PROJECT MANAGEMENT SKILLS IN THE HEALTHCARE ENVIRONMENT: PERCEIVED IMPORTANCE TO HEALTHCARE PROJECT SUCCESS

by

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Abstract

This co-relational research applied a mixed-method research model to answer the question of which behavioral and technical skills are perceived necessary for project managers to possess in order to successfully deliver projects in the healthcare environment. There are significant social and organizational differences between the customer and profit driven environment of general business and the provider driven environment of healthcare. Using an established questionnaire from two previous studies, one researching the topic of business systems analyst's skills and the other researching project manager's skills, this research attempted to determine the skills perceived necessary to be a successful project manager in the healthcare environment. Various nonparametric tests were applied to the mean-ranked lists derived from the results of the online questionnaire, which utilized a seven-level Likert scale.

Dedication

This effort is dedicated to those I hold in high esteem. Jane and Anne, my daughters, encouraged and listened, Jan consoled and Lynette provided the strength and comfort, in words and nourishment, necessary for me to persevere. Without their positive influence in my life I would not have kept my focus on the goal and my fingers on the keyboard. Their work, for which I will always be grateful, kept me on task and gave me the strength to continue. I would also like to dedicate this work to my grandchildren as a lesson that goals are important, achievement is paramount and education is vital. In all things remember what is stated in 1 Thessalonians 5:18 (Kings James Version) "In every thing give thanks: for this is the will of God in Christ Jesus concerning you."

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Table of Contents

List of Tables

List of Figures

CHAPTER 1. INTRODUCTION

Introduction to the Problem

In 2000, the Institute of Medicine reported that an estimated 98,000 hospital patients die as a result of human error (Institute of Medicine, 2000, p. 3). Approximately 1.5 million patients per year are injured as a result of drug errors in hospitals and the cost to patients from preventable drug related errors is estimated at over $3.5 billion per year (Institute of Medicine, 2001a). Expanding the use of technology is one solution recommended for reducing errors in healthcare environments (Aspden, 2004; Crane & Crane, 2006); however, because of the complexity of the projects and the complexity of the business conditions found in many healthcare organizations, there may be a shortage of project managers with the skills necessary to successfully address the various aspects of managing generalized projects in a healthcare environment (Caldwell, Brexler, & Gillem, 2005). With Information Technology (IT) as a core component of many healthcare projects, the problem of ineffective project management is further exacerbated by the findings in recent reports indicating that only 28 percent of all IT projects are successful (Shenhar & Dvir, 2007; The Standish Group, 1994, 2004).

Local, state, and federal legislation, meant to control and monitor various aspects of the healthcare industry, have resulted in numerous requirements for system development and installation projects. For example, the requirements of the Sarbanes-Oxley Act of 2002 (SOX) (Borkowski & Kulzick, 2006; "Sarbanes-Oxley Act of 2002,"

2002) are drawing the attention of the healthcare community. Healthcare executives are particularly interested in assuring their facilities are compliant with SOX (O'Dell, 2006). To meet the compliance requirements requires successful completion of a number of IT related projects. Meanwhile, the Health Insurance Portability and Accountability Act (HIPAA) ("Health Insurance Portability and Accountability Act of 1996," 1996) has placed an additional burden on healthcare organizations. Compliance with HIPAA also requires that healthcare organization are capable of successfully implementing projects throughout the organization (Bernstein, McCreless, & Côté, 2007).

Other healthcare projects result from internal pressures to reduce costs and increase profitability. Fully one-third of hospitals reported a fiscal loss, while another one-third report margins less than four percent (O'Dell, 2006). The pressure to reduce costs and increase profitability can have a significant impact on patient health and well being. In one study conducted by the American College of Physician Executives, when asked the question: "In your healthcare organization, are there situations where low- or poor-quality (care) is tolerated for physicians or departments that generate high amounts of revenue?" nearly 39 percent of respondents agreed that poor quality of care is tolerated if the department or physician is profitable (Romano, 2007).

Bernstein et al. (2007) suggest that healthcare projects are unique because of the products and services they are meant to provide. The services included as deliverables in healthcare projects generally relate to improvement of the consumer's quality of life. Consideration for the consumer must be included in the determination of which projects are pursued and which are not pursued. One aspect of the consumer's quality of life includes patient safety while in the healthcare environment. Patient safety must be

considered in balance with corporate profitability. Assessing the value of projects in healthcare often results in more IT related projects where advances in technology are expected to improve patient safety and other quality of care considerations (Brewin, 2004).

Attempts to address patient safety through the application of technical solutions while considering corporate profitability continue to bring new technologies to the forefront in healthcare. These new technologies include radio frequency identification (RFID) (Flower, 2006), computerized patient order entry (CPOE) (Porter, 2007), and electronic intensive care units (eICU) (Cerón, 2007). Meanwhile over 60 percent of the executives surveyed in the Leadership Survey conducted by the Health Information Management Systems Society (HIMSS) expected their IT budget to increase less than ten percent between the 2006 and 2007 budgeting periods (Bernstein et al., 2007). Perhaps more significant to healthcare than in other industries is the pressure to implement change through project management while providing less funding (Ward Jr., Spragens, & Smithson, 2006). Monetary pressures in the healthcare environment may be the result of additional controls placed on healthcare cost increases and federal regulations limiting available funding (Stimson, 2006). The pressure to successfully deliver complex projects that include leading edge technology places additional burden on the healthcare project manager (Cerón, 2007; Flower, 2006).

Healthcare's poor financial performance is frequently attributed to poor management of the operational aspect of the business (L. V. Green, 2004; Mango & Shapiro, 2001; Thompson, Wolf, & Spear, 2003; Tucker, 2004; Tucker & Edmonson, 2003). Healthcare has, however, been willing to adopt non-healthcare developed systems

to assist in improving operations including Total Quality Management (TQM) (Bigelow & Arndt, 1995; Westphal, Gulati, & Shortell, 1997) and the balanced scorecard (BSC) (Wicks & St. Clair, 2007). Harrington and Trusko (2005), however, report that TQM and "Continuous Quality Improvement (CQI) efforts were poorly implemented in most healthcare organizations" (p. 488).

To address performance issues resulting in errors that jeopardize patient safety, as mentioned above, many healthcare organizations are authorizing projects that will utilize tools and techniques that were previously found only in the manufacturing industry (Manos, Sattler, & Alukal, 2006; Marting, 2007; Ward Jr. et al., 2006). Quality control and quality management techniques common in manufacturing are being applied to the service industry in general and to healthcare in particular (Torres & Guo, 2004). Some healthcare entities have adopted methodologies such as Lean, Six Sigma, and Lean Six Sigma to address their quality shortfalls (Aheme, 2007; Feder, 2006; Huehn-Brown, 2006; Lander, 2007). Projects addressing the implementation of these quality approaches incur the additional burden of adapting techniques frequently associated with repetitive and repeatable manufacturing processes to the variable environment of healthcare delivery (Manos et al., 2006).

Other projects requiring the attention of healthcare executives include risk management (Okoroh, Ilozor, & Gombera, 2006), the introduction of clinical information systems (CIS) and electronic records (Rogoski, 2007), and value stream or supply chain management (Burns, 2002). To be successful, these projects must be addressed in terms of their importance to the patient, the doctors, professional staff, administration, the community, and legal and regulatory constraints (Badri, Davis, & Davis, 2001).

Background of the Study

Pressures on the healthcare community to move toward a more automated system of delivery while maintaining personal contact with the patient has resulted in a number of roadblocks including issues with technical training, subject matter expertise, the fast pace of adoption and funding. With only one third of hospitals reporting profit margins over four percent (O'Dell, 2006) the funds available to spend on improvements to their systems is limited or non-existent. Adoption of many of the newest technologies are meant to help the healthcare facility improve profitability through increased buying power, as in the case of group purchasing organizations (GPOs) (Roark, 2005). Other technologies are addressing improved patient care, as purported by electronic prescription systems (Spil, Schuring, & Michel-Verkerke, 2004). To be successfully implemented, however, these solutions require capable project managers.

The number of projects and the limited resources to address each project has resulted in a need for improvements in the ability of healthcare providers to develop the systems and skills necessary for improved project selection, improved project definition, and improved project delivery (Badri et al., 2001). A key component of successful project delivery is the project manager and the skills the project manager possesses (El-Sabaa, 2001).

The complexity of many healthcare projects and the added complexity of the healthcare environment require skilled project managers in order to successfully implement projects that may influence life-and-death decisions, patient safety, and healthcare costs (Manos et al., 2006). In order to assist project managers in maintaining or developing skills necessary to better achieve these goals requires the skills perceived

necessary for success to be prioritized, studied, and better understood (Jiang, Klein, & Margulis, 1998).

A 1989 study evaluated the behavioral skills that systems analysts and users perceived to be necessary for successful project completion in IT (Green, 1989) In 1989 the "systems analyst" was generally considered the leader of system development projects; the role of project manager had not yet been fully accepted or implemented in most organizations. A study conducted in 1998, utilized 18 of the 21 behavioral and technical skills defined in the 1989 study in an effort to determine the behavioral and technical skills perceived necessary in successful Information Systems (IS) project leaders, IS managers, and Chief Information Officers (CIOs) (Jiang et al., 1998).

The study by Jiang et al. (1998) included personal interviews with six Chief Information Officers (CIOs) to further expand the information gathered from the surveys. Where the Green (1989) study included 872 questionnaires returned from members of 52 organizations, the Jiang et al. study included only 118 questionnaires from members of six organizations. The Green study specifically lists the type of businesses that participated. None of the participating organizations were healthcare related. The participants in the Green study were associated with "17 city governments, 18 state governments, 19 industrial firms, and 16 financial firms" (p.119)

Jiang et al. (1998) incorporated 18 of the 21 behavioral and technical skills recognized by Green (1989) as components necessary for success in systems analysis and applied these skills to a study of IT project leaders. These skills were found to be applicable "to any project development regardless of environment (Frame, 1994)" (Jiang et al., 1998, p. 40). While Jiang et al. conclude that project management skills are

universal, others have found that project success relates to other factors, such as cultural issues (Kendra & Taplin, 2004) and leadership style (Turner & Müller, 2005). Sumner, Bock, and Giamartino (2006) conclude that "It is important for project managers to recognize the leadership behaviors that their counterparts value" (p. 49).

There are various influences across differing environments that impact the project manager's ability to achieve successful project completion (Dvir, Sadeh, & Malach-Pines, 2006). Factors that lead to differences between the healthcare environment and other business environs have not been thoroughly studied to determine the important behavioral and technical skills that will impact the ability of a project manager to be successful when leading projects in a healthcare environment. The influences in healthcare organizations that affect successful project delivery and which behavioral and technical skills the project manager must possess to ensure success has not been addressed by studies of environmental influences on project success.

Statement of the Problem

The behavioral and technical skills of the project manager have been found to be a primary influence on the successful delivery of projects (PMI Standards Committee, 2004). In healthcare entities, such as hospitals, clinics, or healthcare corporations, project success is required to meet regulations, provide effective, safe, and efficient services, and to ensure profitability. The project manager's behavioral and technical skills found to be necessary for deliver of successful projects have been studied in the general population for many years (Dvir et al., 2006; Green, 1989; Jiang et al., 1998; Kendra & Taplin, 2004; Marting, 2007; Muzio, Fisher, Thomas, & Peters, 2007; Parker & Skitmore, 2005).

However, very little research exists regarding the required skills for successful project management specific to the healthcare environment.

The cost of healthcare in the United States, the possible deadly outcomes from failed or partially failed projects, and the requirements placed on healthcare organizations by regulatory agencies requires the ability to recruit, hire, train, and support individuals with the necessary behavioral and technical skills to be successful (Turner & Müller, 2005; Williams & Murphy, 2005).

Purpose of the Study

The purpose of this study is to determine the relative importance of 21 behavioral and technical skills necessary for successful project delivery as perceived by project managers and others in the healthcare environment. Environmental and emotional influences not found in other environments may impact the behavioral and technical skills necessary to be a successful project manager in healthcare. The relative importance of the behavioral and technical skills recognized for successful project management in healthcare environments may be different from the relative importance of these skills in other environments.

Rationale

The rationale for this research is based on the need for developing comprehensive behavioral and technical skills for project managers involved in and working within the healthcare environment. To meet the goal of developing a comprehensive list of behavioral and technical skills ranked in order of perceived importance, the current research utilized the instrument developed by Green (1989) containing the 21 behavioral

and technical skills previously validated by the Green study in 1989. This research utilized the results of earlier studies, along with the findings from other related research to formulate and design an instrument which was used to determine the relative importance of behavioral and technical skills found necessary for successful project management in healthcare environments. The results of this study were used to determine the perceived importance of behavioral and technical skills for project managers employed within the healthcare industry and relate these results to the behavioral and technical skills of project managers in other industries.

There are a number of accepted and theoretical approaches to project management that present behavioral and technical skills necessary for project managers to be successful (Dvir et al., 2006). The Project Management Body of Knowledge (PMBOK) (PMI Standards Committee, 2004) presents human resource skills required of the project manager as one of the nine knowledge areas which constitute successful project practices. Research supporting a relationship between leadership style differences and project success is available (Dvir et al., 2006; El-Sabaa, 2001; Frame, 1994; Garman, Burkhart, & Strong, 2006; Gehring, 2007; Glover, 2005; Muzio et al., 2007; Parker & Skitmore, 2005; Turner & Müller, 2005; Williams & Murphy, 2005), but current research does not recognize differences in successful project management skills based on environmental factors, such as the difference between project management skills in construction versus healthcare environments.

The research questions were developed to create a matrix of information on various environmental categories from three viewpoints. The first viewpoint studied in each of the environments was that of the total response from all participants. The results

of these questions provide a complete view of all individuals involved in project management in healthcare to any degree. The second viewpoint is that of the project manager. The final viewpoint is that of the other individuals involved in healthcare projects who are not involved in direct project management.

The testing environments used to evaluate the responses from each of these three viewpoints were (a) the response from all of the various environments within healthcare compared to the responses from those individuals working outside the healthcare environment; (b) the responses from those within the for-profit healthcare environments compared to the responses from respondents in the not-for-profit healthcare environments; (c) the responses from those within several types of healthcare organizations; (d) the viewpoint of those respondents from various sizes of healthcare organizations.

Research Questions

This research is designed to determine the perceived significance of behavioral and technical skills recognized by project managers and others in healthcare as necessary for successful project completion. The complete list of 21 behavioral and technical skills as utilized by Green and a full explanation and definition of the terms is included in Table 1. This research compared the importance of the 21 behavioral and technical skills as perceived by project managers involved in the delivery of projects within the healthcare industry with the perceived importance of the 21 behavioral and technical skills as viewed by project stakeholders and other project resources involved in healthcare industry projects.

