding was performed in order to gain an understanding of the inquiry issue, how respondents perceived the issue under review, and the nature and types of relationships involved. Coding is a process of reducing the data into smaller groupings so they are more manageable. The process also helps researchers to begin to see relationships between these categories and patterns of interaction (Williams, 2007).

The codes served as the sub-categories of the major themes, Patient Care Experience, Efficiency of Workflow, and Respondents' Preparedness, examined by this research study. Some sub-categories required designation under more than one major theme. Ten sub-category codes were developed based on predefined themes that emerged from the data. Some responses required designation under more than one sub-category. The sub-category codes developed for this study were:

- Poor Communication (PC)
- Time Consuming (TC)
- System Not User Friendly (SNUF)
- Poor Training (PT)
- Poor System Operation (PSO)
- No Standardization (NS)
- Poor Workflow (PW)
- Reduces Patient Care (RPC)
- Inhibits Safety (IS)
- Component Addition (CA)

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Table 30 presents the summary of the analysis of the qualitative data for Patient Care Experience as reported by 78 respondents who chose to complete the comments/recommendation question listed at the conclusion of the Research Survey.

Table 30

Summary of Analysis of Qualitative Data for Patient Care Experience by Sub-Category

Patient Care Experience									
PC	TC	SNUF	PT	PSO	NS	PW	RPC	IS	Totals
19	46	43	15	33	18	14	34	34	256
7%	18%	17%	6%	13%	7%	6%	13%	13%	100%

Legend: PC "Poor Communication", TC "Time Consuming", SNUF "System Not User Friendly", PT "Poor Training", PSO "Poor System Operation", NS "No Standardization", PW "Poor Workflow", RPC "Reduces Patient Care", IF "Inhibits Safety", CA "Component Addition"

Table 31 presents the summary of the analysis of the qualitative data for Efficiency of Workflow as reported by 78 respondents who chose to complete the comments/recommendation question listed at the conclusion of the Research Survey.

Table 31

Summary of Analysis of Qualitative Data for Efficiency of Workflow by Sub-Category

Efficiency of Workflow								
PC	TC	SNUF	PSO	NS	PW	RPC	IS	Totals
19	46	43	33	18	14	34	34	241
7%	19%	18%	14%	8%	6%	14%	14%	100%

Legend: PC "Poor Communication", TC "Time Consuming", SNUF "System Not User Friendly", PT "Poor Training", PSO "Poor System Operation", NS "No Standardization", PW "Poor Workflow", RPC "Reduces Patient Care", IF "Inhibits Safety", CA "Component Addition"

Table 32 presents the summary of the analysis of the qualitative data for Respondents' Preparedness as reported by 78 respondents who chose to complete the comments/recommendation question listed at the conclusion of the Research Survey.

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Table 32

Summary of Analysis of Qualitative Data for Respondents' Preparedness by Sub-Category

Respondents' Preparedness				
PT	PSO	PW	CA	Totals
15	33	14	1	63
24%	52%	22%	2%	100%

Legend: PC "Poor Communication", TC "Time Consuming", SNUF "System Not User Friendly", PT "Poor Training", PSO "Poor System Operation", NS "No Standardization", PW "Poor Workflow", RPC "Reduces Patient Care", IF "Inhibits Safety", CA "Component Addition"

Seventy-eight respondents chose to complete the comments/recommendation question listed at the conclusion of the Research Survey. Four hundred sixty-nine participants did not respond to the comments/recommendation question.

Summary

Chapter IV presented the research design, settings used, description of the participants, research questions, and results of the statistical analyses and description of the findings from the data collected for this study. Chapter V provides a summary of the research study, consideration of the assumptions and limitations, discussion of the results and conclusions drawn regarding the research questions, implications for the field of change management, and recommendations for future research.

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CHAPTER V

SUMMARY AND DISCUSSION

This chapter presents a brief overview of the problem addressed, relevant literature to the outcome of this research, and methodologies and procedures implemented in this study. This chapter also provides a summary and discussion of the results pertinent to each research question and recommendations for future research in the area of change management.

Introduction

The purpose of this research was to examine a case study by evaluating performance outcomes of a technology change management initiative in a health care organization. This study was developed with an array of issues surrounding change management programs with technology platforms, the management of complex change and the amount of criticism that became the impetus behind the implementation of the Electronic Health Records Management Systems (EHRMS) across the healthcare industry and its long-term transformative effects. Despite recognition that user response largely determined the success of a technology implementation or change management program and the fact significant resources are spent on strategic programs to promote acceptance, there was very little research in terms of evaluating performance outcomes which make a change management program more successful in health care settings (Kirkley & Stein, 2004).

The researcher used the Technology Acceptance Model (TAM, Davis, 1980) model revised to fit research and presented it as a Modified Technology Acceptance version of a technology change management program. Various attributes have been identified within the literature review as the most common and significant in implementing a successful technological change management effort, thus providing a body of knowledge hailed as leading conjecture in

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the industry. Therefore, this study utilized the Modified TAM model to examine the impact of implementing the eCare change management program in two metropolitan area hospital settings. Performance outcomes, as well as external demographic variables were determined to obtain value in driving change.

Restatement of the Problem

Studies of organizational change were preoccupied with the changes, rather than analyzing the change process (Pettigrew, Ferlie & McKee, 1992). According to Boonstra (1997), too much attention is being placed on the change in organizations and not on how to ensure effective change is accomplished (i.e., the process).

Hornstein (2008) posited organizations believed only through technological innovation alone, can survival and prosperity be obtained. This seemed to be the same tag line given by many technology consultants and sales representatives to manipulate IS/IT managers to market organizations a shiny new thing as a panacea to solve all their financial and organizational issues. Hornstein (2008) continued to report, that it is not the "hard" technology acquisitions by themselves that guide organizational success, but the integration of these assets into organizational change management processes that elevate the importance of the human system. That is, the integration really makes the difference. Furthermore, research has shown most IS/IT interventions are unsuccessful at integrating employee adoption issues and effectively resolving resistance to change (The Standish Group International, 2001).

While it is inevitable that the current way of managing healthcare organizations is continually changing, this researcher feels an examination of the performance outcomes of change management in healthcare is timely and speaks to the current needs in the healthcare sector. Too often, implementing enterprise-wide information technology neglects the human

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factor (Martinsons & Chong, 1999; Ives & Olsen, 1984; Willcocks & Mason, 1988). Thus, attention to organizational development and change management in IT implementation may result in a positive impact on productivity, job satisfaction, and other work attitudes. To this end, justifying the pursuit of change management effectiveness in most organizational interventions, particularly in IT initiatives, where traditionally these processes tend to turn the organization upside-down, is a far greater support mechanism (Davenport, Eccles & Prusak, 1992).