Table 1. *Definition of Behavioral and Technical Skill Requirements for Systems Analysts*

Behavioral and Technical Skill	Definition
Diplomacy	Being able to say "no" without being too blunt: displaying tact in dealing with others.
Interviewing	Asking the right questions in order to obtain the information needed.
Directing	Giving instructions and communicating user requirements to programming and support staff.
Patience	Continually refining user requirements feedback: tolerating lack of computer literacy and specificity.
Assertiveness	Insisting on a course of action or what one believes in, even though it may be unpopular.
Leadership	Getting work done while keeping the team satisfied: effectively giving rewards and punishment.
Programming	Converting system specifications into effective and efficient computer code.
Speaking	Presenting your ideas in a manner easily understood by your audience, both in group meetings and person to person.
Writing	Preparing written documents that accurately communicate ideas in a manner that is easily understood by intended readers.
Listening	Paying attention to and concentrating on what is being said, and asking questions that refine points about which one is uncertain.
Empathy	Being able to understand how others feel: accurately determining what someone else thinks about an issue.
Sales	Promoting the system you advocate: persuading others to accept your viewpoint.
Politics	Understanding what motivates individuals: determining sources of power and influence in an organization.
Management	Planning, organizing and controlling projects so that they get done on schedule and within budget.
Training	Educating users and other non-technical groups on the capabilities of computers and systems.
Cooperation	Working with others productively: resolving conflict in an effective manner.

Table 1. *(continued)*

Behavioral and Technical Skill	Definition
Functional Application Knowledge	Sufficiently knowing what the user's functional application entails to accurately interpret what he or she really needs.
Organizational Communications	Having a broad view of company goals and operations: knowing the orientation of senior management.
Analysis and Design	Translating user requirements into functional systems specifications.
Non-verbal Communications	Reinforcing the message to others through gestures and facial expressions.
Sensitivity	Being aware of the implications of design and change for the user community.

Note. From "Perceived importance of Systems Analysts' job skills, roles and non-salary incentives" by G. I. Green, 1989*, MIS Quarterly*, 13(2), p. 120. Copyright 1989 by Society for Information Management and the Management Information Systems Research Center. Reprinted with permission of the author.

This research also compares the views of the project managers and others involved with projects conducted within for-profit healthcare with the views of project managers and others involved with project delivery in the not-for-profit healthcare environments. Comparisons in the research are also made relative to the size of the organization based on the estimated number of employees and several type of healthcare organizations.

The research performed by Green (1989) studied the perceived importance of the 21 behavioral and technical skills from two viewpoints. The first view was an analysis of possible differences between the view of the systems analyst and the view of the users regarding the importance of behavioral and technical skills of the systems analyst. Whereas Green contrasted the differences in perceived importance of the 21 behavioral

and technical skills between systems analysts and users, this study tests the possible differences in the perceived importance of the same 21 behavioral and technical skills and how these views differ between project managers and others involved in the projects, but with the added refinement of isolating the viewpoints of these two groups within the healthcare environment. The research questions formulated to address this aspect of the research are

1. Which of the 21 behavioral and technical skills are perceived to be most important for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in all healthcare environments?

2. What is the relative importance placed on the 21 behavioral and technical skills of the healthcare project manager from the viewpoint of the project manager and does this relative importance placed on the 21 behavioral and technical skills differ significantly from project managers outside the healthcare industry?

3. What is the relative importance placed on the 21 behavioral and technical skills of the healthcare project manager from the viewpoint of individuals, other than project managers, involved in the project and does this relative importance placed on the 21 behavioral and technical skills differ significantly from individuals involved with projects, other than project managers, outside the healthcare industry?

4. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in for-profit versus not-for-profit healthcare environments?

5. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in for-profit versus not-for-profit healthcare environments?

6. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from

the viewpoint of non-project managers involved with projects in for-profit versus not-for-profit healthcare environments?

7. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in the various types of healthcare environments?

8. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in the various types of healthcare environments?

9. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of others (non-project managers) involved with projects in the various types of healthcare environments?

10. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

11. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

12. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of others (non-project managers) involved with projects in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

Significance of the Study

As noted above, there are a significant number of issues in healthcare resulting from internal and external pressures to improve in all areas – safety, security, delivery of services, cost, and profitability. Many projects result from a need to address outside influences such as competitive environments, government regulation, and medical discoveries and research. Unlike other project management environments many of the projects in healthcare deal with life-and-death issues (Porter, 2007; Rathert, Fleig-Palmer, & Palmer, 2006; Shannon, 2007). Similar to other organizations, projects are expected to be delivered on time, within budget, and with the expected functionality. However, in healthcare, a delay in delivery may result in unnecessary patient exposure to life threatening situations. In healthcare, cost overruns may cause patients to forego necessary treatment and failing to delivery the necessary functionality may result in injury or death (Shannon, 2007).

This study utilized a matrix of the most important behavioral and technical skills that project managers should possess in order to successfully deliver projects in the various healthcare environments as perceived by project managers and others involved with healthcare related projects. The results of this research will provide a basis for developing an effective plan to improve the behavioral and technical skills of project managers employed in the healthcare environment. Knowledge of the behavioral and technical skills that project managers should possess to deliver more successful projects will allow healthcare organizations to address these skills as part of the hiring practices and in the development of an effective training curriculum for project managers.

Definition of Terms

The 21 behavioral and technical skills were utilized by Green (1989) in the 1989 study of the behavioral and technical skills of systems analysts and these behavioral and technical skills were utilized again by Jiang et al.(1998) in a study of the behavioral and technical skills of project managers – see Table 1.

The *Guide to the Project Management Body of Knowledge (PMBOK)* is the compilation of project management knowledge compiled and maintained by the Project Management Institute (PMI) most recently published in 2004 (PMI Standards Committee, 2004).

Health Insurance Portability and Accountability Act of 1996 (HIPAA), also known as the Kennedy-Kassenbaum Bill, refers to two sections of the bill, specifically Title I of HIPAA, which "protects health insurance coverage for workers and their families when they change or lose their jobs" (Healthcare Information and Management Systems Society, 2006, p. 41). Title II refers to the Administrative Simplification provisions, which "required the establishment of national standards for electronic healthcare transactions and national identifiers of providers, health insurance plans, and employers" (Healthcare Information and Management Systems Society, 2006, p. 41).

Healthcare is defined as any entity involved in the delivery of healthcare services or that support healthcare delivery. This definition may include, but is not limited to, hospitals, clinics, support services, and supply chain elements supporting healthcare delivery. Public and private organizations that deliver health services are also included in this definition.

Leadership style, as defined by the U.S. Army Handbook (1973), refers to the "manner and approach" used by the project manager to "provide direction, implement plans, and motivate people." Leadership styles and their impact and influence on project management are discussed further in chapter 2.

Lean is a "business philosophy that was originally developed at the Toyota Motor Company, where it was called [Toyota Production System] TPS…The objective is to eliminate all forms of waste in the production process" (Ehrlich, 2002).

A *Project* "is a temporary endeavor undertaken to accomplish a unique product or service with a defined start and end point and specific objectives that, when attained, signify completion" (PMI Standards Committee, 2004, p. 5)

The *Project Manager*, according to PMI, is responsible for: "Identifying requirements; establishing clear and achievable objectives; balancing the competing demands for quality, scope, time and cost; and adapting the specifications, plans, and approach to different concerns and expectations of the various stakeholder" (PMI Standards Committee, 2004, p. 8).

Project Management "is the application of knowledge, skills, tools, and techniques applied to project activities in order to meet or exceed stakeholder needs and expectations from the project" (PMI Standards Committee, 2004, p. 8).

Project Management Institute (PMI) is the international organization of project management professionals with over 200,000 members in 135 countries. PMI offers training, examinations, and certifications for Project Management Professional (PMP) and Certified Associate in Project Management (CAPM).

Project Management Institute – Healthcare Project Management Specific Interest Group (SIG) is a specific interest group within the Project Management Institute. The purpose of the Healthcare SIG is to further professional project management in the healthcare industry (Project Management Institute (PMI)-Healthcare Project Management Specific Interest Group (SIG), 2004).

Regulations refer to the legal and fiscal criteria that hospitals must meet in order to continue operation. These include federal regulations relative to reporting policies, patient safety, and insurance; state regulations that govern aspects of the business including human resource requirements, such as employment, environmental issues, and reporting requirements; and industry specific requirements relative to certification and inspections. Some examples of regulations that influence the healthcare environment include The Health Insurance Portability and Accountability Act of 1996, The Sarbanes-Oxley Act of 2002, the Gramm-Leach-Bliley Act of 1999, and compliance with the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).

Six Sigma is defined as "a disciplined, data-driven approach of continually improving process quality and productivity to result in bottom line profitability" (Ehrlich, 2002).

Supply Chain or *Value Chain* is the "entire production chain from the input of raw materials to the output of final product consumed by the end user" (Burns, 2002, p. 7).

Assumptions and Limitations

This research was limited to a study of 21 behavioral and technical skills and how project managers and others in the healthcare environment perceive the importance of

these skills as necessary for success in delivery of projects on time, on budget, and with the expected functionality. The list of 21 behavioral and technical skills used in this study was originally published as a study of behavioral and technical skills necessary for systems analysts to be successful (Green, 1989) Jiang et al. (1998) removed three items from the list of behavioral and technical skills originally developed by Green. These three items were removed because they were determined to be technical skills and were not included in the study by Jiang et al. The remaining 18 behavioral skills were utilized in the study of project managers and Information Systems (IS) project managers in several organizational environments (Jiang et al., 1998). Neither of these studies included participation and evaluation of the behavioral and technical skills of project managers within the healthcare environment.

The basic assumption of this study was that project managers working in the healthcare arena are sufficiently knowledgeable and able to recognize those skills they find helpful in the performance of their work. The study by Green (1989) was not limited to the opinion of the system analyst, but included information gleaned from those affected by the systems being developed.

The study by Jiang et al. (1998) was also not limited to the project manager's opinion of the relative importance of behavioral skills necessary for successful project management. Jiang et al. included IS managers in their research. To contrast the two studies, Green included the project manager and those impacted by the project, whereas, Jiang et al. included the project manager and those responsible for managing the project management function.

This study also assumed an evaluation of project management behavioral and technical skills where input was provided from a broad spectrum of participants in healthcare project delivery environments would be more informative and useful than a limited study of specific healthcare areas. For example, it was assumed there may be a difference in the behavioral skills required by project management professionals working on projects in a surgical clinic versus skills found most helpful in a research hospital. The differences in necessary behavioral and technical skills may be found to be influenced by the personalities of the participants, variation in case loads and diagnoses, and physical and emotional environments. This study was not meant to address particular differences in behavior skills at this level of detail.

Also, the sample used in this study included project managers and non-project managers who participate in the Project Management Institute's Healthcare Specific Interest Group (PMI Healthcare SIG) supporting healthcare project management. The researcher recognized that membership in PMI is not inclusive of all project managers and the Healthcare SIG is not inclusive of all project managers in healthcare. The researcher also recognizes that there are numerous project environments and some may not conform to the project definition provided by PMI. This might include Six Sigma and Lean project efforts where the skills required may differ from those found in more traditional PMBOK conforming environments. Project management in environments other than those following the PMI project performance process was not distinguished in this research.

Other limitations include the fact that some surveys were started but were not completed. These surveys were invalidated. Also, the participants in the survey may not

have been able to express their views fully because of concerns for confidentiality even though the system of collecting responses was designed to allow for complete confidentiality. Another limitation was the size of the responses that may influence the generalizability of the research.

Nature of the Study, or Theoretical/Conceptual Framework

This study was a mixed methodology study utilizing an online survey tool to develop quantitative data and personal interviews (qualitative research) to expand and clarify the results of the quantitative portion of the study. The researcher provided current members of the Project Management Institute's Healthcare Specific Interest Group (PMI Healthcare SIG) with the opportunity to participate in the study. The online survey was a seven-level Likert scale based questionnaire using a version of the "Behavioral Skills Requirements Questionnaire" utilized in the 1989 research conducted by Green with modifications to support online access and expanded to request more information on the participant's healthcare environment.

Following the analysis of the quantitative data gathered from the online survey results the researcher interviewed subjects who agreed to participate in a phone discussion of the topic of healthcare project management and the considerations for differences in healthcare project management and project management in other types of organizations. The participants in the phone interview process represented various healthcare provider organizations, but all the participants in the phone interviews were associated with the PMI Healthcare SIG. The online survey included a question asking whether or not the participants would take part in a phone interview to further discuss the

opinions found to be prevalent in the survey results. Participation in the phone interview were informed that participation in the phone interview was strictly voluntary and contact information for those participating in the phone interview was destroyed with the responses developed during the phone interview being referenced only by a sequential number assigned to the interview at the time of the call by the researcher.

Organization of the Remainder of the Study

Chapter 2 of this study examined the available literature on the topic of project management, project management in healthcare environments, and unique aspects of the healthcare environment organization and project environment. The literature review served to further clarify the implications of positive and negative influences on projects and the ability of project leadership to guide those influences to project success if properly addressed. The literature review also included basic information on the various types of projects and approaches to project management found in various environments, with an emphasis on the healthcare environment. This research contributes to a better understanding of the perceived importance of various behavioral and technical skills necessary to achieve project management success in a healthcare environment.

Chapter 3 is a review of the research methodology utilized in this study and provides the basis for the rationale used to determine the approach to research selected for this study. A considered evaluation of various approaches is presented and the discussion presents the reasoning behind the selected approach. Chapter 3 also provides the assumptions made in determining the best research approach to study the selected topic and the limitations this approach has on the findings presented.

Chapter 4 presents the data collected for this research and an overview of the analysis of the data derived from the quantitative research and the information and clarification provided by the qualitative research from the phone interview process. Chapter 4 also presents consideration of the data resulting from this study as it relates to the data found in previous similar studies of project management and systems analysis.

Chapter 5 is a discussion of the results of the research, the conclusions that can be drawn from these results, and recommendations that can be made based on these results. There is also a presentation of suggested further research on the topic of project management in the healthcare environment.

CHAPTER 2. LITERATURE REVIEW

The topic of Project Management involves a broad field of research that includes behavioral and technical skills as well as leadership and motivational topics. The project manager, as defined by the Project Management Institute (PMI), is "the person assigned by the performing organization to achieve the project objectives" (PMI Standards Committee, 2004, p. 369). In order to provide assistance to the project manager in the achievement of the project objectives, PMI has published a roadmap to the Project Management body of knowledge in a concise manual titled *Guide to the Project Management Body of Knowledge* (PMBOK).

The PMBOK suggests that there are five process groups and nine knowledge areas that interlace in a matrix of activities necessary to complete a project successfully. The PMBOK states that in order for a project to be successful the "appropriate process" must be selected; there must be a "defined approach" to adapting the requirements; the project must "comply with requirements to meet stakeholder needs, wants, and expectations"; and there must be a balance of the "competing demands of scope, time, cost, quality, resources, and risk" (PMI Standards Committee, 2004, p. 37).

The five process groups are initiating, planning, executing, controlling, and closing (PMI Standards Committee, 2004). The PMI Standards Committee has also defined the nine knowledge areas as

1. Project Integration Management
2. Project Scope Management

3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management

Management of each of the process groups within the purview of the knowledge areas is a function of the project manager. Proper execution of these process groups will help the project manager coordinate, manage, and control the project (Strait, 2006).

However, the PMBOK provides a bolded warning to qualify its earlier statements regarding the requirements for achieving a successful project. This warning reads

> This does not mean that the knowledge, skills and processes described should always be applied uniformly on all projects. The project manager, in collaboration with the project team, is always responsible for determining what processes are appropriate, and the appropriate degree of rigor for each process, for any given project. (PMI Standards Committee, 2004, p. 37)

With the above statement, PMI indicates the high degree of importance placed on the ability of the project manager to make decisions, interact with others on the project, and understand the tools required for a successful project outcome. These abilities will also vary depending on the company in which the project manager is employed (Garton & McCulloch, 2006).

In order to more fully understand the importance of the role the project manager plays in the successful delivery of IT projects in the healthcare environment, literature pertinent to project management relative to several topical areas is reviewed. The first

section reviews literature that pertains to the delivery of projects relative to information technology. The second topic is a review of literature that presents distinctive characteristics to the delivery of projects specific to healthcare. The third topic is a review of literature relative to project management, specifically, how the project manager's leadership skills influence the project outcomes. The last section is a presentation of literature pertinent to the discussion of influences of behavioral and technical skills on the delivery of projects.

Project Management in Information Technology

Early research into the skills necessary to be successful in managing projects within an IT function focused on the systems analyst position. The systems analyst was, at one time, the position responsible for managing IT project delivery. Later the role of project delivery within IT was moved to individuals designated as project managers. In the position of IT project manager the individuals were responsible for the successful delivery of IT based projects. However, the role of IT project manager did not preclude the individual in that role from continuing to perform technical functions as well as managing project activity. To better understand the current state of IT project management it is necessary to understand the history of the development of IT project delivery.

Information Technology has gone through several changes in nomenclature; at one time the area of study now known as Information Technology was referenced as Information Systems or simply the computer department. This article will address the field of project management and information technology based on the activities of

individuals who performed the work using a consistent reference of "project manager" for those individuals who lead projects involving the delivery of information technology (IT) for those departments and functions that provide information utilizing computing machinery.

The IT department and the work performed within the department have been recognized as strategic to the success and long-term competitive advantage of the healthcare organization (Byrd, Lewis, & Turner, 2004; Glaser, 2007a, 2007b). Byrd et al. (2004) concluded from their research that there is strategic value associated with the knowledge and skills of the IT personnel in their organizations.

The Bureau of Labor Statistics, U.S. Department of Labor (2006-2007) defines the role of the IT project manager in terms of what a project manager in the IT department would do: "*Project managers* develop requirements, budgets, and schedules for their firms' information technology projects. They coordinate such projects from development through implementation, working with internal and external clients, vendors, consultants, and computer specialists" (p. 1). The complexity of the role of the IT project manager is further defined by distinguishing those project managers who possess a technical background and those who specialize in the field of project management and may have little or no experience with the technology prevalent in IT (Garton & McCulloch, 2006).

Project managers who manage projects related to IT are frequently confronted with projects where they are called on to implement systems to improve the use of resources with the expectation that the result of the project will be a more efficient organization. These projects are generally complex, involve multi-disciplinary team

members, and require inter-organizational teams to design, develop, and deliver the systems (Gillard, 2004)

Argyris (1970) published an early discussion of the aspects of project management within the computing systems environment. Argyris discusses the need for a more open environment where cooperation and collaboration are applied to project delivery rather than enforcing the strict rational and technical aspects of IT. In order to foster improvement in the introduction of Information Systems Argyris suggests that the individual responsible for project delivery must be more aware of "his personal feelings and his defenses" (p. 40).

In a later article, Argyris (1971) presents the effects of implementing information systems that tend to make information available to anyone on an equal basis while the business maintained the hierarchical structure common to a pyramidal organizational structure built on a hierarchical availability of information. Argyris also explores the various organizational and psychological conflicts created by the introduction of information systems that include the ability of upper management to measure performance across the enterprise and for the enterprise to measure the performance of upper management through a widespread availability of information. With the introduction of a higher order of information availability, Argyris argues that there is a more emotional aspect to implementation of information systems.

Drucker (1988) warned of the changes in organizational effectiveness that would be brought about by the availability of information and how the universal accessibility of information would serve to flatten the organizational structure. The same structural impact on the organization is discussed by Frenzel and Frenzel (2004). The importance of

the flattening of the organization due to the universal availability of information contributes to the difficulty in the implementation of IT projects in those organizations where the hierarchical nature of the organization is seen to be under attack as a result of the IT systems projects (Drucker, 1988; Frenzel & Frenzel, 2004).

The requirements of information systems to be rational in their approach to the manipulation and presentation of data and yet significantly impacting the emotional aspects of the environment presented a problem that Argyris (1982) later described with the statement "MIS were not humanized adequately" (p. 3) where MIS refers to "Management and Information Systems" – an older moniker for the current IT . Other studies were performed to determine the effect of behavioral and technical skills on project delivery (Cheney & Lyons, 1980; Dvir et al., 2006; Green, 1989; Jiang et al., 1998; Muzio et al., 2007).

Arvey and Hoyle (1974) recognized that there was a need for more diversity in the personnel within the information systems department because there were some activities that involved interaction with systems and other activities that involved interaction with people. Arvey and Hoyle referred to these two positions as "systems analyst" (p. 61) and "programmer analyst" (p. 61). Arvey and Hoyle determined that it was possible to adequately measure performance in these areas using a rating scale, supporting the concept of rating scales in further studies of the topic of a project manager's performance (Green, 1989; Jiang et al., 1998)

Some of the diversity necessary to support Project Management in an organization is dictated by the size and business structure of the organization. Attewell (1992) proposed a theory of innovation diffusion, specifically, business computing.

Attewell presented several organizational and operational considerations that affect the speed at which innovation is adopted. These considerations include: (a) the size of the firm; (b) profitability; innovation champions present in the firm; and (c) organization and environmental attributes that include the intensity of the competition and the degree of centralization. Attewell also discusses the methodology for diffusion of the innovation in terms of the source of the innovation, citing several studies indicating that there is a difference between the adoption of technical knowledge that was first developed in a public institution, a manufacturing environment, and a user organization (Freeman, 1963; Nasbeth & Ray, 1974; Pavitt, 1984; Ray, 1969, 1988; von Hippel, 1988).

Further support for differing issues that influence the implementation of information systems were introduced by de Guinea, Kelley and Hunter (2005). De Guinea et al. found that, in addition to the size of the institution, there were also differences in the successful implementation of projects in small businesses where the objective of the IT system development and implementation project varied. Goulielmous (2004) determined that information systems development is "a complex social and organizational process" (p. 383). IT system development is influenced by the organizational environment in which it occurs and should be viewed as a complex social activity (Cannon, 1994; Lederer & Nath, 1991; Willcocks & Margetts, 1994). Failure of IT projects may result from the complexity of the projects and the fact that many people are generally involved. Each of these participants/stakeholders will have a diverse view of the goals to be achieved (Venugopal, 2005). Venugopal suggests setting a single goal in order to simplify the IT project to achieve success. This approach may add to the complexity of projects by creating many smaller projects, but the result is a clear goal for

each. However, Vinaja (2005) suggests "Managing IT requires an integral view of these elements; a narrow focus on a specific element is a recipe for failure" (p. 64). Brooks (1975) also suggests that as projects grow they become more complex to manage.

Another problem facing IT project managers attempting to successfully complete IT projects may be the inability of the project manager to thoroughly transfer knowledge among diverse business and IT groups involved in the project (Karlsen & Gottschalk, 2004). The application of new technology requires an attitude of research and self-training in order to learn the products and processes being implemented. "Effective knowledge management reduces errors, creates less work, provides more independence in time and space for knowledge workers, generates fewer questions, produces better decisions, reinvents fewer wheels, advances customer relations, improves service, and develops profitability" (Karlsen & Gottschalk, 2004, p. 4).

Chulkov and Desai (2005) suggest that the bandit theory, when applied to project selection, would suggest that more complex and difficult projects would be proposed more often than less complex projects. However, Chulkov and Desai also propose that the more complex project selection may also be more advantageous and beneficial for the firm even though the probability of success is diminished.

The view of increasing the possibility of IT project success through limiting project size is supported by the description of a "geek" presented by Glen (2003) that "In general, geeks are rather ambivalent about joining groups. As introverts, they're most comfortable working alone, concentrating on problems small enough to be attacked by only one person" (p. 46).

The size of the project and an inability to transfer knowledge to large groups of stakeholders has lead to the development of an agile approach to project management. The agile project involves a smaller number of developers and a limited project size (Dalcher & Benediktsson, 2006). Dalcher and Benediktsson suggest that an ideal project would entail no more than six developers working for six months. This limited project scope and size allows the project team to more easily achieve the self-training and knowledge dissemination aspect of project success.

"Like all projects, those involving IT begin with a defined goal. However, IT projects have peculiarities that tend to blow project management problems out of proportion." (Awazu, Desouza, & Evaristo, 2004, p. 73). Taylor-Cummings (1998) proposes that "…IS project leaders will be at a disadvantage if they do not have the opportunity to develop referent power with their business counterparts, opportunities which they have been denied by physical isolation and separate socialization" (p. 34). One of the factors Taylor-Cummings found while researching the topic of team development and efficiency was that of "multi-disciplinary teams (versus the user of intermediaries or separate user/IS teams)" (p. 38). Austin, Hornberger, Shmerling, and Elliott (2000) suggest that further complications in IT based projects result from high concentrations of technical personnel on projects stating that "Technical personnel did not dominate successful projects" (p. 236).

Project Management in Healthcare

The total spent on Information Technology in the hospital market in 2006 was estimated to be between $11.6 and $12.8 billion while the possible savings estimated

from IT implementation in the hospital environment is over $77 billion per year (O'Dell, 2006). Hospital administrators estimate the greatest benefit of IT spending is patient safety with "improved operational efficiency" (p. 3) being the second greatest benefit. In addition to patient safety, other benefits expected from implementation of IT systems include support of the patient care function, facility administration and operations, and strategic decision making functions (Austin et al., 2000). "The health care world is increasingly being driven by information…" (Flower, 2006, p. 55).

Healthcare is increasingly turning to project management to deliver improved patient care (Kumpf & Wittelsberger, 2005). Those areas where project management is involved with healthcare include the large number of projects that do not directly relate to the delivery of care to the patient. The percentage of expense on non-patient care activities is estimated to be 75 percent of the total cost of healthcare delivery (Hadfield & Holmes, 2006). However, spending on IT projects has been found to be a benefit to the profitability of healthcare facilities (Menon, Lee, & Eldenburg, 2000). Haughton (2000) concludes that information will continue to be a source for improved delivery of health services and increases in efficient and accurate decision making. The ability to deliver projects successfully may also be considered a competitive advantage (Söderlund, 2005).

The Institute of Medicine (IOM) has estimated that medical errors add $37 billion to the cost of healthcare in the United States each year (Institute of Medicine, 2000). Crane and Crane (2006) conclude that medication errors in hospitals are system problems that require systems solutions. Implementing effective systems solutions require effective IT project management (Garton & McCulloch, 2006). The Institute of Medicine (2001a). concluded that "IT has enormous potential to improve the quality of health care with

regard to six aims: patient safety, effectiveness, patient-centered care, timeliness, efficiency, and equity" (p. 6). The Patient Safety and Quality Improvement Act of 2005 was passed to address the issue of patient safety (Feder, 2006).

In addition to the costs in dollars and lives associated with errors in healthcare, and the fact that these errors can be addressed successfully through IT (Institute of Medicine, 2001a), IT systems have become significant elements in the delivery of care. The criticality of effective IT project delivery is demonstrated by the report showing when IT systems installed at the London Ambulance Service failed there were between 20 and 30 people who lost their lives (Beynon-Davies & Lloyd-Williams, 1999) as a direct result of this system failure.

Another aspect of system failure is the difficulty inherent in successfully implementing IT projects within a healthcare environment. The cancellation of IT projects following high expenditures is demonstrated by the cancellation of the Wessex RISP project which resulted in a £20 million loss to the Wessex Regional Health Authority in the early 1990s (Beynon-Davies & Lloyd-Williams, 1999). More recently, cancellation of the Millennium Accounts Receivable System (MARS) in 2003 by HCA, one of the largest for-profit healthcare organizations, accounted for an estimated $110M to $130M loss for the company (Nashville Business Journal, 2003). Finally, the IT project failure at Bay Pines VA Medical Center in St. Petersburg, Florida which resulted in costs to the Department of Veterans Affairs of $278 million (Kearns, 2007).

Despite the recognized variation in projects when the size, objective, and industry are considered (Paul Attewell, 1992; de Guinea et al., 2005; Freeman, 1968; Nasbeth & Ray, 1974; Pavitt, 1984; Ray, 1969, 1988; von Hippel, 1988), the initial goals of one of

the first healthcare corporations, Healthcare Corporation of America (HCA) was to "apply management and cost reduction techniques that have been developed and implemented in other industries" (Rodengen, 2003, p. 17).

Mintzberg (2002) studied the work performed by various functions within the healthcare environment and found that there were numerous activities performed at various levels of the healthcare organization. Mintzberg (2002) concludes that there are "disconnections at every level, especially between clinical operations and management" (p. 204). Mintzberg also admits that the study of healthcare did not involve nursing and other functions within the healthcare environment with the implication that the addition of these functions would have further exacerbated the disconnection.

Where healthcare organizations fall within the context of small to medium enterprises (SME) the implementation of IT projects is hampered further by a lack of involvement by top executives and the use of outside resources for development and implementation (Caldeira & Ward, 2002). The effective delivery of IT projects in the healthcare environment frequently depends on numerous factors including the available time, the budget allocated, and the availability of resources to deliver the functionality required. However, one of the risk factors assessed during the risk assessment process is the experience of the project manager (Badri et al., 2001).

Dewey (1938) explains that "there is some kind of continuity in any case since every experience affects for better or worse the attitudes which help decide the quality of further experiences, by setting up certain preference and aversion, and making it easier or harder to act for this or that end" (p. 37). Dewey explains that certain experiences influence how a person will act or react when placed in other environments.

Project success is frequently related to the environment. Several authors have established a connection between the organizational setting in which projects are performed and the environmental attitude toward implementing change (Paul Attewell, 1987; Gray, 2001; Zuboff, 1988). Other authors have found a connection between the social and political aspects of the organization and the effect of these considerations on the ability to make change (Bariff & Galbraith, 1978; Burchell, Clubb, Hopwood, Hughes, & Nahaplet, 1980; Kling & Scacchi, 1980; Markus & Pfeffer, 1983; Markus & Robey, 1983).

Bernstein et al. (2007) determined that the key to successful adoption of new IT techniques in healthcare required involvement by the end user(s) concluding that "users are less likely to use technology if there is no direct visible benefit to them in the performance of their job" (p. 22). Garcia and Turner (2006), however, provide the argument that successful project delivery is dependent on the maturity of the organization to accept process improvement. Garcia and Turner also point out that organizations that have successfully implemented process improvement methodologies are more likely to be capable of implementing further process improvement.

One aspect of healthcare project implementation is the level of involvement of the physician in various aspects of the implementation process and acceptance by the physician of the changed environment or process. One study of cardiac surgery centers in 16 hospitals found that the methods used to implement the change significantly influenced the outcome of the project (Edmonson, Bohmer, & Pisano, 2001). Edmonson et al. found that the process required to successfully implement technological change in the hospital operating room environment involved the four step of enrollment,

preparation, trials, and reflection. Edmonson et al. also found that doctors who participated in successful project implementation found that their roles were changed from that of order giver to one of team member.

Caldwell et al. (2005) found that the successful implementation of Lean projects in a healthcare environment required involvement of the physicians whose work was most directly influenced by the project outcomes. A further complicating factor in healthcare projects was the need to "educate physicians in all aspects of healthcare management…" (Caldwell et al., 2005, p. 45) to positively influence project acceptance. Cerón (2007) presents a case where successful outcomes, such as a 27 percent decrease in hospital mortality in Intensive Care Units (ICUs), can be achieved through implementation of highly complex systems requiring a team approach including physicians, nurses, and hospital administration. Cerón's conclusions suggest that the project manager should be proficient in team building skills.