Therefore, the purpose of this research project is to evaluate the impact (i.e., the patient care experience and efficiency of Providers and Non-Providers workflow) of the Electronic Health Records Management System (EHRMS) notably eCare, in an urban metropolitan hospital system located in the Midwest. There was very little research in terms of evaluating performance outcomes which make a change management program more successful in health care settings (Kirkley & Stein, 2004).

Review of Methods and Procedures

A survey and focus group-based design was planned to create both a qualitative and quantitative description and evaluate existing phenomena (i.e., performance outcomes, affect of demographic characteristics of respondents), to identify problems and/or justify current conditions and practices in the field of technology implementation, and to make recommendations for future research and practice in performance improvement as it relates to the area of change management. Due to unforeseen circumstances, employees were not made available to participate in the planned focus group discussions.

Because of the unavailability of employees for focus groups, a contingency plan was implemented to capture qualitative data to analyze. The contingency plan provided an additional opportunity for respondents to write comments/recommendations concerning eCare at the

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conclusion of the Research Survey. These comments/recommendations were coded in categories by the major themes (Patient Care Experience, Efficiency of Workflow, and Respondents' Preparedness) and are described under the summary and discussion of findings sections later in chapter.

A survey-based design was used to create both a quantitative and qualitative description and evaluate existing phenomena (i.e., performance outcomes, affect of demographic characteristics of respondents), to identify problems and/or justify current conditions and practices in the field of technology implementation, and to make recommendations for future research and practice in performance improvement. This study used descriptive statistics relying on composite scores across participant work categories and sites, as well as qualitative questions allowing for comments/recommendations by respondents.

The setting for this study was a healthcare organization (St. John Providence Health System) located in a large urban metropolitan area of Michigan. Two of the nine affiliates of St. John Providence Health System Providence Hospital & Medical Center (PHMC) and Providence Park Hospital (PPH) served as settings for this study. The sample consisted of 547 employees of St. John Providence Health System work categories participating in the EHRMS change management initiative (eCare).

A pilot test of the criterion instrument, specifically designed for this study by the researcher was conducted. The pilot test determined each criterion instrument's ease of use and understanding. The pilot test was administered to 20 participants selected randomly with expectation of similar characteristics of the target population, and reflected as close as possible, the research environment conditions and procedures. The total number of pilot study participants was based on 5% of the estimated sample size (400). Changes in clarity and wording to the final

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research instrument were made to reflect the results and suggestions from the pilot test respondents.

Prior to beginning the study, the VP for Research and VP for Process Improvement and Care Design announced to the service chiefs a study would be conducted by a Doctoral Candidate from Wayne State University. Service chiefs were directed to announce the study to their staff members. Instructions concerning anonymity, time allotment to complete survey and procedures for research survey distribution and data collection were provided to the service chiefs.

Data collection occurred during the winter semester of 2011. All data gathered was with explicit permission from the participants and in full compliance with both Wayne State University's Human Investigation Committee (HIC) and St John Health System's Internal Review Board (IRB) guidelines.

The Principal Investigator randomly distributed 2000 survey packets via employee mailboxes. A physical survey document, with additional tear-off sheet for raffle participation and an informed consent was included in each survey packet. Lock boxes and a separate box for collection of survey packets and raffle sheet were provided.

In order to promote prime return of distributed surveys, a tear-off entry for a raffle was included in each survey packet. After completing the survey packet, respondents were encouraged to complete and deposit the tear-off entry blank in a separate marked container. At the conclusion of the research study, 20% of the respondents' entries were drawn to receive a one time cash gift in the amount of $50.00, $25.00 or $5.00.

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Restatement of Research Questions

The five research questions this study sought to answer were directly linked to the literature, the Modified Technology Acceptance Model and the researcher's years of technological change management implementation experience. This study examined the following five research questions:

1. To what degree did the eCare Change Management Initiative improve the quality of the patient care experience?
2. To what degree did the eCare Change Management Initiative improve the efficiency of the providers' and non-providers' workflow?
3. Will the respondents' demographic characteristics have an impact on their rating of the improvement in efficiency of the providers' and non-providers' workflow?
4. Will the eCare Change Management Initiative improve patient satisfaction (i.e., overall rating of care)?
5. Will the eCare Change Management Initiative meet the objectives of the change management process including preparedness, understanding, and participation?

Summary of Findings

Research Survey Questions #1 & 2 were used to answer Research Question #1. Descriptive statistics to determine the Quality of the Patient Care Experience overall mean and standard deviation were calculated. Total number of respondents designating information concerning Quality of the Patient Care Experience was $N = 547$ ($M = 3.239$, $SD = 1.058$). Therefore, based on the Likert scale of 1 "Not at all", 2 "Some", 3 "Neutral", 4 "Mostly", and 5 "Very Much" used, the sample as a whole rated the degree as neutral in improvement of the quality of the Patient Care Experience.

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Research Survey Questions #3, 4, 5, 6, and 7 were used to answer Research Question #2. Descriptive statistics to determine the Efficiency of Workflow overall mean and standard deviation were calculated Total number of respondents designating information concerning Efficiency of Workflow were N = 547 (M = 2.035, SD = .383). Therefore, based on the Likert scale of 1 "Not at all", 2 "Some", 3 "Neutral", 4 "Mostly", and 5 "Very Much" used, the sample as a whole rated the degree of improvement as "some" in Efficiency of Workflow.

Research Survey Question #3 used Pearson's chi-square statistic to determine the linear association between the respondents' demographic characteristics and their rating of the eCare's improvement in efficiency of their workflow. Descriptive Statistics for Efficiency of Workflow and Respondents' Demographic Characteristics means and standard deviations were calculated. Descriptive statistics for respondents' demographic characteristics are Hospital Location, M = 1.54(SD = .499), Age Group, M = 2.91(SD = 1.04), Gender, M = 1.68(SD = .480), Job Classification, M = 1.47(SD = .499), Race/Ethnicity, M = 1.83(SD = 1.321), and Level of Education, M = 2.79(SD = 1.581).

Efficiency of Workflow mean was 2.04(SD = .383). The relationship between Efficiency of Workflow and Hospital Location was X^2 (df = 19, N = 547) = 38.664, p = .005. Twenty cells (50.0%) had an expected count less than 5. The minimum expected count was .46. The relationship between Efficiency of Workflow and Age was X^2 (df = 76, N = 545) = 229.847, p = .000. Sixty-nine cells (69.0%) had an expected count less than 5. The minimum expected count was .07. The relationship between Efficiency of Workflow and Gender was X^2 (df = 36, N = 544) = 29.463, p = .771. Thirty-eight cells (66.7%) had an expected count less than 5. The minimum expected count was .01. The relationship between Efficiency of Workflow and Job Classification was X^2 (df = 19, N = 547) = 23.826, p = .203. Twenty cells (50.0%) had an expected count less

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than 5. The minimum expected count was .47. The relationship between Efficiency of Workflow and Race/Ethnicity was X^2 (df = 114, N = 547) = 574.598, p = .000. One hundred fourteen cells (81.4%) had an expected count less than 5. The minimum expected count was .00. The relationship between Efficiency of Workflow and Level of Education was X^2 (df = 112, N = 542) = 481.796, p = .000. One hundred eight cells (79.4%) had an expected count less than 5. The minimum expected count was .01.

Since the Efficiency of Workflow and Demographic Characteristics expected frequencies were above 20% for all of the Pearson's Chi-square tests, the approximation to the chi-square distributions broke down and is not normally acceptable (Runyon & Haber, 1988). Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results, therefore no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Demographic Characteristics data. Research Question #3 remains unanswered.

A *t*-test for independent samples to compare means for the pre-and-post scores for patient satisfaction (i.e., overall rating of care) was proposed for this study. Due to unforeseeable circumstances (i.e., change-over to new vendor responsible for gathering data), pre-and-post eCare patient satisfaction (i.e., overall rating of care) figures could not be provided by the research site. Therefore, research question #4 remains unanswered.

Means for Research Survey Questions #8-10 were calculated to determine Respondents' Preparedness overall mean and standard deviation statistics for Research Question #5. Total number of respondents designating information concerning Respondents' Preparedness were N = 547 (M = 3.390, SD = .986). Therefore, based on the Likert scale of 1 "Not at all", 2 "Some", 3 "Neutral", 4 "Mostly", and 5 "Very Much" used, the sample as a whole rated the degree of

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preparedness, understanding, and participation in the eCare Change Management Initiative as neutral.

Seventy-eight respondents chose to complete the comments/recommendation section listed at the conclusion of the Research Survey. Four hundred sixty-nine participants did not respond to the comments/recommendation section. The themes and sub-categories had findings and are as follows:

The Patient Care Experience Theme had a total of 256 sub-category codes as follows: PC 19 (7%), TC 46 (18%), SNUF 43 (17%), PT 15 (6%), PSO 33 (13), NS 18 (7%), PW 14 (6%), RPC 34 (13%), IS 34 (13%), equaling 100%. The Efficiency of Workflow Theme had a total of 241 sub-category codes as follows: PC 19 (7%), TC 46 (19%), SNUF 43 (18%), PSO 33 (14), NS 18 (8%), PW 14 (6%), RPC 34 (14%), IS 34 (14%), equaling 100%. The Efficiency of Workflow had a total of 63 sub-category codes as follows: PT 15 (24%), PSO 33 (52%), PW 14 (22%), RPC 34 (14%), IS 34 (14%), equaling 100%.

Discussion of Findings

Respondents designating information for Research Question #1 concerning Quality of the Patient Care Experience, as a whole rated the degree as neutral in improvement of the quality of the Patient Care Experience. One explanation may relate to “response bias”. Groves and Peytcheva (2006) posit there may be a level of “response bias” and conversely, respondents may consciously, or subconsciously, give responses they thought the administration wanted to hear.

Often “neutral” is taken literally to indicate an endorsement of no opinion or unsure. This also may indicate a lack of an opinion or lack of interest on the topic (DeMars & Erwin, 2005). The neutral response category falls under the broader classification of middle response options. This could mean about right in a question where the options were “too much”, “not enough”, or

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“about right”. According to Krosenic (1999), respondents may choose “neutral” because they do not want to exert the cognitive effort to form an opinion. An individual does not reply to a single question without thinking about why and for what purpose a question has been asked (Sudman, Bradburn, & Schwartz, 1997; Schober, 1999). Further, when the respondent has difficulty in interpreting a question, he/she seeks assistance from different contextual hints. Importantly, while the attitude structure may remain stable in memory an individual may report different attitudinal judgments depending on the context which the attitude is elicited (Schwarz, 1995).

Instead of the Likert scale of 1 to 5 being used, a fixed choice of “yes or no” may be more appropriate and provide more accurate results. Additionally, my professional experience has shown non-responses or high levels of neutrality among responses could be evident of a more extended problem within the organization.

Results for Research Question #2 reported the sample as a whole rated the degree of improvement as “some” in Efficiency of Workflow. The instructions on the Research Survey created the context and definition of eCare. Not all providers and non-providers were at the same stages of implementation of the change management initiative.

A preamble definition of the total eCare project was provided in the instructions on the Research Survey. However, not all of the respondents were at the same stage of implementation of the eCare project. Respondents being at different stages of implementation may have produced unreliable results. Brace (2004) posit if questions on a survey are based on information respondents do not know inaccurate data may result.

The assumption of information accessibility underlies two models of context effects: 1) the belief sampling model (Tourangeau, 1999), and 2) the inclusion/exclusion model (Schwarz & Bless, 1992). According to the belief sampling model, respondents utilize a sample of all

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relevant beliefs stored in memory when forming a judgment and the judgment is based on an aggregation of these beliefs (Tourangeau, 1999). Therefore, if respondents had not experienced the entire eCare project they may reach back in their memory of past experiences and form their opinion. The inclusion/exclusion model rests on the assumption of information accessibility. In order for respondents to form a judgment about the target stimulus (i.e., eCare project), a representation of both the target and a standard of comparison must be constructed (Schwarz & Bless, 1992). The addition of a "not applicable" choice might provide a more accurate outcome.

Research Question #3 investigated the effects of the respondents' demographic characteristics on their rating of the improvement in efficiency of the providers' and non-providers' workflow. Since the Efficiency of Workflow and Demographic Characteristics expected frequencies were above 20% for all of the Pearson's Chi-square tests, the approximation to the chi-square distributions broke down and is not normally acceptable (Runyon & Haber, 1988). Applying the test when there are fewer cells than the minimum expected frequency can lead to inaccurate results, therefore no assumptions can be made from the results examining the relationship between the responses for Efficiency of Workflow and Demographic Characteristics data.