Crane and Crane (2006) suggest that medication errors, estimated to cause between 44,000 and 98,000 deaths per year (Institute of Medicine, 2001b), could be addressed through more integrated systems rather than the current practice of implementing isolated solutions to complex problems. Crane and Crane also suggest that "no hospital has put together an innovative and integrated solution to the medication error problem" (p. 6). A major problem with developing solutions to these complex problems in healthcare is the team approach required for the solution in an environment of highly trained and independent professionals (Drucker, 1988).

Another complication to successful implementation of IT projects in the healthcare environment is the need to address the relative power over the adoption or

resistance to change frequently exerted on the part of physicians. The ability to implement effective IT projects may require change in the structure of the healthcare organization to be effective (Doolin, 2004). Drucker (1988) points out that hospitals have numerous specialties with their own language and their own knowledge that may report directly to executive management in the hospital organization. Drucker suggests the organization of this common healthcare structure is further complicated by the presence of numerous ad hoc teams. Gray (2001) suggests that literature on knowledge management supports the concept that organizations are formed by the stocking and the flow of knowledge.

According to Herzlinger (2006), in the healthcare environment there are numerous issues that influence the outcome of project delivery. These issues include the consumer focus on healthcare and the efforts to provide services needed and requested by the patient. A second issue presented by Herzlinger is the complexity of the technology involved in the delivery of healthcare services. Thirdly, the business model of the healthcare environment with the small groups formed by practicing physicians, the diversity of the knowledge required in each of the areas of specialization, and the number of providers that may be involved in the care of a patient at any one time. Herzlinger provides the example that as many as five specialists may be involved in the care of a patient with diabetes.

In one study of healthcare facility executives, where the executives were asked to rank their perceived importance of seven principles and responsibilities for IT, the principle of most importance was the "employment of effective project management in

systems development" (Austin et al., 2000, p. 236). The seven principles and responsibilities studied included

1. Strategic information systems planning
2. Employment of a user focus in system development
3. Recruiting of competent personnel
4. Information systems integration
5. Protection of information security and confidentiality
6. Employment of effective project management in systems development
7. Post-implementation evaluation of information systems

Badri et al. (2001) proposed a methodology to determine the probability of success in IT project delivery in the healthcare environment finding that there were several criteria, other than management factors, that affected the success of project delivery. These factors included time, cost, and the availability of resources necessary to deliver the desired outcome, which are the same three factors the project manager is expected to manage during the course of the project (PMI Standards Committee, 2004).

One aspect of project management that was not directly evaluated as part of the previous studies utilized as background on the necessary behavioral and technical skills referenced in this research (Cheney & Lyons, 1980; Green, 1989; Jiang et al., 1998) is the ability of the project manager to maintain flexibility when moving from one project to another. Supporting projects frequently requires the project manager to lead various teams, either while managing several projects concurrently or moving from one project to another in a series of activities. Consideration of the project manager's ability to adapt to different teams was not evaluated by the three previous studies by Cheney and Lyons,

Green, and Jiang et al. Baumgardner (2007) evaluated the ability of military personnel to transition among military healthcare environments. Baumgardner found that there were several characteristics necessary to successfully transition between projects. The characteristics defined by Baumgardner are (a) knowledge and awareness of the organization, (b) ethics and positive attitude, (c) personality traits, (d) socialization and communication, (e) competence development and (f) relationship development by engagement.

The impact of the Baumgardner (2007) study on this research is Baumgardner's conclusion that when the military healthcare personnel have the ability to transition quickly "activities like project preplanning, implementation of an individual's skill sets and team performance are achieved sooner" (p. 54). Because of the recognized influence of the time required to become effective in a new position, this study must consider the amount of time the respondents have been in their current position and the amount of time they have been in project management in order to accurately evaluate the ability to successfully apply the behavioral and technical skills.

Benbasat et al. (1980) studied the impact of the maturity of the IT organization on the skills perceived as necessary for successful project delivery. The Benbasat et al. study evaluated the skills necessary by IT personnel when viewed in the context of the maturity of the organization. Benbasat et al. found that the more mature the organization the more useful generalist's skills were perceived necessary for success. Technical skills tend to create a situation where solutions are sought within a "narrow technical framework" (p. 32).

An evaluation of IT within the healthcare industry found that the key to successful IT adaptation in healthcare is communications and that project management is key to IT success in healthcare because IT implementations generally meet the criteria for a project as defined by PMI. Another finding from the same research is that a successful implementation phase is the key to successful project delivery in healthcare (Bernstein et al., 2007).

Adding to the difficulty of successful project delivery in the healthcare environment is the complexity of project requirements as a result of legislation such as the Sarbanes-Oxley Act (SOX) and the Healthcare Insurance Portability and Accountability Act (HIPAA). Changes in the business environment including Group Purchasing Organizations (GPOs) and e-Commerce business-to-business (B2B) supply chain activities have added to the complexity and skill requirements of the healthcare project manager (Burns, 2002).

Project management in healthcare is further complicated by an environment where "fragmentation and potential adversarial positioning complicate workflow sequences, leaving them much less stable, unpredictable, and lacking in linear order compared with other industries" (Minard, 1999, p. 93). Minard also points out that physicians do not need information technology to care for patients and to perform medical processes. IT systems are frequently seen as slowing the process rather than enhancing patient care.

However, several government regulations have created a requirement for IT project management to implement functionality at some of the basic operational levels of the healthcare entity. These include the Health Insurance Portability and Accountability

Act (HIPAA), Sarbanes-Oxley Act (SOX), and the Gramm-Leach-Bliley Act (Al Mamun, Hassan, & Lai, 2004; Robinson, 2005; Simmons, 2005). Literature supports the need for a Business Analyst (BA) function in IT projects as a means of supporting project success by bridging the gap that exists between the business functions and the IT functions (Armour, 2004; Kodaganallur & Shim, 2006; F. W. Taylor, 1998).

Herzlinger (2006) lists "six forces that can drive innovation – or kill it" (p. 61) with specific emphasis on these six forces in the healthcare area. These forces include

1. The players – those involved in the process
2. The funding – the amount of money allocated to the innovation
3. The policy – what regulations, business requirements, or medical discovery is driving the need to change
4. The technology – what role does the adoption of new technology play in the acceptance of innovation
5. The customer – what does the patient/consumer need and want
6. Accountability – the requirement that the patient/consumer, the insurer, and the healthcare community expect in order to maintain the accountability of the physician, the facility, or the practice.

Herzlinger (2006) cites HCA (formerly Healthcare Corporation of America) as innovators of a healthcare business model that allowed for consolidation of services across dozens of hospital facilities and lowering the cost to deliver healthcare services to the patient/consumer. Despite recognized advantages to the adoption of information technology as a benefit to healthcare delivery, the healthcare industry lags behind other industries in the strategic application of IT (Minard, 1999). Minard believes that one cause for this lack of adoption of IT in healthcare may be the result of the business model where the processes are more complex and more labor intensive. Minard also believes

that administrators of healthcare facilities are frequently physicians or they have graduated from healthcare administration programs and their training will lead them to seek the right answer as a result of their approach to patient risk. This distinguishes healthcare decision makers from leaders in other business environments who may have business or MBA degrees that will lead them to seek a more incremental and flexible approach where adjustments can be made along the path.

In a discussion of telemedicine programs, Hu and Chau (1999) discuss their observation that in areas where the physician is considered a user of the new technology, it is an imperative for project success that the physician accept the new technology. Hu and Chau also note that various organizational and provider models will have differing impacts on the acceptance of new technology. Where the patient has more information and more approval authority over services provided, the physician may be less likely to be capable of maintaining control of the services and technology being provided.

Project Management and Leadership

Abramson (2007) specifies eight different common leadership theories including transactional, transformational, situational, behavioral, attribution, ethical, charismatic, and visionary theories. Abramson also recognizes that there are an untold number of other theories of leadership that have been proposed and studied. The "best practice" today is situational leadership (Twentyman, 2007). Situational leadership was introduced by Hersey and Blanchard (1977, 1985) and continues to be studied today as a viable approach to management leadership (Ralph, 2005). Situational leadership is applicable to the management of complex and changing environments where project managers

frequently find themselves (Grover & Walker, 2003). Situational leadership theory has been studied in relation to project management and found to be an effective leadership approach (Lee-Kelley, 2002; Moorcroft, 2004; Silverthorne, 2000; Strang, 2005; Turner & Müller, 2005). Yukl (1989) even suggests that situational leadership theory is preferred in the area of project management. Gillard (2004) suggests the diversity of activity involved in project management, including meeting with team members, stakeholders, customers, and organizational leaders, requires situation leadership in order for the project manager to be effective.

Leadership traits have been studied for much of the 20th century. Jennings (1960) notes that by 1940 there had already been at least 20 studies of leadership traits and that these studies had recognized 79 leadership traits. Later studies recognized that there was a distinction between behavioral and technical skills (Arvey & Hoyle, 1974; Benbasat et al., 1980). Cheney and Lyons (1980) recognized 25 different behavioral and technical skills for IT professionals. Cheney and Lyons also recognized that the "planning and control of systems projects" (p. 42) was a category ranked second in importance by managers in 32 of the largest corporations at the time of the study, 1980.

In a study published in 2007, Gehring (2007) proposed that there were differences between the skills necessary for general management and the leadership skills necessary for project managers to be successful. Gehring proposed that management skills, such as planning, problem solving, and allocating tasks to resources, are necessary for project managers to be successful, but leadership skills are also required. Gehring states "…if you cannot get people to use their skills appropriately, they are of little use to the project"

(p. 45). Selg and Rihel (2007) describe project leadership as "the ability to get things done well through others" (p. PM52).

Calisir and Gumussoy (2005) report that the top three problems found to plague IT projects are priority shifts, insufficient front-end planning, and technical complexities. Bernstein et al. (2007) suggest other problems affecting IT projects are budget, supportive leadership, project management, implementation, and end user involvement. The reason for the high level of priority shift and the difficulties with project management stem from the fact that project management was found to "employ an accommodating style in successfully managing conflict and disagreement" (Calisir & Gumussoy, 2005, p. 635). There is no clear and consistent source of authority of the project manager other than that authority gained from their reputation as a project manager (Gillard, 2004).

Loppnow (2007) determined that success in the implementation of clinical information systems depended on leadership that was both visionary and committed to the process. According to Loppnow, the reason the ability to see the whole picture and commitment to the project is necessary is due to the high operational and strategic level at which these systems are implemented. Tucker (2004) concludes that operational failure may result from a lack of leadership involvement in the project delivery process.

Project Management and the 21 Behavioral and Technical Skills

Glover (2005) disclosed that in 2003 the federal government of the United States reported that 771 projects were in trouble and that $20.9 billion in project expenditures was at risk. The solution proposed by Glover was for the government to recognize the

shortage of experienced and capable project managers. Glover also suggested that the government develop project management skills that include the ability to critically analyze, plan intelligently, manage personnel, and develop change control and communications strategies. A weak project manager has been defined as one of several reasons for project failure (Jiang, Klein, & Balloun, 1996; Kappelman, McKeeman, & Zhang, 2006; Pinto & Slevin, 1987). It is also important to the successful delivery of projects that the project manager be capable of recognizing issues that arise and that the project manager possesses the necessary skills to address them. The skills development process is frequently the result of experience (Anonymous, 2003).

The IT project manager must manage a team of users, developers, database administrators, other IT professionals, and various stakeholders (Garton & McCulloch, 2006). Difficulties arise in project management when attempting to ensure end user involvement for a successful project delivery (Baroudi, Olson, & Ives, 1986). The project manager must also work with IT professionals involved in the project. Glen (2003) discusses the IT professional ("geek") and methods of leading "geekwork." While discussing an IT professional's involvement in projects Glen suggests

> If you want to optimize geekwork, it's important to think carefully about projects – to examine their effects and understand the differences between true projects and other forms of work that may not provide the same benefits. Then you must build an organization designed to support projects rather than simply tolerate them. (p. 180)

Glen (2003) expresses the opinion that the project is ideally suited to the IT professional and that the project is an ideal way to increase the productivity of the IT professional. However, the fact that many IT projects fail doesn't seem to support this viewpoint (Ewusi-Mensah, 1997). A lack of effective communications may be a

contributing factor to the failed project (Avison, Gregor, & Wilson, 2006; Beise, Niederman, & Mattord, 2004).

Gillard (Gillard, 2004) suggests that the project manager can only exercise authority over current projects. The concept of authority for the project is a result of both the implied authority over the project activity and authority the project manager has garnered from personal influence. Leadership of the project team requires the project manager to exercise the proper type of authority in concert with the current situation.

While Gorla and Lam (2004) suggest that the project team should be developed from an analysis of the personality types involved in order to build an effective IT project team the research indicates that there is a specific set of skills in addition to the personality types required to achieve success (S. Taylor, 2005). Other studies have proposed a mix of various organizational and behavioral knowledge and skills must be utilized in effective IT delivery (Chang & King, 2000, December; Cheney, Hale, & Kasper, 1989, January; Darais, Rice, Nelson, & Buche, 2001, December; Dhillon & Lee, 2000, December; Lee, Trauth, & Farwell, 1995; Leitheiser, 1992; McMurtrey, Grover, Teng, & Lightner, 2002; Nelson, 1991; Rockart, Earl, & Ross, 1996; Ross, Beath, & Goodhue, 1996; Tu, Ragunathan, & Ragunathan, 2001; Watson, Young, Miranda, Robichaux, & Seeley, 1990). Still other studies have revealed a correlation between the knowledge and skills of the IT personnel and the ability of the corporate entity to remain competitive and to maintain flexibility within the IT environment (Byrd et al., 2004).

Jiang et al. (1998) included 18 of the 21 behavioral and technical skills utilized by Green (1989) in their study of the perceived importance of various behavioral and technical skills among project managers. Green had earlier pursued a study of the

perceived importance of 21 recognized behavioral and technical skills among system analysts. The 21 skills utilized in the Green study were derived from 25 behavioral and technical skills previously published by Cheney and Lyons (1980). Cheney and Lyons studied the perceived importance of the 25 skills as they were perceived to be important in three IT functions including (a) Data Center Manager, (b) Systems Analyst, and (c) Programmer. Several of these skills were determined by Green to not apply when considering the behavioral and technical skills of the systems analyst function alone.

The Cheney and Lyons (1980) study included the use of personal interviews and a questionnaire and included 32 information systems managers to determine their view of the relative importance of 25 behavioral and technical skills of several job functions found within the IT structure at that time. Cheney and Lyons report that the most important skill area for the systems analyst at that time was systems design. The definition of a systems analyst presented by Cheney and Lyons considered a more technical individual who would be responsible for defining the system requirements of the end user or customer. The programmer was responsible for the programming of the application following definition by the systems analyst. There is no mention in the Cheney and Lyons study of a project or a project management function. Delivery of the application as requested by the end user or customer was the responsibility of the systems analyst. Austin et al. (2000) found that successful projects were not generally lead by technical personnel, but rather involved a more diverse team of multidisciplinary personnel.