The primary investigator's time constraints to complete the study may have been instrumental in limiting the survey foot print and may have reduced variance. This type of constraint provided additional layers for concern: a) the 2000 population may not have been captured in the short research window, and b) the sample size may not have been reached due to the facility reduction (from 9 to 2). The sample size depends largely on the degree to which the sample population approximates the qualities and characteristics of the general population (Leedy, 1989). The population of St. John Providence Health System was approximately 10,700

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employees. Therefore, the data collected from the 547 respondents from only two of the facilities may not be an accurate representation of the general population. Research Question #3 remains unanswered.

Research Question #4 was designed to compare pre/post eCare implementation on the respondents' opinion of improvement in patient satisfaction (i.e., overall rating of care). Due to unforeseeable circumstances (i.e., change-over to new vendor responsible for gathering data), pre-and-post eCare patient satisfaction (i.e., overall rating of care) figures could not be provided by the research site. Additionally, Providence Park Hospital (PPH) was created from the ground up utilizing the eCare system. Thus, this site would not have a baseline figure to compare pre/post. Therefore research question #4 remains unanswered.

Research Question #5 investigated whether the eCare Change Management Initiative met the objectives of the change management process including preparedness, understanding, and participation. The sample as a whole rated the degree of preparedness, understanding, and participation in the eCare Change Management Initiative as neutral. One explanation may relate to "response bias". Groves and Peytcheva (2006) posit there may be a level of "response bias" and conversely, respondents may consciously, or subconsciously, give responses they thought the administration wanted to hear.

Often "neutral" is taken literally to indicate an endorsement of no opinion or unsure. This also may indicate a lack of an opinion or lack of interest on the topic (DeMars & Erwin, 2005). The neutral response category falls under the broader classification of middle response options. This could mean about right in a question where the options were "too much", "not enough", or "about right". According to Krosenic (1999), respondents may choose "neutral" because they do not want to exert the cognitive effort to form an opinion. An individual does not reply to a single

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question without thinking about why and for what purpose a question has been asked (Sudman, Bradburn, & Schwartz, 1997; Schober, 1999). Further, when the respondent has difficulty in interpreting a question, he/she seeks assistance from different contextual hints. Importantly, while the attitude structure may remain stable in memory an individual may report different attitudinal judgments depending on the context which the attitude is elicited (Schwarz, 1995). Instead of the Likert scale of 1 to 5 being used, a fixed choice of "yes or no" may be more appropriate and provide more accurate results.

Respondents were given the opportunity to write comments/recommendations concerning eCare at the conclusion of the Research Survey. This qualitative data was analyzed by reading through the responses, developing codes or themes, numbering the codes/themes, by making connections between discrete pieces of qualitative data (Williams, 2007). Coding was performed in order to gain an understanding of the inquiry issue, how respondents perceived the issue under review, and the nature and types of relationships involved. Coding is a process of reducing the data into smaller groupings so they are more manageable. The process also helps researchers to begin to see relationships between these categories and patterns of interaction (Williams, 2007).

The codes served as the sub-categories of the major themes, Patient Care Experience, Efficiency of Workflow, and Respondents' Preparedness, examined by this research study. Some sub-categories required designation under more than one major theme. Ten sub-category codes were developed based on predefined themes that emerged from the data. Some responses required designation under more than one sub-category. The sub-category codes developed for this study were:

- Poor Communication (PC)
- Time Consuming (TC)

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- System Not User Friendly (SNUF)
- Poor Training (PT)
- Poor System Operation (PSO)
- No Standardization (NS)
- Poor Workflow (PW)
- Reduces Patient Care (RPC)
- Inhibits Safety (IS)
- Component Addition (CA)

The qualitative section (Leedy, 1989) was designed to provide a more complete picture of the phenomena of interest (i.e., were the eCare Change Management Initiative objectives met). According to Shotland & Mark (1987), evaluators often use the pairing of quantitative and qualitative methods in sequence so the results of each data collection effort provides information for the next. The original design of this research included conducting focus groups to obtain more qualitative information. Due to employees' unavailability, the focus groups were eliminated. Additionally, the small number of respondents (78) completing the comments/recommendations section of the Research Survey may not have been representative of the general population. Therefore, a more complete research design may have resulted in more accurate and complete results.

Limitations of the Study

With every great practical suggestion, there are various limitations or drawbacks which may or may not be under the researcher's control. The following list presents the limitations and drawbacks surrounding this research study as recognized by the researcher.

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1. Healthcare administrators may view the study as a comparison of, or competition between, their organizations rather than a fact-finding method used to document possible attributes for deploying a successful eCare initiative, as well as how the study may assist in future change management initiatives. This can be minimized, if each organizational unit is brought in on the study at its infancy to identify requirements that reduce holding of information, stalling, and sabotaging. Much of these activities are by-products of competition.
2. The human element of needing to be perceived as successful in their management positions may result in difficulty for the in-house change management lead or team to give an objective accounting of events and the underlying assumptions of the eCare. This is primarily the case when managers feel their jobs are on the line and when in actuality, studies like these rarely have anything to do with performance management outcomes. This can be minimized by eliminating the "thumb" on the middle manager. Introduce this activity to each manager and staff member directly from the top echelon that should advance the idea these activities will not impact or effect performance evaluations.
3. This study was limited to persons employed by a specific health care organization located in an urban metropolitan area of the State of Michigan and may not be representative of all health care organizations. Generalizations to other populations of health care organizations must be made with caution.
4. This study relied on paper and pencil self-report instruments which are subject to socially desirable responses.

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5. There was a high level of survey fatigue within this organization and such issue may have propagated a negative attitude toward taking another survey.
6. Relying on representatives of the administration to distribute the survey may have reduced both the importance and seriousness of the study.
7. It was a huge mistake to allow respondents the option of removing the survey from the drop-off point and completing it at another time and location. This decision may have reduced the level of urgency and caused procrastination among the employees.
8. Significant format changes in the survey instrument may have complicated the ability to read and follow instructions to complete the survey.
9. The primary investigator's time constraints to complete the study may have been instrumental in limiting the survey foot print and may have reduced variance. This type of constraint provided additional layers for concern: a) the 2000 population may not have been captured in the short research window, and b) the sample size may not have been reached due to the facility reduction (from 9 to 2).
10. The primary investigator's limited financial resources may have limited data collection, due to possible inadequate size of award incentives and interest by hospital employees.
11. There may be unknown factors related to the change management initiative not accounted for in this study.

Unilateral decision making to minimize the research footprint in an effort to save time and reduce the burden on staff may have contributed to the non-statistically significant results. Particularly, the reduction from nine to two facilities of St. John Providence Health System, limited the opportunity for variance among the other diverse populations originally available.

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Thus, the reduced number of facilities was very counter-productive in the researcher's effort to properly evaluate the eCare change management program.

The design for distribution of information to potential respondents may have been deficient. The introduction sessions were presented to the facility employees by selected members of the administration. This may have inadvertently created an atmosphere of coercion in favor of positive results toward the institution. A presentation by the researcher without members of the administration in attendance may have afforded a more favorable environment to openly respond.

Although the introduction sheet which was attached to each survey packet described the study, actually meeting the researcher may have added credibility to the research. As it relates to the quantitative data collection from the Research Survey, the researcher agrees with the "keep it simple" rule, only provide the information that gets the message across and nothing more. Too much information only clouds or convolutes the data collection process. The researcher posits managing the data collection process with a more hands on approach to extract both quantitative and qualitative data, would better serve research studies of this kind in the future.

Quantitative data was not statistically significant. The researcher was not afforded the opportunity to conduct the focus groups as originally planned. Perhaps, the blended approach of adding qualitative data collection via focus groups may have resulted in additional data. McDowell & MacLean (2002) and Paterson, Bottorff, & Hewat (2003) suggested by blending qualitative and quantitative data, a more realistic, thorough depiction of the context may result. Further, St. John Providence Health System had recently been involved in a system-wide data collection. Survey fatigue may have also contributed to the non-statistically significant outcomes.

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Limitations should not be barriers research; they should act like baselines and assist with making better preparation or establishing clear points of early redirection and general areas of concentration. To that end, the limitations and findings of this study have presented opportunities for future research and discovery.

Implications for Practice and Recommendations for Future Research

The following section presents implications for practice, and recommendations for future research in the area of change management initiatives. The study was challenging and the findings were inconclusive for the research questions. However, the qualitative data gathered from the comments/recommendations section of the eCare Research Survey provided additional information in great detail concerning the research topic. The capture of detailed opinions, attitudes, beliefs and comments/recommendations expressed by the respondents provided suggestions for revisions of the eCare change management program. This qualitative data also provided implications for future research in the area of change management.

Although, the results were not statistically significant, several practical suggestions to ensure a better capture of qualitative and quantitative data in a hospital setting can be drawn from this research process. Hancock (2002) offers several practical suggestions to address the issues associated with not being able to capture qualitative and quantitative data and ensure research questions are being answered.

First, in order to be successful at accomplishing this, the organization has to be made more conducive and familiar with the purpose of paper/pencil surveys, focus groups, observations, and individual interviews (Hancock, 2002). This can be accomplished by building program evaluation, quality initiatives, staff capacity building, and in-service training within all levels of the organization. The more respondents have exchanges with these topics and tools; the

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value of their implementation will be recognized and accepted immediately. Secondly, establish a formal communications strategy and plan (Hancock, 2002). Therefore, the organization or implementation team will be able to introduce during each initiative or phased process and generate the proper messages and frequency for surveys, focus groups, observations and individual interviews.

Additionally, establish a formal reflection process or utilize an After Action Review (AAR) protocol and implement it each time a major initiative or project runs its course or concludes (Headquarters Department of the Army, 1993). The ability to have a group interface and navigate the following questions, may definitely open the eyes of the most conservative: 1) What was supposed happen?, 2) What did actually happen?, 3) What went wrong?, and 4) How do we change it? Finally, ensure whenever possible, recruit and develop leaders who can sell the change management program message. Utilize individuals across the entire spectrum of the organization or team to act as sounding boards for change management process activities.

Successful change management programs are distinguished by their attributes, as well as commitment to addressing the differences between change, and transition and transformation. Transformational change differs from change and transition in terms of the demands on organizational stakeholders and impact on the core values of an organization (Levy & Merry, 1986). Transformation is at the heart of successful change management programming, however; the literature is still very sparse on what is available in terms of how to determine a successful change management program and which attributes contribute the most. Future research should target the attributes which constitutes this success and a road map should be developed to guide organizations through this journey. This is very important, because at a minimum having a road

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map will allow change agents to construct better models and make better preparation for making their organizational setting more conducive for the change effort.

Secondly, qualitative data was gathered from the comments/recommendations section of the eCare Research Survey. This section alone can provide a great deal of information and assistance for determining if performance objectives were met or had disparities. Through the identification of themes and codes, the anecdotal (qualitative) feedback offered opinions, attitudes, beliefs and comments that may have significantly impacted the eCare change management program (e.g., poor communications, time consuming, systems not user-friendly, poor training, poor system operation, poor workflow, reduces patient care, and inhibits safety).

Worthen, Sanders, & Fitzpatrick (1997) posit there are other methods of qualitative data collection than responding to a comment/recommendation section on a survey. They posit observation methods such as site visits to observe the program in operation using one's observational skills to note contextual issues with any interactions. Interviews allow for clarification and greater depth of information from the audience. Content analysis allows for reviewing of documents, historical data, publications, and company documents and may provide a clearer picture of the company's DNA including values, beliefs, mores, and past initiatives and projects. Triangulation involves the consistency of results from different sources and methods for measuring the same construct. By using all methods for measuring the same construct provides a measurement of each side of the triangle illustrating a different facet of the phenomenon.

Therefore, future research should include consideration of respondent's feedback and observations. This is very important, because much of the literature and empirical studies have touted a major reason for resistance among staff, is the lack of management's ability to listen and include their feedback (Dawson & Jones, 2002).

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Future designs for research in the field of change management should consider several of the limitations and drawbacks discovered during this research study. The evaluation project of the eCare Change Management Initiative was designed after the initial implementation of the initiative. A more appropriate and effective evaluation project may have been designed if the investigator had participated in the initial development of the eCare Change Management Initiative. A survey designed specifically for each respective stage of implementation of the eCare Change Management Initiative may have provided more statistically significant data because individual departments at each facility were at different stages of implementation. Descriptive survey method demands that the researcher select from the general population a sample population that would be both logically and statistically defensible (Leedy, 1989). The small number of respondents making up the sample in this research may not have been reflective of the general population of the facilities. Determining the standard error of the mean is true for both large and small samples. The sampling distribution of means for populations >30 even when the population is nonnormal (Leedy, 1989). The size of the sample statistically can be determined by estimates of the representativeness of the sample on certain critical parameters at the acceptance of probability. The probability of error is determined by taking a sample of the population as opposed to utilizing the total population. Consideration of how far the sample mean deviates from the mean of the total population is usually determined statistically through a determination of the standard error of the mean. This research study did not have >30 in each cell. Therefore, the results of this study cannot be considered representative of the general population.