Categorization of the skills necessary for successful project management is also inconsistent. El-Sabaa (2001) proposes that there are three categories of skills necessary

to be a successful project manager. These skills include: (a) human skills, (b) conceptual and organizational skills, and (c) technical skills. El-Sabaa explains that the human skills are those skills that allow a person to be group oriented and to work well in teams. El-Sabaa uses the term "conceptual and organizational skills" (p. 2) to describe those skills that provide the project manager with the ability to view the project in its entirety including all interrelationships. In addition, the project manager must also be able to view the project in terms of the impact on the organization. The term "technical skills" (p. 2) provided by El-Sabaa is explained as the experience or knowledge of the technology being implemented that the project manager must possess in order to be successful. "Technical skills" (p. 2) also refers to the analytical ability of the project manager. Others suggest that the project manager simply needs to be detail-oriented to be successful (Cammarano, 1997).

Garton and McCulloch (2006) present nine skills necessary for successful project management. The nine skills suggested by Garton and McCulloch are

1. Organizational skills
2. Leadership
3. People management
4. Communication
5. Time management
6. Technical or specialized knowledge and understanding
7. Business management
8. Creating and giving presentations

9. A working knowledge of various business tools including e-mail, word processing, web browsers, and a project management system such as Microsoft Project or Primavera.

Summary

The diversity of the above mentioned studies and their findings indicates that there is very little consistency to findings from prior research to indicate what technical and behavioral skills are necessary to achieve successful project management. The diversity of results also implies that there may be effects from other factors, such as the environment where the projects are being conducted, that influence the behavioral and technical skills necessary for success. This research will categorize the results within a narrow environmental spectrum to determine what consistencies and variances exist within healthcare related entities. This research also recognizes that there are differences that exist even within the realm of healthcare project management that may influence the factors necessary for success.

The research questions 1, 2, and 3 address the perceived importance of the 21 behavioral and technical skills within healthcare environments from the viewpoint of all respondents, from the viewpoint of participating project managers and from the viewpoint of non-project-managers. The research published by Jiang et al. (1998) and Green (1989) included no participants from healthcare environments. Green found there were significant differences (viewed at the .05 level of significance) in the perceived relative importance of behavioral and technical between users and analysts for diplomacy, directing, assertiveness, programming, speaking, sales, politics, and nonverbal communications.

The significance of the differences in the perceived importance of behavioral skills and behaviors between healthcare environments and other environments could lead to problems when viewing overall experience of the project manager as a hiring criteria rather than distinguishing experience in the healthcare environments from experience in other environments. Jiang et al. (1998) recognized the significance of the differing experiences with the statement that "To the extent that there are differences, training and selection programs should take these differences into account" (p. 3). Other research suggests that there are differences in project success resulting from the experience level of the project manager and in the organizational structure in which the project delivery takes place (Schenk, Vitalari, & Davis, 1998; Stock, McFadden, & Gowen III, 2007).

Research questions 4, 5, and 6 address differences in the perceived importance of the 21 behavioral and technical skills when evaluated for the viewpoint of project managers and non-project-managers in for-profit and not-for-profit healthcare environments. Green (1989) and Jiang et al. (1998) recognized differences in organizational structures and the perceived importance of the 21 behavioral and technical skills. Where Jiang et al. suggest that the importance placed on the behavioral and technical skills may even vary with the maturity of the organization, Green suggested that " Further research on organizational context issues is recommended"(p. 131). Green had studied the perceived importance of the 21 behavioral and technical skills from the viewpoint of employees within private and public sector organizations and found significant differences of opinion between members of the two organizational structures. Green also suggests that various organizations have varying governmental regulations

and reporting requirements which could influence the importance placed on various project manager skills and behaviors.

Research questions 7, 8, and 9 require evaluation of the perceived importance of the various 21 behavioral and technical skills when viewed by project managers and non-project-managers in six different healthcare environments: Healthcare organization corporate offices, hospitals, clinics, physician's offices, retirement communities, and other healthcare organizations. These healthcare environments differ to various degrees in numerous aspects of project delivery including contact with patients, technology utilization, interaction with healthcare professionals, employee involvement in project delivery, and patient healthcare delivery considerations. Green (1989) concluded that "…further research is necessary to determine the content and context of the systems analyst job [project manager] function" (p. 131). Snyder (2000) suggests that there may also be differences in the reporting and ownership hierarchy of entities in an organization in terms of the success factors and behavioral skills of project management. Whereas Stock et al. (2007) suggest that the organizational culture may influence the ability to deliver quality healthcare, organizational culture may also influence project delivery outcomes.

Evaluation of research questions 10, 11, and 12 requires consideration for the perceived importance of the various 21 behavioral and technical skills by the respondents (all respondents, project manager respondents, and non-project-manager respondents) and the size of the organization as measured by the approximate number of employees. The difference in the size of the organization can be an influence in the structure of the project delivery organization and the importance placed on project success. Larger organizations

may have numerous projects and may, therefore, utilize a project management office (PMO), whereas, smaller firms may require that functional managers accept the additional burden of project management as part of their workload. Firms that utilize dedicated project managers may perceive the importance placed on various skills and behaviors differently than firms that do not utilize dedicated project managers (Glaser, 2007b; Lederer & Nath, 1991; Minard, 1999; Schmitz, 1999; Skipper & Bell, 2006; Stock et al., 2007; Strait, 2006). Contrary to the conclusions derived by the numerous studies mentioned above was the conclusion presented by Snyder (2000) that "Since project management behaviors were consistently rated to be of average importance or above this can be interpreted that such approaches are universally valued across facilities of all sizes" (p. 106). Snyder's study of the perceived importance of project management in healthcare also states that the size of the organization was "not considered relevant and not assessed" (p. 102).

The next chapter will discuss the research methodology used to determine the perceived importance of the 21 behavioral and technical skills among various healthcare and non-healthcare groups and the influences on these prioritizations.

CHAPTER 3. METHODOLOGY

Purpose of the Research

The purpose of this research was to analyze differences in the perception of the importance of 21 behavioral and technical skills as outlined by Green (1989) among project managers and others involved with project delivery in various healthcare environments including for-profit and not-for-profit healthcare environments and among the various sizes and types of healthcare facilities. This research compared the perceived importance of the 21 behavioral and technical skills determined from responses from participants in the current research to participants in previous research where the same list of skills was utilized.

Introduction

This research was designed to determine the perceived significance of the 21 behavioral and technical skills recognized as necessary for successful project completion by project managers and others who work in the healthcare environment. The 21 technical and behavioral skills evaluated in this research were initially defined and evaluated in a research study by Green (1989). Green evaluated the perceived importance of the 21 behavioral and technical skills determined necessary for system analysts to possess to achieve successful systems development and delivery. Table 1, presented earlier in this study, provides the words and phrases used by Green to describe the 21

skills along with Green's definition of the term for the purpose of the questionnaire distributed in 1989.

Jiang, Klein, and Margulis (1998) utilized 18 of the 21 behavioral and technical skills originally defined and used in the study by Green (1989) in their study of the behavioral and technical skills necessary for project managers to be effective in the delivery of successful projects. The Jiang et al. (1998) study and the Green (1989) study did not include project manager or systems analysts involved in the healthcare environments in their research.

Green (1989) utilized a 2 x 2 experimental design with the first independent variable being the whether the respondent was in the private or public sector. The second independent variable was an indicator whether the respondent was a systems analyst or a member of the user community.

Jiang et al. (1998) used a similar instrument to the one used by Green (1989), incorporating a five-point Likert scale with 1 = very unimportant and 5 = very important for each of the behavioral and technical skills utilized in the earlier research by Green. Jiang et al. did not distinguish between organizational affiliations and the study only included project managers in the sample.

The current research utilized a survey instrument incorporating inquiry aspects similar to the one incorporated in the Green (1989) study as it relates to the 21 behavioral and technical skills. However, the Green study was conducted using printed questionnaires which were distributed via the United States Postal Service. This study distributed a request to participate in the study via e-mail and the questionnaire was available in an online Internet format. Additional questions not included in the Green

study were included in the online questionnaire utilized in this research to gather information regarding the current project management responsibilities of the person completing the questionnaire and to discern the type and size of healthcare facility at which the respondent is engaged.

This research is designed to determine the perceived significance of behavioral and technical skills recognized by project managers and others working in healthcare environments as necessary for successful project completion. The current research study utilized an online questionnaire designed to rank the perceived importance of 21 behavioral and technical skills of project managers previously used by Green (1989). The complete list of behavioral and technical skills is presented, with the explanation of the terms provided by Green in the 1989 study, in Table 1.

This research study compares the views of the project managers involved in the delivery of projects within the healthcare industry with the view of project stakeholders and other project resources involved in healthcare industry projects. This research also compares the views of the project managers and others involved in projects conducted within for-profit healthcare with the views of project managers and others involved with project delivery in the not-for-profit healthcare environments. Comparisons are also made between the perceived importance of the 21 behavioral and technical skills among participants grouped by the size of the organization and the type of healthcare organization with which they are associated.

The research performed by Green (1989) studied the perceived importance placed on behavioral and technical skills from two viewpoints. The first view was an analysis of possible differences between the view of the systems analyst and the view of the users

regarding the importance of behavioral and technical skills of the systems analyst. Whereas Green contrasted the differences in perceived importance of the 21 behavioral and technical skills between systems analysts and users, this research studies the possible difference in the perceived importance of the same 21 behavioral and technical skills and how these views differ between project managers and others involved in the projects, but with the added refinement of isolating the viewpoints of these two groups within the healthcare environment.

Each of the questions answered by this research addresses the perceived difference in the perception of project managers and project participants, other than the project managers, when addressing the importance of the 21 behavioral and technical skills to the project manager's ability to successfully deliver projects. The individuals included as participants other than project managers are those individuals who were included in the Project Management Institute Healthcare Specific Interest Group (PMI Healthcare SIG) e-mail distribution list and who responded in the questionnaire that they are not project managers.

The participants, other than those directly involved in project management, may include those responsible for managing project managers, consumers of the project deliverables and other stakeholders in project delivery. Other individuals involved in the projects may include project sponsors, project resources such as consultants and programmers, and project stakeholders. These individuals may include individuals interested in the topic of healthcare project management, individuals who are participating in projects conducted within the healthcare environment, individuals

managing project managers involved in the healthcare industry, or stakeholders in healthcare project delivery.

The questionnaire was distributed to individuals who were included on the PMI Healthcare SIG e-mail distribution list. It was assumed that inclusion on the PMI Healthcare SIG e-mail list indicated an involvement or interest in the field of project management within the healthcare environment. Three research questions were formulated to address the aspect of the research dealing directly with the perceived importance of the 21 behavioral and technical skills in healthcare project delivery.

1. What is the perceived relative importance of the 21 behavioral and technical skills are perceived to be most important for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects outside the healthcare industry?

2. What is the perceived relative importance placed on the 21 behavioral and technical skills of the healthcare project manager from the viewpoint of the project manager and does this relative importance placed on the 21 behavioral and technical skills differ significantly from project managers outside the healthcare industry?

3. What is the perceived relative importance placed on the 21 behavioral and technical skills of the healthcare project manager from the viewpoint of individuals, other than project managers, involved in the project and does this relative importance placed on the 21 behavioral and technical skills differ significantly from individuals involved with projects, other than project managers, outside the healthcare industry?

The above questions address the significance of the perceived importance of the 21 behavioral and technical skills of project managers and others involved in the projects that occur within any healthcare organizations.

A second aspect of Green's (1989) research involved the study of the perceived differences in the importance placed on the 21 behavioral and technical skills between public organizations and private organizations. The purpose for Green's study of this

aspect of systems analysis was to determine if there exists a difference in the perceived importance of the 21 behavioral and technical skills in different organizational structures.

This research attempts to determine if there is a difference in the perceived importance of the 21 behavioral and technical skills within the healthcare environment, but with a distinction being made between differences in perception possible between two distinct healthcare environments. Similar to the distinction Green (1989) made between public and private organizations there may be differences between the perceived importance of the 21 behavioral and technical skills necessary for project managers to achieve successful project completion when viewed from within the for-profit healthcare organization and not-for-profit healthcare organization. As in the case of the healthcare and non-healthcare environments, it is important to understand if there is a difference between the perceptions of the project managers and others involved in projects when viewed from within for-profit and not-for-profit healthcare environments. The questions developed to address the project manager's viewpoint of the study are:

4. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in for-profit versus not-for-profit healthcare environments?

5. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in for-profit versus not-for-profit healthcare environments?

6. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of non-project managers involved with projects in for-profit versus not-for-profit healthcare environments?

The above questions make a distinction between possible importance being placed on the 21 behavioral and technical skills when viewed by the project managers and the viewpoint of others (non-project managers) in for-profit healthcare as opposed to the perceived importance placed on the 21 behavioral and technical skills of project managers involved with not-for-profit healthcare environments.

Similar to differences that may exist between organizational structures in a for-profit versus not-for-profit organization are differences in the organizational structure that may exist between the categories of healthcare organization. In order to determine if there are differences between various categories of healthcare organization, this research attempts to determine if there are significant differences between the following categories of healthcare organizations: corporate office, hospital, clinic, physician's office, retirement community, and other.

7. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in the various types of healthcare environments?

8. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in the various types of healthcare environments?

9. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of others (non-project managers) involved with projects in the various types of healthcare environments?

The above questions address a possible difference in the importance being placed on the 21 behavioral and technical skills of project managers when viewed by project

managers and individuals other than the project managers in the various types of healthcare environments. The following questions address the differences possible between project managers and other involved with projects and project delivery when viewed from the standpoint of various sizes of healthcare organizations. The size of the organization is determined by an estimated number of employees in the organization.

10. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers and others involved with projects in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

11. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of project managers in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

12. Is there a significant difference in the relative importance of the 21 behavioral and technical skills perceived necessary for project managers to possess to assure project success when working within the healthcare environment from the viewpoint of others (non-project managers) involved with projects in the various sizes of healthcare environments, where the size of the organization is measured in terms of the approximate number of employees in the organization?

Research Hypotheses

The questions and hypotheses reference the 21 behavioral and technical skills thought to be important for successful project managers to possess in order to deliver effectively deliver projects. These 21 behavioral and technical skills were developed in the 1989 study conducted by Green (1989). Green's explanation of these 21 behavioral

and technical skills is presented in Table 1. This researcher developed the following hypotheses from the above questions.

Hypothesis 1

$H1_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects in this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

$H1_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects as a result of this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

Hypothesis 2

$H2_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects in this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H2_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects as a result of this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

Hypothesis 3

$H3_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects in this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H3_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects as a result of this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

Hypothesis 4

$H4_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H4_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 5

$H5_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H5_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 6

$H6_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H6_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 7

$H7_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

$H7_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 8

$H8_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

$H8_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 9

$H9_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

$H9_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 10

$H10_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H10_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Hypothesis 11

$H11_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H11_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Hypothesis 12

$H12_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H12_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of

healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Research Design

This study utilized a mixed method research design that included an online Internet-based questionnaire incorporating pertinent aspects of the survey developed by Green (1989) and later utilized by Jiang et al. (1998). The electronic questionnaire was developed using an online Internet platform (www.SurveyMonkey.com). Invitations to participate in the survey were distributed via e-mail to approximately 2,417 members of the Project Management Institute's Healthcare Specific Interest Group (PMI Healthcare SIG).