One has to be careful while interpreting the results and generalizing the findings of this research to other populations and geographical locations, especially, considering the lack of

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statistical significant outcomes. Interpretations and generalizations should be made with caution. As recommended, more robust design, larger group size, multiple sites and blended data should be addressed in future research to determine the attributes of a successful change management initiative. Despite the lack of statistical findings, further research in this area is warranted. The results of this research study, particularly the learning from the doing a research project in general, will lay a firm foundation for future investigations by the researcher.

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APPENDIX A

CORRESPONDENCE

20 October 2010

Wayne State University
Dean Steven Ilmer, PhD
College of Education, Ste. 441
Education Building
5425 Gullen Mall
Detroit, MI. 48202

Dear Dean Ilmer:

It is with great pleasure that St. John/Providence Health Systems and the Governing Body support Dion N. Johnson in his efforts to secure a Ph.D. in Performance Technology/Instructional Technology from Wayne State University. His sound methodologies, processes, and knowledge in Performance Improvement as it relates to Change Management and Electronic Health Records Management as demonstrated by his Dissertation Proposal entitled "A Case Study: Attributes of A Successful Technology Change Management Initiative In A Health Care Organization" has and will become a monumental study for our organization, as we continue to improve our virtual technology environment.

Therefore, Dion has asked me to serve in the capacity of research sponsor and liaison to assist him in the completion of his doctoral research. I will assist in following ways: 1) eliminate any barriers or issues inhibiting collection of data; 2) provide introductions and navigation through the political environment; and 3) provide direction and professional guidance on how to engage all levels of hospital personnel.

To this end, the St. John/Providence Health Systems Office will provide the necessary venues, human capital and resources to make his study successful, as well as lend it to both rewarding academic and practical uses. If you have any further questions, please feel free to contact my office at (586) 753-0654.

Yours truly,

Ernest L. Yoder, MD, PhD, FACP
Vice President, Medical Education & Research
St. John Health and Ascension Michigan

cc: Terence A. Thomas, Esquire - Sr., Senior Vice President
Advocacy and Corporate Responsibility for St. John Health (SJH)

Judy Avie, PhD
VP Process Improvement and Care Design
eCare Transformation

Ingrid Guerra-López, PhD
Doctoral Committee - Chair
Associate Professor, Administrative & Organizational Studies
Director, Institute for Learning & Performance Improvement
Wayne State University

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--- On **Thu, 4/8/10, Kieran Mathieson <*mathieso@oakland.edu*>** wrote:

From: Kieran Mathieson <mathieso@oakland.edu>
Subject: Re: Fw: Request Copy Right Permission TAM Model
To: "Dion Johnson" <dion.johnson@sbcglobal.net>
Cc: "Dr. Ingrid Gerra" <iguerra@wayne.edu>
Date: Thursday, April 8, 2010, 11:05 AM

Dion,

I've used TAM in several publications. Not sure exactly how many, maybe four or so. At one time, one of my TAM papers was the fifth most cited paper in my field, so my use of TAM is well-known. Fred Davis is certainly aware of my work. We've talked about it, and I've talked with his students over the years.

I've never sought permission from Fred or anyone else to use the TAM model, or the instruments. Of course, I have never just cut-and-pasted the diagrams of TAM from his papers; that might be copyright violation. I've redrawn them myself. Nobody has ever complained about what I have done, including Fred.

There are some copyrighted instruments that authors guard closely. ETS instruments, for example. But there are few of those in the information systems literature, if any. I have used other people's instruments often, and they have used mine. That is standard practice.

Kieran

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--- On **Mon, 4/12/10, Adrienne Boyd <*adrienne.boyd@prosci.com*>** wrote:

From: Adrienne Boyd <adrienne.boyd@prosci.com>
Subject: Re: Request Permission to site, mention and/or highlight in Dissertation Proposal
To: "Dion Johnson" <dion.johnson@sbcglobal.net>
Date: Monday, April 12, 2010, 10:30 AM

Dion,

This is fine to use as you have written it. It falls under “fair use” related to copyright.

Thanks and best of luck,
Adrienne

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ST JOHN PROVIDENCE HEALTH SYSTEM

14 March 2011

Wayne State University
Dean Steven Ilmer, PhD
College of Education, Ste. 441
Education Building
5425 Gullen Mall
Detroit, MI 48202

Dear Dean Ilmer:

It is with great pleasure that St. John Providence Health System and the Governing Body support Dion N. Johnson in his efforts to secure a Ph.D. in Performance Technology/Instructional Technology from Wayne State University. His sound methodologies, processes, and knowledge in Performance Improvement as it relates to Change Management and Electronic Health Records Management as demonstrated by his Dissertation Proposal entitled "A Case Study: Attributes of a Successful Technology Change Management Initiative In A Health Care Organization" has and will become a monumental study for our organization, as we continue to improve our virtual technology environment.

Therefore, Dion has asked me to serve in the capacity of research sponsor and liaison to assist him in the completion of his doctoral research. I will assist in the following ways: 1) eliminate any barriers or issues inhibiting collection of date; 2) provide introductions and navigation through the political environment; and 3) provide direction and professional guidance on how to engage all levels of hospital personnel.

To this end, St. John Providence Health System Office will provide the necessary venues, human capital and resources to make his study successful, as well as lend it to both rewarding academic and practical uses. If you have any further questions, please feel free to contact my office at (596) 753-0649.

Yours truly,

David M. Svinarich, PhD
Vice President, Research
St. John Providence Health System

cc: Laura Napiewocki, JD, MHSA
Senior Staff Attorney, St. John Providence Health System

Judy Avie, PhD
VP Process Improvement and Care Design, eCare Transformation

Ingrid Guerra-Lopez, PhD
Doctoral Committee – Chair
Associate Professor, Administrative & Organizational Studies
Director, Institute for Learning & Performance Improvement
Wayne State University

28000 Dequindre
Warren, MI 48092

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Tue, May 10, 2011 12:36:22 PM
IRBNet Board Action
From: Nicole Bolda <no-reply@irbnet.org>
Add to Contacts
To: Dion Johnson <dion.johnson@sbcglobal.net>

Please note that Providence Hospital and Medical Centers IRB has taken the following action on IRBNet:

Project Title: [233643-1] Case Study: Attributes of a Successful Technology Change Management Inititative in a Health Care Organization
Principal Investigator: Dion Johnson, PhD

Submission Type: New Project
Date Submitted: April 8, 2011

Action: APPROVED
Effective Date: May 10, 2011
Review Type: Expedited Review

Should you have any questions you may contact Nicole Bolda at nicole.bolda@stjohn.org.

Thank you,
The IRBNet Support Team

www.irbnet.org

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Tue, May 10, 2011 12:40:26 PM
IRBNet Board Document Published
From: Nicole Bolda <no-reply@irbnet.org>
Add to Contacts
To: Dion Johnson <dion.johnson@sbcglobal.net>

Please note that Providence Hospital and Medical Centers IRB has published the following Board Document on IRBNet:

Project Title: [233643-1] Case Study: Attributes of a Successful Technology Change Management Inititative in a Health Care Organization
Principal Investigator: Dion Johnson, PhD

Submission Type: New Project
Date Submitted: April 8, 2011

Document Type: Decision Letter
Document Description: Decision Letter
Publish Date: May 10, 2011

Should you have any questions you may contact Nicole Bolda at nicole.bolda@stjohn.org.

Thank you,
The IRBNet Support Team

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BY:

APPENDIX B

HIC APPROVAL FORM

WAYNE STATE UNIVERSITY

HUMAN INVESTIGATION COMMITTEE
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://hic.wayne.edu

Full AAHRPP Accreditation

CONCURRENCE OF EXEMPTION

To: Dion Johnson
Administration & Organization Stud

From: Dr. Scott Millis S. Millis, PhD
Chairperson, Behavioral Institutional Review Board (B3)

Date: February 15, 2011

RE: HIC #: 016311B3X

Protocol Title: Case Study: Attributes of a Successful Technology Change Management Initiative in a Health Care Organization

Sponsor:

Protocol #: 1101009292

The above-referenced protocol has been reviewed and found to qualify for Exemption according to paragraph #2 of the Department of Health and Human Services Code of Federal Regulations (45 CFR 46.101(b)).

- Protocol Summary Form, revised 2-11-2011.
- Research Information Sheet, submission/revision dated 2-11-2011.
- Receipt of a Letter of Support from St. John Health and Ascention Michigan, dated 10-20-10.
- Receipt of a research protocol

This proposal has not been evaluated for scientific merit, except to weigh the risk to the human subjects in relation to the potential benefits.

- Exempt protocols do not require annual review by the IRB.
- All changes or amendments to the above-referenced protocol require review and approval by the HIC BEFORE implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the HIC Policy (http://www.hic.wayne.edu/hicpol.html).

NOTE:

1. Forms should be downloaded from the HIC website at each use.
2. Submit a Closure Form to the HIC Office upon completion of the study.

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IRB Administration Office
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FAX: (313) 993-7122
http://irb.wayne.edu

Full AAHRPP Accreditation

NOTICE OF EXPEDITED AMENDMENT APPROVAL

To: Dion Johnson
Administration & Organization Stud

From: Dr. Scott Millis S. Millis PhD/M.D.
Chairperson, Behavioral Institutional Review Board (B3)

Date: June 24, 2011

RE: IRB #: 016311B3X

Protocol Title: Case Study: Evaluating Performance Outcomes of a Technology Change Management Initiative in a Health Care Organization

Funding Source:

Protocol #: 1101009292

Expiration Date:

The above-referenced protocol amendment, as itemized below, was reviewed by the Chairperson/designee of the Wayne State University Institutional Review Board (B3) and is APPROVED effective immediately.

- Protocol- Data collection methods and/or instruments and administrative/editorial changes which includes the addition of 3 questions to survey, the addition of an introduction to survey, and other editorial changes.
- Information Sheet (dated 06/16/2011)- Changes to information sheet reflect protocol revisions.

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IRB Administration Office
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http://irb.wayne.edu

Association for the Accreditation of Human Research Protection Programs, Inc. Full AAHRPP Accreditation

NOTICE OF EXPEDITED AMENDMENT APPROVAL

To: Dion Johnson
Administration & Organization Stud

From: Dr. Scott Millis S. Millis PhD/M.S.
Chairperson, Behavioral Institutional Review Board (B3)

Date: June 03, 2011

RE: IRB #: 016311B3X

Protocol Title: Case Study: Evaluating Performance Outcomes of a Technology Change Management Initiative in a Health Care Organization

Funding Source:

Protocol #: 1101009292

Expiration Date:

The above-referenced protocol amendment, as itemized below, was reviewed by the Chairperson/designee of the Wayne State University Institutional Review Board (B3) and is APPROVED effective immediately.

- Protocol (dated 06/2011)- Data collection methods and/or instruments and administrative editorial changes which includes a reduction in the number of survey questions, the addition of t-tests for patient quality of care scores, editorial revisions, reduction in the number of St. John Health System facilities, increase in survey participants to 2000, and the addition of two focus groups.
- Protocol- Protocol title changed to Case Study: Evaluating Performance Outcomes of a Technology Change Management Initiative in a Health Care Organization.
- Information Sheet (dated 06/16/2011)- Editorial changes to reflect changes in protocol including title, facility locations, etc.

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APPENDIX C

APPROVED RESEARCH SURVEY PACKET

1

Information Sheet

Title of Study: CASE STUDY: EVALUATING PERFORMANCE OUTCOMES OF A TECHNOLOGY CHANGE MANAGEMENT INITIATIVE IN A HEALTH CARE ORGANIZATION

Principal Investigator (PI): Dion N. Johnson, Doctoral Candidate
College of Education
Administration and Organizational Studies
(313) 580-2208

Purpose:

You are being asked to be in a research study being conducted by Dion N. Johnson, PI, at two of the nine medical affiliates of St. John Providence Health System, Providence Hospital & Medical Center (PHMC) and Providence Park Hospital (PPH). Data from this study will be used to complete his Doctoral Studies in Human Performance Technology, from Wayne State University. The estimated number of study participants at these two facilities will be 2000 individuals. The purpose of the study is to evaluate performance outcomes of the eCare Technology Change Management Initiative. The PI developed and will distribute the research documents to the two affiliate hospitals of St. John Providence Health System located in metropolitan Detroit, Michigan area.