The initial response from members of the PMI Healthcare SIG was found to be sufficient for the purpose of this study and requests from other organizations to participate were not necessary. Following the responses of the participants to the questionnaire and evaluation of the data developed from these responses, interviews were conducted to clarify the findings and to develop a more thorough understanding of the results. The phone interviews were conducted among project managers and others involved in the healthcare environment who indicated their approval to be contacted through completion of a separate contact authorization form included with the online questionnaire. The query regarding a follow-up interview was incorporated in the initial questionnaire and provided for an anonymous entry of information regarding the best time to contact the individual and his or her telephone contact information. This contact

information was destroyed following the interview and all interviews are referenced using generic comments and a sequential numbering scheme to ensure anonymity.

The determination to utilize a mixed method research approach was the result of an evaluation of the benefits and limitations of research conducted using various approaches. The primary concerns relative to the online questionnaire were anchored in a perception that the results derived from the questionnaire alone would not be sufficiently useful in providing answers to assist in improving the outcomes of project management efforts. A generalizable conclusion is not possible without qualitative analysis as a means of explaining the results (Arbnor & Bjerke, 1997).

Sample

The target population was members of the PMI Healthcare SIG and individuals included on the PMI Healthcare SIG e-mail distribution list. At the time of the study there were approximately 2,417 members of the PMI Healthcare SIG who, through their association with the PMI Healthcare SIG, are assumed to participate in project management in the healthcare environment. A query included in the questionnaire was used to determine an independent variable indicating if the respondent is currently working in the healthcare field. The participant did not need to be employed by a healthcare organization to be active in the healthcare environment. For example, a project manager working for a solution provider organization providing healthcare records management systems would be considered as a participant working in the healthcare environment.

Membership in the Project Management Institute (PMI) is assumed to indicate that these individuals participate to some degree in project environments. A query incorporated in the online questionnaire was used to determine the independent variable indicating if the respondent is currently responsible for project management as part of his or her daily activities.

An invitation to participate in the online Internet based questionnaire was distributed to the then-current e-mail address of the approximate 2,417 members of the PMI Healthcare SIG and others who had indicated a preference to be included on the PMI Healthcare SIG e-mail distribution list. The PMI Healthcare SIG did not provide the e-mail addresses to this researcher, but the PMI Healthcare SIG did distribute the invitation to participate under the PMI Healthcare SIG e-mail address and letterhead. A link to the online survey was included in the invitation sent to the PMI Healthcare SIG e-mail list. The purpose for the study and instructions on how to participate in the survey were included in the e-mail. The e-mail was sent to the PMI Healthcare SIG members with approval from the then-President of the PMI Healthcare SIG. The PMI Healthcare SIG webmaster prepared the e-mail and initiated the send process.

A follow-up e-mail was sent to the PMI Healthcare SIG e-mail list after a one-week waiting period providing a second opportunity for the members to respond to the questionnaire. A second follow-up e-mail was sent to the PMI Healthcare SIG e-mail list after a second week.

The population sampled consisted of the members of the PMI Healthcare SIG. The membership of the PMI Healthcare SIG is an appropriate population to conduct the research due to the involvement of these individuals in healthcare project delivery and

project management as demonstrated by their membership in the organization. For this research study the sample was drawn from the approximate 2,417 members of the PMI Healthcare SIG at the time the invitation to participate in this survey was distributed.

An *a priori* power analysis was conducted to determine the sample size required to detect a small effect size (f^2 (V) = 0.20) with power = 0.80 for a one-way multivariate analysis of variance (MANOVA). The analysis showed a total sample size of 76 would be appropriate, with approximately 25 participants for each independent variable where three independent variables would be included in the analysis. A sample size of 67 participants would be required, with approximately 33 participants per independent variable where two independent variables are included in the analysis.

Consent to conduct research within the PMI Healthcare SIG was requested and the then-President and then-board of directors of the PMI Healthcare SIG approved the distribution of the invitation to participate to the members of the PMI Healthcare SIG and others on the e-mail list. Consent to participate in the survey was included as the initial form presented to the participant upon linking from the e-mail invitation to the SurveyMonkey.com Universal Resource Locator (URL). Background information was requested in the first several questions to determine whether or not the participant was employed as a project manager, what type of certification and licensure the participants held, the type of organization where the participant is engaged, and the size of the organization in which they are engaged based on the number of employees. This background information was utilized in the research to respond to the various hypotheses.

Setting

The questionnaire was hosted by an online Internet platform managed by SurveyMonkey.com. An invitation to participate in the study was distributed via e-mail to the members of PMI Healthcare SIG and others on their e-mail distribution list. Instructions on how to participate were included in the body of the e-mail message and an electronic link to the URL of the online Internet questionnaire was included in the body of the e-mail message. Recipients of the e-mail were able to link to the URL directly from within the e-mail message.

The personal interview phase of the study was conducted via phone with those individuals who indicated it would be acceptable to call them to further discuss the questionnaire and their feelings about the behavioral and technical skills as they relate to project managers and the ability of project managers to successfully complete projects in the healthcare environment.

Instrumentation/Measures

The instrument utilized in the study is derived from the instrument utilized in an earlier study by Green (1989) and a modified version of the same instrument utilized by Jiang et al. (1998). At the request of this researcher, Dr. Green provided a copy of the original paper-based survey used in the 1989 study. The questionnaire incorporates a seven-point Likert scale for the determination of the importance the respondent felt was applicable to the 21 behavioral and technical skills being investigated in this research. The questionnaire also included a section where the respondent was requested to indicate the ranking of the behavioral and technical skills they felt were the five most important

behavioral and technical skills for the project manager to possess. This scale was a ranking from 1 to 5 with 1 being the highest ranking and 5 being the lowest ranking.

Changes to the section of the Green (1989) survey instrument that requested demographic and background information were necessary to reflect information requirements for this healthcare specific study. Additional changes to the survey instrument were made to reflect modifications incorporated by Jiang et al. (1998) study to better address project management environments. Due to these changes it was necessary to validate the instrument through field testing and pilot testing.

Field testing of the survey instrument was conducted with the participation of friends and relatives. The purpose of the field test of the survey instrument was to confirm validity of the testing instrument. The multiple step process of field testing was used to confirm that the survey is usable, easily understood, and is capable of providing the information necessary to respond to the questions proposed by the dissertation.

Pilot testing followed the successful completion of the field testing process. The pilot test included a number of volunteer participants who were invited to take part in the survey for the express purpose of determining if there are logic and flow issues that would need to be addressed in the survey prior to general distribution to the approximate 2,417 members of the PMI Healthcare SIG (Project Management Institute Healthcare Specific Interest Group, 2008). The pilot test participants were individuals from various healthcare related functions including registered nurses (RNs), project managers, and consultants familiar with project management in the healthcare environment. The majority of the respondents in the pilot test hold the Project Management Professionals

(PMP) certification from PMI. There were no negative comments or suggestions requiring changes to the initial survey.

A reliability test of the pilot test results was performed using Statistical Package for Social Sciences (SPSS) GradPack version 17.0. The reliability test chosen was the Cronbach's Alpha (see Table 2). The result of .701 is generally considered acceptable (Sekaran, 2000, p. 312). The low value for Cronbach's Alpha may have been attributable to the disperse characteristics of the respondents taking part in the pilot test. No two participants in the pilot test worked for the same type of organization and the size of the organizations varied significantly. The selection of a broad spectrum of pilot test participants was purposeful to assure reliability of the survey.

Table 2. *Cronbach's Alpha Test for Reliability*

Cronbach's Alpha test	*N* Items
.701	21

A reasonable facsimile derived from an image capture of the screens utilized as part of the online survey instrument used in this study is included in this document as Appendix A. While the copy of the instrument included in Appendix A shows the questions and information pages without page breaks, the online service presented the questions and information pages to the participant with one question or information page per screen.

Data Collection

An invitation to participate in the online Internet-based questionnaire was e-mailed to then-current listed e-mail address of the approximate 2,417 members of the PMI Healthcare SIG and others who had requested inclusion on the e-mail list. The PMI Healthcare SIG did not provide the e-mail addresses to this researcher, but instead the PMI Healthcare SIG accepted responsibility for distribution of the e-mail containing the invitation to participate under the PMI Healthcare SIG address and letterhead. A link to the online survey was included in the invitation e-mailed to the PMI Healthcare SIG e-mail distribution list. The purpose for the study and instructions on how to participate in the survey were included in the e-mail. The invitation to participate in this research was included in a standard periodic communication from the PMI Healthcare SIG leadership to the PMI Healthcare SIG members and others who had requested to be included in the PMI Healthcare SIG e-mail distribution.

A follow-up e-mail was sent approximately one week following the initial survey. A second follow-up request was made approximately two weeks after the initial survey in an attempt to increase the response rate to the survey.

Anonymity for those individuals participating in the online questionnaire was assured through the use of the online survey tool which did not capture information on the participants. The participants who agreed to participate in the phone interview, the qualitative aspect of the research, were asked to provide minimal contact information. Contact information and responses to the personal interviews were assigned a sequential number and the respondent's identity was not used in the discussion of the qualitative

research included in this research. The contact information provided through the online survey was destroyed following collection and analysis of the data.

Quantitative data was made available from the data collection process through the online Internet provider, www.SurveyMonkey.com. The data analysis functions provided by the online survey service were utilized to provide analysis of the data collected as a result of the survey. Subsequently the data was imported into Statistical Package for Social Sciences (SPSS) GradPack version 17.0 for further analysis.

Data Analysis

In this study the independent variable was the status indicated by the respondent as either a project manager or not a project manager. Other independent variables included were the type of facility the survey participant was associated with, whether the survey participant worked in a small or large healthcare environment as determined by the approximate number of employees of the organization, and whether the survey participant worked in a for-profit or a not-for-profit organization.

The data collected was analyzed using tests appropriate to nonparametric data and tools appropriate for the comparative analysis of ranked lists. The tests appropriate for nonparametric data included Kruskal Wallis, Mann-Whitney *U*, and Kolmogorov Smirnov *Z*. Tests use for a comparative analysis of ranked lists include Kendall's tau_b and Spearman's Rank Order Correlation Coefficient (also known as Spearman's *rho*).

A comparison to the research by Green (1989) was performed to determine the differences between healthcare and non-healthcare environments. These analysis techniques were not used by Green and Jiang et al. (1998) in their analysis of the data

collected in their research. Green and Jiang et al. compared rankings of the mean values without consideration for significance of the differences that might exist between the ranked lists.

Green (1989) utilized the 21 behavioral and technical skills as independent variables and tested the hypotheses at the .05 level of significance through a simultaneous study of the relationship of variance between the independent variables and the groupings of the job responsibilities and type of organization. Jiang et al. (1998) utilized a ranking of the behavioral and technical skills similar to the ranking utilized earlier by Green. However, Jiang et al. incorporated a grouping of the resultant data by the number of years of project management experience. There was no significance associated with job responsibility because the Jiang et al. study only included participants from the project management role. Jiang et al. also were not concerned with the type of organization since all of the respondents to their survey participated in a non-healthcare for-profit environment.

The same technique of ranking the behavioral and technical skills based on responses to the questionnaire that was utilized in the published research by Green (1989) and Jiang et al. (1998) was utilized in this research. Ranking of the responses used the independent variable of each of the 21 behavioral and technical skills. The ranking was based on the perceived importance of the behavioral and technical skill as indicated by the participants. The hypotheses incorporate the 21 behavioral and technical skills as independent variables and test the hypotheses at the .05 level of significance. The current research utilizes a simultaneous study of the relationship of variance between the independent variables and the groupings of the job responsibilities (project manager or

Non-project manager), profit initiative of the organization (for-profit or not-for-profit), size of the organization (fewer than 5,000 employees or more than 5,000 employees) and type of organization (Healthcare or non-Healthcare).

Factor analysis was found to not be appropriate for application to the data from this research because the data did not represent a normal distribution.

Data analysis was performed using Statistical Package for Social Sciences (SPSS) GradPack version 17.0. SPSS was used to perform descriptive statistics to depict the variable characteristics of the data collected in the survey. The data was downloaded in a Microsoft Excel format from the online survey provider, SurveyMonkey.com, and imported into Statistical Package for Social Sciences (SPSS) GradPack version 17.0 for analysis. Some transposition and data cleansing was performed in Microsoft Excel.

Analysis of the survey results was conducted based on a variety of standard techniques frequently used in quantitative data analysis. The following section discusses the methodologies chosen for the analysis pertinent to each of the hypotheses considered in this research.

In order to determine if there is a correlation between the 21 dependent variables on the questionnaire, the survey results for the 21 behavioral and technical skills were analyzed using principle component analysis (PCA). However, before performing PCA, the suitability of the data for factor analysis was assessed using a correlation matrix. Those questions demonstrating a coefficient of .3 and above indicates a relationship between the items. Kaiser-Meyer-Oklin values in excess of .6 and results of the Bartlett's test of sphericity that indicate statistical significance were evaluated to determine support for the factorability of the correlation matrix. Results of the Kolmogorov-Smirnov and

Shapiro-Wilk tests for normality (Norusis, 2005) indicated that the data was not normally distributed and no further analysis was performed with factor analysis.

The subsequent test for correlation and variance was based on the following assumptions unless otherwise noted.

1. Significance levels were presumed to be at $p < .05$.
2. Kolmogorov-Smirnov and Shapiro-Wilk tests were evaluated to determine if data distribution violated normality (Norusis, 2005).
3. Correlations of the ranking of the means from the current research results and previous research results were measured using Spearman's Rank Order Correlation Coefficient (also known as Spearman's *rho*) and Kendall's tau_b.
4. Mann-Whitney *U*, Kolmogorov-Smirnov *Z*, and Kruskal-Wallis tests were incorporated where appropriate to validate the results of Spearman's Rank Order Correlation Coefficient and Kendall's tau_b tests.

Hypothesis 1, 2, and 3 were concerned with determination of the amount of difference between the results of the ranking of skills from the Green (1989) study and the ranking of the mean scores from the current research. A determination of the correlation between the current and earlier studies was performed using Spearman's Rank Order Correlation Coefficient (also known as Spearman's *rho*) and Kendall's tau_b. Spearman's Rank Order Correlation Coefficient and Kendall's tau_b are most appropriate where the variables are measured on an ordinal scale as is the case with the data gathered in Green's 1989 study and the data from the current survey (Sekaran, 2000, p. 315). The Pearson correlation coefficient was not utilized because it is most appropriate for the determination of correlation among parametric data where both variables involve continuous data (Leedy & Ormrod, 2005) and analysis of the current data was found to be

nonparametric. Where determination of a significant strong correlation could not be made an additional test for correlation was the Phi test and Cramer's V test.

Hypothesis 1

$H1_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects in this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

$H1_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects as a result of this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

H1 was evaluated using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient. Significance of the association was determined using a two-tailed test of significance where $p < .05$. The values of the measure of significance was between 0 and + 1. Values that fall below zero indicate a negative correlation, while values above zero indicate a positive correlation. The ranking of the results from the Green (1989) study were compared to the ranking of the results from the current research for all respondents. Where determination of a significant strong correlation could not be made an additional test for correlation was the Phi test and Cramer's V test.

Hypothesis 2

$H2_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects in this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H2_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects as a result of this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

H2 was evaluated using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient. Significance of the association was determined using a two-tailed test of significance where $p < .05$. The values of the measure of significance were between 0 and + 1. Values that fall below zero indicate a negative correlation, while values above zero indicate a positive correlation. The ranking of the results from the Green (1989) study were compared to the ranking of the results from the current research for only those respondents to the current study who indicated that they hold the position of project manager. Where determination of a significant strong correlation could not be made an additional test for correlation was the Phi test and Cramer's V test.

Hypothesis 3

$H3_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project

managers involved in healthcare projects in this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H3_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects as a result of this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

H3 was evaluated using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient. Significance of the association was determined using a two-tailed test of significance where $p < .05$. The values of the measure of significance was between 0 and + 1. Values that fall below zero indicate a negative correlation, while values above zero indicate a positive correlation. The ranking of the results from the Green (1989) study were compared to the ranking of the results from the current research for only those respondents to the current study who indicated that they did not hold the position of project manager. Where determination of a significant strong correlation could not be made an additional test for correlation was the Phi test and Cramer's V test.

Hypothesis 4

$H4_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H4_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

H4 considered all responses while analyzing the quantitative data collected from the survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient and comparing the results of those participants who indicated an association with a for-profit healthcare organization and those who indicated an association with not-for-profit healthcare environments. For this hypothesis, the independent variable is the healthcare environment and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills. The independent samples *t* test was found to not be appropriate to compare the means of the two samples because the samples populations were independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 5

$H5_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers

involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H5_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

H5 will consider only those responses from participants indicating their job position as project manager and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of those participants who indicated an association with a for-profit healthcare organization and those who indicated an association with not-for-profit healthcare environments. For this hypothesis, the independent variable is the healthcare environment and the dependent variable is the responses to the ranking of the 21 behavioral and technical skills with consideration for only those respondents who indicated they are project managers. The independent samples *t* test was found to not be appropriate for comparing the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 6

$H6_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H6_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

H6 considered only those responses from participants indicating their job position as something other than project manager and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of those participants who indicated an association with a for-profit healthcare organization and those who indicated an association with not-for-profit healthcare environments. For this hypothesis, the independent variable is the healthcare environment and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills with consideration for only those respondents who indicate they are not project managers. The independent samples *t* test was found to not be appropriate to compare the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p.

56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 7

$H7_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

$H7_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

H7 considered responses from all participants analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various types of healthcare facility as indicated by the respondents. For this hypothesis, the independent variable is the type of healthcare facility and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills. The independent samples *t* test was found be not appropriate to compare the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use

the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 8

$H8_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

$H8_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

H8 considered only the responses from participants indicating their job role as project manager and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various types of healthcare facility as indicated by the respondents. For this hypothesis, the independent variable is the type of healthcare facility and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills with consideration only for those respondents who indicated they perform the function of project manager. The independent samples *t* test was found to not be appropriate for comparing the means of the two samples because the samples populations are independent of each other and the

dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 9

$H9_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

$H9_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

H9 considered only the responses from participants indicating their job role as something other than project manager and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various types of healthcare facility as indicated by the respondents. For this hypothesis, the independent variable is the type of healthcare facility and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills with consideration only for those respondents who indicated they do not perform the function

of project manager. The independent samples *t* test was found to not be appropriate for comparing the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 10

$H10_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H10_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

H10 considered all responses from participants and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various sizes of healthcare facility as indicated by the respondents. For

this hypothesis, the independent variable is the size of the healthcare facility based on an estimate of the number of employees and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills. The independent samples *t* test was found not appropriate to compare the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 11

$H11_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H11_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

H11 considered only the responses from participants who indicate they fill the role of project manager and analyzing the quantitative data collected from the online

survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various sizes of healthcare facility as indicated by the respondents. For this hypothesis, the independent variable is the size of healthcare facility based on the number of employees in the organization and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills with consideration for those respondents who indicate they perform the function of project manager. The independent samples t test was fount to not be appropriate for comparing the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Hypothesis 12

$H12_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H12_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of

healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

H12 considered only the responses from participants who indicate their job role as something other than project manager and analyzing the quantitative data collected from the online survey results for the 21 behavioral and technical skills using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests and comparing the results of the various sizes of healthcare facility as indicated by the respondents. For this hypothesis, the independent variable is the size of the healthcare facility based on an approximate number of employees and the dependent variables are the responses to the ranking of the 21 behavioral and technical skills with consideration only for those respondents who indicated they do not perform the function of project manager. The independent samples t test was fount to not be appropriate for comparing the means of the two samples because the samples populations are independent of each other and the dependent variables (the Likert scale values) are measured on an interval scale while there are only two groups of independent variables (Cronk, 1999, p. 56). Rather than use the independent sample *t* test, a set of more appropriate tests for nonparametric data were utilized that included the Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Validity and Reliability

The instrument used in this study is an adaptation of the instrument utilized by Green (1989) and later modified by Jiang et al. (1998). The online rendition of the instrument was reviewed and extensive testing was performed by educators, statisticians,

and business consultants to confirm both the reliability of the online survey instrument and conformance to the intent of Green and Jiang et al. and the paper-based survey instruments used in the earlier research. The individuals evaluating the instrument included members of the Project Management Institute who had achieved the PMI certification of Project Management Professional (PMP) indicating their knowledge of the field of project management. Others included in the panel of reviewers of the instrument were professors in higher education and experienced business consultants involved in healthcare and other business entities.

The 21 behavioral and technical skills and the definition of these skills as used by Green in the 1989 study were included with each of the survey questions that requested a response by the participant to a Likert scale selection. The same definitions utilized by Green were used in order to maintain consistency in the explanation of the terms used to describe the 21 behavioral and technical skills. This allowed the current survey participants to have equal information to the participants in the Green survey and increased the ability to contrast and compare the results.

Ethical Considerations

Included in this survey were members of the Project Management Institute's Healthcare Specific Interest Group. Participation by these individuals in this study was voluntary. Participation in the survey was in response to an e-mail message that included a link to the online survey and instructions for participating in the survey. Anonymity was assured unless the individual specifically agreed to participate in a phone conversation to discuss the topic and to gather information necessary to clarify the results

of the quantitative survey. The first page of the online survey included disclosure and contact information. Acceptance of this agreement included consent of the participant prior to allowing the participant to proceed to the survey questionnaire.

Information about the participants who agreed to be contacted as part of the phone interview was not associated in any way with the responses to the online survey results to ensure the responses would not influence the interviewer during the phone interview. The participants were asked to provide the best day and time to be contacted. Phone contact was made at the time the participant suggested in their response to the online request to participate. The phone survey results did not include information on the participant or his or her contact information. All information was discarded following the data collection and analysis of the results. Each participant was made fully aware of the confidentiality and anonymity of his or her responses.

The analysis of the phone interviews did not disclose the identity of the respondents nor did it provide any information that could be used to identify the participants, their place of employment, or any other information that could be used to determine the identity of the participants, thus safeguarding the confidentiality of their responses. Confidentiality was maintained because the identity of the respondents was only available to the researcher at the time of contact with the participant. Information regarding the participant and his or her contact information was discarded following the phone interview. The demographic portion of the survey and the responses to the survey were detached from the survey prior to contacting the participant in order to ensure that the researcher was not influenced by the responses of the participant to the survey.

This researcher did not personally know any of the participants in the phone interview and none of the participants in the interview process were associated with the any organization to which the researcher was associated. There were no participants in the phone interview process who were members of the same Project Management Healthcare Local Interest Group with which this researcher was associated. This researcher is not a member of the PMI Healthcare SIG.

The survey required only the first name of those who agreed to participate in the survey, the contact number, and the best day and time to call. No additional information was solicited from the participant during the interview process. Some participants did volunteer information regarding their employer, but this information was not reported in order to preserve the participants' privacy.

CHAPTER 4. FINDINGS AND CONCLUSIONS

Research Problem

The purpose of this research was to evaluate the perceived importance of 21 behavioral and technical skills possessed by project managers in the successful delivery of projects in the healthcare environment. The research was designed to determine which of 21 behavioral and technical skills were perceived to be important in healthcare relative to other environments and whether various environmental characteristics in healthcare influenced the perception of the importance of skills necessary for the project manager to be successful.

The design of the study utilized a mixed method research approach including quantitative results derived from an online survey and qualitative results gathered from phone interviews in a sequential explanatory design where qualitative results are collected after the quantitative data had been analyzed. The qualitative research was performed to further explain the numerical findings from the quantitative research. Mixed method research is a design for "collecting and analyzing both quantitative and qualitative data in a single study" (Creswell, 2003, p. 210).

The sequential exploratory design proposes an equal view of quantitative and qualitative data collection and measurement (Creswell, 2003). This balance between the interpretation of qualitative and quantitative data collection serve as a basis for the research performed. The responses to the online questionnaire provided the quantitative

data allowing for ranking and analysis utilizing standard numerical measures. The responses to the phone interviews allowed for a more in-depth evaluation and interpretation of the quantitative results.

An online survey instrument was chosen to accommodate participation by a diverse and global group. The prospective participants were global and represented various business arenas. The online format offered standardization in the format and the subsequent evaluation of the responses. The choice of an online format for the survey also provided for an easier administration of the survey. The invitation to participate was distributed electronically and the online digital format of the questionnaire was available for participation by individuals already familiar with the online format.

The Project Management Institute Healthcare Specific Interest Group (PMI Healthcare SIG) agreed to distribute an invitation to participate in the survey via their electronic newsletter periodically distributed to individuals who were either members of the PMI Healthcare SIG or who had requested to be included on their electronic mailing list. The PMI Healthcare SIG has performed online surveys of their members in the past and the request to participate in an online survey was not considered unusual and participation was voluntary.

Pilot Study

A pilot study was conducted to determine the validity and reliability of the quantitative instrument and the viability of the qualitative research instrument utilized in this research. The survey instrument was tested using seven respondents from the healthcare community and two individuals from outside healthcare. The script developed

for a follow-up phone interview was tested with several individuals including one registered nurse, a paramedic, and non-healthcare individuals.

The survey instrument (see Appendix A) consisted of three parts: the demographic and organizational profile of the respondents, a Likert scale (1 to 7) evaluation of the 21 behavioral and technical skills (see Table 1), and a matrix for designation of the perceived ranking of the top five behavioral and technical skills. The values associated with the Likert scale were 1 = *Very Unimportant,* 2 = *Unimportant,* 3 = *Somewhat Unimportant*, 4 = *Not Sure,* 5 = *Somewhat Important,* 6 = *Important,* 7 = *Very Important.*

The survey instrument was derived from previous studies that utilized similar behavioral and technical skills and a similar Likert scale for ranking the importance of each of the behavioral and technical skills. Green (1989) used the same 21 behavioral and technical skills utilized in this research. Jiang et al. (1998) elected to use only 18 of these behavioral and technical skills. Jiang et al. did not include the behavioral and technical skills that were determined to be directed at more technical project managers or systems analysts. The three behavioral and technical skills dismissed by Jiang el al. were programming, functional application knowledge, and analysis and design. The decision to include the behavioral skills of programming, functional application knowledge, and analysis and design in the current research was two-fold. Firstly, with these three behavioral and technical skills included in the current survey instrument, the current research would more closely mirror the research conducted by Green in 1989. Secondly, the determination to include these behavioral and technical skills could provide insight into other questions not included in this research, such as whether or not functional

application knowledge was perceived as an important behavioral and technical skill by the participants in the current research.

The effectiveness of the survey instrument was determined from the responses of seven respondents who took part in the pilot study. The pilot study measured the effectiveness of the survey instrument and the use of the online electronic format. Only positive feedback was received from the participants in the pilot study.

The initial page of the online questionnaire explained the purpose of the survey and provided contact information for the participant should there be a problem with the survey. Including contact information along with a full explanation of the research purpose and methodology is a requirement of the Institutional Review Board (IRB) and Capella University. The participant was given the choice to continue or terminate the survey after reading the compulsory advisory information. A total of 336 participants read the informational page regarding the purpose of the survey, the contact information should there be a problem with the survey, and the contact information for this researcher. Approximately sixty-two percent of those individuals who presumably read and understood this introductory question agreed to continue with the survey.

The first part of the questionnaire requested information regarding the business environment of the participant. The next group of questions was designed to provide demographic information of the participants relative to the certification and licensures held by the respondent and the number of years the respondent was involved in projects and healthcare.

The second part of the questionnaire provided for a Likert scale response to the perceived importance of the 21 behavioral and technical skills that constitute the basis for

this research. The seven-level Likert scale allowed the participant to rate their perception of importance of each of the 21 behavioral and technical skills from very unimportant to very important. The definition of the terms used to describe the 21 behavioral and technical skills were the same definitions provided by Green (1989)

The final section of the questionnaire allowed the participant to rank, in perceived importance, the top five behavioral and technical skills from the 21 behavioral and technical skills provided. The results of this matrix were not used in this study. Only the individual responses to each of the 21 behavioral and technical skills were used in the current study. The matrix was included to mirror the questionnaire used by Green (1989). Green did not include results from the matrix-ranking section of the questionnaire as part of the study.

Based on the results of the pilot test and the positive feedback from those involved in the pilot, the online questionnaire was deemed suitable for the purpose of this research.

Utilizing the analysis of the data from the online questionnaire, an interview script was developed that would serve the purpose of clarifying those results. The interview process consisted of a series of questions designed to provide further clarification to the quantitative section of this research and the resulting ranking of the perceived importance of the 21 behavioral and technical skills necessary for project managers in healthcare to be successful in project delivery. The interview questions were found to facilitate an easy conversational flow and an important aspect to the gathering of information for the purpose of determining the required skills for project success and clarification of the results from the quantitative study.

Pilot Study Conclusions

The desired results were achieved in the pilot study. Based on the results of the pilot study in was concluded that the survey questionnaire and the interview instruments were suitable, as well as effective, in addressing the purpose for this research. The positive results of the pilot study indicated the research approach was suitable and that the research could be conducted using the questionnaire and interview instruments with confidence.

Data Collection Process

Through the mixed method research approach, the research resulted in qualitative and quantitative data using an online questionnaire and phone interviews. The phone interviews were conducted only with those participants in the online survey who indicated their willingness to participate in the phone interviews. The phone interviews were conducted anonymously and contact information on the participants was destroyed following the interview. All personal interview responses were referenced generically in the results.

The participants in the survey and those who took part in the phone interview were members of various business entities that serve the needs of the healthcare and project management environments. The research participants were members of the Project Management Institute's Healthcare Specific Interest Group (PMI Healthcare SIG) and others who had requested inclusion on the PMI Healthcare SIG e-mail distribution list. To facilitate a larger response, other organizations were asked to distribute a link to the online questionnaire to their members. In the case that the response from the PMI

Healthcare SIG was not sufficient for the purpose of this research, two other professional organizations were contacted to determine their willingness to participate in the survey. These organizations were The Nashville chapter of the Project Management Institute (PMI) and the Healthcare Information Management System Society (HIMSS) in Tennessee. The Nashville chapter of PMI was selected because of the high number of healthcare participants in the chapter. The Tennessee chapter of HIMSS was selected to represent a group of individuals who are involved with healthcare project delivery primarily in the delivery of information systems.

Responses from organizations other than the PMI Healthcare SIG were not included in the survey results published here because the number of participants from the PMI Healthcare SIG was deemed sufficient. The number of participants who agreed to participate in the phone interview was also sufficient, with over 15 percent of the participants in the online survey having agreed to participate in the phone interview. Even though the number of participants in the online survey who were not project managers was small, those who indicated they were not project managers and did participate were involved and concerned with the issues of project management in the healthcare environment.