Study Procedures:

If you take part in the study, you will be asked to complete a Demographic Form and Research Survey.

Benefits:

The possible benefits to you for taking part in this research study are a greater understanding of a successful Technology Change Management Initiative and eCare system.

Risks:

There are no known risks at this time to participation in this study. There are no known reported incidents of harm to individuals who have participated in similar studies.

Costs:

There will be no costs to you for participation in this research study.

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Information Sheet (cont.)

Title of Study: CASE STUDY: EVALUATING PERFORMANCE OUTCOMES OF A TECHNOLOGY CHANGE MANAGEMENT INITIATIVE IN A HEALTH CARE ORGANIZATION

Principal Investigator (PI):

Dion N. Johnson, Doctoral Candidate
College of Education
Administration and Organizational Studies
(313) 580-2208

Compensation:

A tear-off entry will be included in each survey packet. After completing the survey packet, respondents will be encouraged to complete and deposit the tear-off entry blank in a separate marked container. At the conclusion of the research study, 20% of the respondents' entries will be drawn from the container. The respondents whose names are drawn will receive a gift certificate in the amount of $5.00 from the facilities vending service.

Confidentiality:

All information collected during this study will not contain any individual identifiers.

Voluntary Participation /Withdrawal:

Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time.

Questions:

If you have any questions about this study now or in the future, you may contact Dion N. Johnson at the following phone number (313-580-2208). If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee may be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1728 to ask questions or voice concerns or complaints.

Participation:

By completing the research survey packet you are agreeing to participate in this study.

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For the purposes of this research, eCare is defined as an electronic medical record system containing a set of software solutions including: Inpatient PowerChart, Emergency Department FirstNet, Radiology Department RadNet, preoperative and postoperative Surginet, Pharmacy PharmNet, along with links to laboratory, transcribed documents, and registration systems that enables St. John Providence Health System to provide real time patient information to caregivers. eCare provides:

- *Consolidated single electronic patient record,*
- *Evidence-based medicine,*
- *Improved efficiency of treatment processes and coordination of care,*
- *Increasing safe, accurate, and consistent care.*

RESEARCH SURVEY

Please place a √ in the appropriate column	Not at All	Some	Neutral	Mostly	Very Much
11. I feel the eCare system has improved patient safety.					
12. I feel the eCare system has improved clinical outcomes and clinical service.					
13. I find the eCare system practical in accomplishing my job responsibilities.					
14. Using the eCare system enables me to accomplish tasks more quickly.					
15. Using the eCare system improves my ability to complete tasks more effectively.					
16. Using the eCare system enhances the quality of my work.					
17. Overall, I feel the eCare sytem has improved the organization of my workflow.					
18. I feel I was adequately prepared or trained to participate in the eCare initiative.					
19. I actively participated in sharing information for the eCare initiative.					
20. I feel my knowledge and understanding of the eCare initiative is adequate.					

What would you like to add as a recommendations/comments concerning eCare?

_____

_____

Thank you for your cooperation and participation with this project.

V.3 6/16/11

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DEMOGRAPHIC INFORMATION FORM

Please provide the following demographic information by checking the appropriate box of each category. This information remains confidential and will be used anonymously in a written report.

HOSPITAL: □ Providence Hospital & Medical Center (PHMC)
□ Providence Park Hospital (PPH)

AGE GROUP: □ 18 – 25 □ 26 – 35 □36 – 45 □ 46 – 55 □ 56+

GENDER: □ Male □ Female

JOB CLASSIFICATION:

□ Providers: St. John Providence Health System defines providers as physicians, mid-level, physicians assistant, nurse practitioners, nurses, and residents.

□ Non-Providers: St. John Providence Health System defines non-providers as health unit coordinators, technicians, pharmacists, dietary, therapist, administrators, and medical students.

AGE GROUP:
□ 18 – 25 □ 26 – 35 □ 36 – 45 □ 46 – 55 □56+

GENDER: □ Male □ Female

RACE/ETHNIC CODES AND DEFINITIONS:

□ White (not of Hispanic origin): All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

□ Black (not of Hispanic origin): All persons having origins in any of the peoples American Africa, Islands of the Caribbean, or any of the Black racial groups.

□ Hispanic: All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

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DEMOGRAPHIC INFORMATION FORM (cont.)

□ Asian or Pacific Islanders: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, Japan, Korea, the Philippine Islands, and Samoa.

□ American Indian or Alaskan Native: All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

□ No, I do not wish to answer.

LEVEL OF EDUCATION:

□ High School Diploma or GED □ Bachelors

□ Masters □ Ed.S.

□ Ph.D/Ed.D. □ M.D./D.O.

COMPUTER USE:

Have you received training on using computers? □ yes □ no

How many years have you used the computer for personal use?

□ Under one year

□ One to two years

□ Three to five years

□ Six to Ten years

□ Ten years and over

How many years have you used the computer for professional use?

□ Under one year

□ One to two years

□ Three to five years

□ Six to Ten years

□ Ten years and over

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ABSTRACT

CASE STUDY: EVALUATING PERFORMANCE OUTCOMES OF A TECHNOLOGY CHANGE MANAGEMENT INITIATIVE IN A HEALTH CARE ORGANIZATION

by

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December 2011

Advisor: Dr. Ingrid Lopez

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Degree: Doctor of Philosophy

The purpose of this research was to examine a case study by evaluating performance outcomes of a technology change management initiative in a health care organization. This study was developed with an array of issues surrounding change management programs with technology platforms, the management of complex change and the amount of criticism that became the impetus behind the implementation of the Electronic Health Records Management Systems (EHRMS) across the healthcare industry and its long-term transformative effects. Despite recognition that user response largely determined the success of a technology implementation or change management program and the fact significant resources are spent on strategic programs to promote acceptance, there was very little research in terms of evaluating performance outcomes which make a change management program more successful in health care settings (Kirkley & Stein, 2004).

The study was challenging and the findings were inconclusive for the research questions. However, the qualitative data gathered from the comments/recommendations section of the eCare Research Survey provided additional information in great detail concerning the research topic. The capture of detailed opinions, attitudes, beliefs and comments/recommendations

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expressed by the respondents provided suggestions for revisions of the eCare change management program. This qualitative data also provided implications for future research in the field of change management.

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