Factor Analysis

Factor analysis was considered as a method of making the results of the research more manageable. Analysis of the results of the online survey was made more difficult because of the large number of behavioral and technical skills. Having the ability to recognize correlations in the data would have provided a means of reducing the size of

the data to a more manageable level. A second anticipated advantage would have been the categorization of the data that could be used to better analyze similarities in the grouping of responses.

Table 3. *Tests of Normality of Current Research Using Kolmogorov-Smirnov and Shapiro-Wilk*

Behavioral and Technical Skill	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Diplomacy	.338	207	.000	.562	207	.000
Interviewing	.297	207	.000	.680	207	.000
Directing	.296	206	.000	.671	206	.000
Patience	.251	206	.000	.807	206	.000
Assertiveness	.264	206	.000	.828	206	.000
Leadership	.324	206	.000	.674	206	.000
Programming	.180	207	.000	.920	207	.000
Speaking	.368	206	.000	.627	206	.000
Writing	.353	207	.000	.712	207	.000
Listening	.465	207	.000	.556	207	.000
Empathy	.258	206	.000	.841	206	.000
Salesmanship	.217	206	.000	.858	206	.000
Politics	.251	207	.000	.794	207	.000
Management	.385	205	.000	.674	205	.000
Training	.263	207	.000	.856	207	.000
Cooperation	.322	206	.000	.738	206	.000
Application Knowledge	.237	207	.000	.817	207	.000
Organizational	.230	206	.000	.824	206	.000
Analysis and Design	.235	206	.000	.842	206	.000
Non-verbal Communications	.239	205	.000	.850	205	.000
Sensitivity	.293	207	.000	.795	207	.000

a. Lilliefors Significance Correction

The purpose of factor analysis was to "examine the correlations among a number of variables and identify clusters of highly interrelated variables that reflect underlying themes, or factors, within the data" (Leedy & Ormrod, 2005, p. 274). In order for data to be effectively analyzed using factor analysis it must be ordinal, demonstrate a bivariate

normal distribution for each pair of variables and observations should be independent (Bartholomew, 2004; Gatignon, 2003; Yang & Trewn, 2004).

Data from the current research did not meet the criteria for the use of factor analysis to determine underlying categorization and sub-grouping of the 21 behavioral and technical skills as demonstrated by the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests for normalization (see Table 3). Based on the results of this analysis we must reject the assumption of normality. Figure 1 visually demonstrates the lack of normality to the results of determining the mean values for all responses to the seven-level Likert scale. Also, it was determined that factor analysis was not appropriate for the statistical analysis of the current research data because data derived from a Likert scale questionnaire is interval-scaled (Cooper & Schindler, 2006).

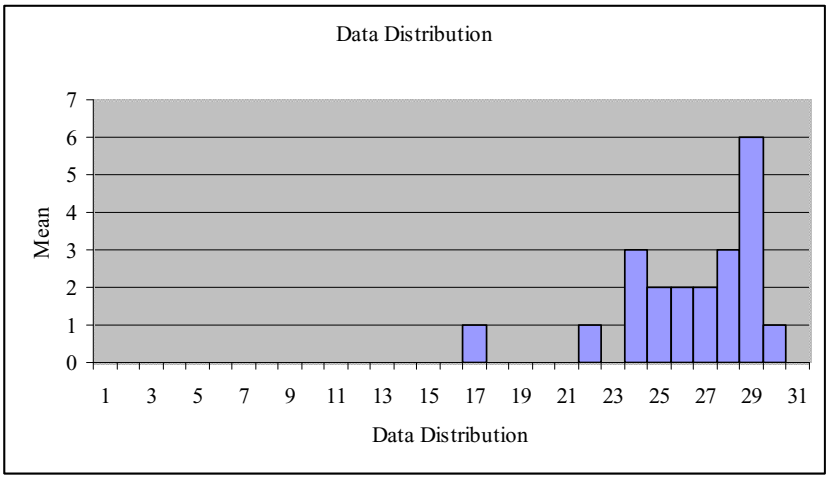

Figure 1. *Histogram of research data distribution*

Quantitative Results

The initial activity performed as part of this research involved the accumulation and analysis of the quantitative data resulting from the responses of the participants in the

online questionnaire. This data was analyzed to determine what further information was necessary to extract a more meaningful interpretation of the results. The data analysis was performed prior to initiation of a process of qualitative research meant to provide meaning to the results attributed to the quantitative research. As mentioned above, Creswell (2003) defines this approach as Sequential Explanatory Design. One benefit of a mixed methodology research approach utilizing Sequential Explanatory Design is the ability to evaluate "surprising results in more detail" (Creswell, 2003, p. 215).

Analysis of the quantitative data took two forms. One area of analysis was a comparison of the ranking of mean scores of the 21 behavioral and technical skills. This process involved developing a mean score for the responses to the seven-level Likert scale. The 21 behavioral and technical skills were then ranked from 1 to 21 and analysis was performed to determine if a significant difference exists between the rankings of mean scores derived from two or more independent groups of participants.

Testing hypotheses 1, 2 and 3 required a comparison of the ranking of means of the 21 behavioral and technical skills developed from the research performed by Green (1989) and the ranking of the same 21 behavioral and technical skills derived from the current research. The analysis of the significance of the differences between the rankings resulting from the two studies was performed using Spearman's Rank Order Correlation Coefficient and Kendall's tau_b. These tests are meant to analyze associations in ranks of data when the data is nonparametric (Cronk, 1999).

The testing of hypotheses 4 through 12 involved two forms of analysis appropriate for the data. The first form of analysis was a development of the ranking of means and a comparison of the resulting ranks using Spearman's Rank Order Correlation

Coefficient and Kendall's tau_b. In order to further analyze the data it was determined that testing appropriate to nonparametric data should also be performed to confirm the results of the analysis of the ranks. The additional testing includes the Mann-Whitney *U* test, the Kolmogorov-Smirnov two-sample test, and Kruskal-Wallis analysis of ranks (Cronk, 1999).

Hypothesis 1

$H1_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects in this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

$H1_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects as a result of this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989.

Participants were asked to indicate their perception of the importance of each of the 21 behavioral and technical skills based on these seven levels. Participants were allowed to select only one of each of these levels and they did not have the option of indicating values that might fall between these levels. The scale used was 1 = *Very Unimportant,* 2 = *Unimportant,* 3 = *Somewhat unimportant,* 4 = *Not Sure,* 5 = *Somewhat important,* 6 = *Important,* 7 = *Very Important.*

The seven-levels and associated descriptions are the same Likert scale values utilized in the research conducted by Green (1989). Utilizing the same Likert scale values

as Green used allowed the information to be compared more easily and more accurately. Table 4 shows the mean, standard deviation, and frequency counts for the 21 behavioral and technical skills from the responses from all participants in the current research.

Table 4. *H1 Frequency Counts for All Responses from Current Data* (n=224)

Behavioral and Technical Skill	Mean	Std Dev	Frequency 1	2	3	4	5	6	7	N
Listening	6.7545	0.4517	0	0	0	0	2	51	171	224
Speaking	6.5605	0.6539	0	1	0	1	7	76	138	223
Management	6.5450	0.6348	0	0	1	1	8	78	134	222
Diplomacy	6.4955	0.8884	3	0	0	1	12	68	140	224
Writing	6.4866	0.6351	0	0	0	1	14	84	125	224
Leadership	6.4439	0.7971	0	2	0	2	17	74	128	223
Cooperation	6.4081	0.6362	0	0	0	0	18	96	109	223
Directing	6.4036	0.7156	1	0	0	0	15	97	110	223
Interviewing	6.3259	0.9064	2	0	0	3	28	74	117	224
Patience	6.2063	0.8012	0	0	1	4	35	91	92	223
Politics	6.1652	0.8441	0	1	1	1	45	85	91	224
Organizational Communications	6.1300	0.7919	0	0	0	5	42	95	81	223
Sensitivity	5.9152	0.9782	1	3	1	9	39	113	58	224
Empathy	5.8610	0.8921	0	0	6	4	58	102	53	223
Assertiveness	5.7578	0.9418	1	1	5	6	59	110	41	223
Non-verbal Communications	5.6071	1.1471	1	4	10	10	63	90	46	224
Salesmanship	5.5112	1.0858	1	2	12	7	84	79	38	223
Application Knowledge	5.5045	1.1482	2	6	8	3	83	86	36	224
Analysis and Design	5.4866	1.3853	3	9	14	8	58	80	52	224
Training	5.1384	1.4058	5	11	18	9	80	73	28	224
Programming	4.0402	1.8469	20	41	36	19	47	43	18	224

Table 5 includes the ranking of the top ten skills developed from the Green study (1989) and the current research. The calculation of the mean and ranking of the mean derived from the Likert scale responses was the methodology used by Green (1989) The mean score was not used, but instead the actual rank of the behavioral and technical skill was utilized in the testing process in order to allow a more accurate comparison of the ranking of the data. Ranking in this manner allowed for the application of tests

recommended for rank score comparison to be used to determine if a significant difference existed between the rankings of the mean scores.

Table 5. *H1 Comparing Overall Mean Ranking of Green (1989) and Current Research*

Behavioral and Technical Skill	Green 1989	Current Research
Listening		1
Speaking	2	2
Management		3
Diplomacy	3	4
Writing		5
Leadership		6
Cooperation		7
Directing	1	8
Interviewing		9
Patience		10
Politics	7	11
Organizational Communications	5	12
Sensitivity		13
Empathy		14
Assertiveness	9	15
Non-verbal Communications	10	16
Salesmanship	8	17
Application Knowledge		18
Analysis and Design		19
Training	4	20
Programming	6	21

The ranking of means developed from the Green (1989) study were compared to data from the current study using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient. Significance of the association was determined using a two-tailed test of significance where $p < .05$. The values of the measure of significance can be between -1 and + 1. Values that fall below zero indicate a negative correlation, while values above zero indicate a positive correlation.

Kendall's tau_b, and Spearman's Rank Order Correlation Coefficient differ in many respects, but they are both designed to determine the strength of a linear relationship between two ordered lists (Sekaran, 2000). Table 6 shows the results of Kendall's tau_b test and Table 7 presents the results of Spearman's Rank Order Correlation Coefficient test.

The results of Kendall's tau_b shows a Correlation Coefficient of .378 and the results of Spearman's Rank Order Correlation Coefficient is .552 indicating that the ranking of the top ten items in the Green (1989) research and the ranking of the top ten items from the current research have a moderate positive correlation. However, the significance level of .128 calculated for Kendall's tau_b and .098 calculated for Spearman's Rank Order Correlation Coefficient negate the implication of correlation, indicating instead that any correlation observed is not significantly different from random noise.

Table 6. *H1 Kendall's tau_b Comparison of Green and Current Rank Order*

Test	Category	Analysis	Green Ranking	Current Ranking
Kendall's tau_b	Green ranking	Correlation Coefficient	1.000	.378
		Sig. (2-tailed)	.	.128
		N	10	10
	Current ranking	Correlation Coefficient	.378	1.000
		Sig. (2-tailed)	.128	.
		N	10	21

Kendall's tau_b analysis shown in Table 6 and Spearman's Rank Order Correlation Coefficient tests shown in Table 7 indicated that the moderately positive correlation coefficient of .378 found to exist when comparing the mean ranking of the Green study (1989) and the results of the current research cannot be attributed to the data

alone. These analyses indicate there is no statistically significant correlation between the mean rankings provided by non-healthcare related project resources in the Green research and the mean rankings provided by healthcare related project resources in the current study.

Table 7. *H1 Spearman's Rank Order Correlation Coefficient Analysis of Green's Research and Current Research Rank Order*

Test	Category	Analysis	Green Ranking	Current Ranking
Spearman's *rho*	Green ranking	Correlation Coefficient	1.000	.552
		Sig. (2-tailed)	.	.098
		N	10	10
	Current ranking	Correlation Coefficient	.552	1.000
		Sig. (2-tailed)	.098	.
		N	10	21

In order to support the null hypothesis that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects in this research and all individuals involved in other types of projects as determined by the Green study conducted in 1989, the correlation coefficient in either Kendall's tau_b or Spearman's Rank Order Correlation Coefficient needed to be between .0 and 1.0 and the demonstrated two-tailed significance level needed to be less than .05 ($p < .05$). The results from the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests indicated only a moderate correlation found between the two lists that were not significant.

Hypothesis 2

$H2_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects in this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H2_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects as a result of this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.

Using the mean calculated for each of the 21 behavioral and technical skills determined from the results of the current research, the data was ranked in order from the largest mean value to the smallest. The results of this ranking are shown in Table 8. The mean values and rankings from the Green (1989) study were then applied to the 21 behavioral skills based on the information provided in Green's research study. The comparable results are also shown in Table 8.

The rankings reported in the Green (1989) research and the rankings developed from the current research data were then compared to determine if the correlation between the two ranked lists and the significance of the correlation using the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests for correlation between ranked lists were found to be significant. These tests differ in many respects, but they are both designed to determine the strength of a linear relationship between two ordered lists (Sekaran, 2000).

Table 8. *H2 Ranking by Project Managers/Systems Analysts in Green Research and Current Research*

Skill	Current	Green
Listening	1	
Speaking	2	2
Management	3	
Diplomacy	4	3
Writing	5	
Cooperation	6	
Leadership	7	
Directing	8	1
Interviewing	9	
Patience	10	
Politics	11	5
Organizational Communications	12	7
Sensitivity	13	
Empathy	14	
Assertiveness	15	8
Non-verbal Communications	16	10
Analysis and Design	17	
Salesmanship	18	6
Application Knowledge	19	
Training	20	4
Programming	21	9

Table 9 shows the results of Kendall's tau_b test and Spearman's Rank Order Correlation Coefficient statistical analysis. The results of Kendall's tau_b shows a Correlation Coefficient of .511 and Spearman's Rank Order Correlation Coefficient of .673 indicate that the ranking of the top ten items in the Green (1989) research and the ranking of the top ten items from the current research have a significant moderately positive correlation. In the case of the ranking of the project managers in this study and the project managers in the earlier study, the significance level of .040 calculated for Kendall's tau_b and .033 calculated for Spearman's Rank Order Correlation Coefficient support the implication of correlation, albeit moderate correlation as indicated by a

correlation coefficient of .511 and .673 respectively. Consideration for answering the question whether "no significant difference" exists requires an evaluation of the significance and the correlation value.

The results of the analysis of the current research results must be weighed with the understanding that "Correlation between .3 and .7 are considered moderate" (Cronk, 1999, p. 42). Indication of a moderate correlation found to be significant does not necessarily indicate "no significant difference" exists between the rankings. A review of the Spearman's Rank Order Correlation Coefficient indicates that the positive correlation is, at best, moderate (*rho* = .673). Further analysis was deemed necessary to determine if the significance and correlation determined in the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests could be interpreted to mean that the data demonstrated "no significant difference."

Table 9. *H2 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Green's Research and Current Research Rank Order*

Test	Category	Analysis	Current Ranking	Green Ranking
Kendall's tau_b	Current ranking	Correlation Coefficient	1.000	.511(*)
		Sig. (2-tailed)	.	.040
		N	21	10
	Green ranking	Correlation Coefficient	.511(*)	1.000
		Sig. (2-tailed)	.040	.
		N	10	10
Spearman's *rho*	Current ranking	Correlation Coefficient	1.000	.673(*)
		Sig. (2-tailed)	.	.033
		N	21	10
	Green ranking	Correlation Coefficient	.673(*)	1.000
		Sig. (2-tailed)	.033	.
		N	10	10

* Correlation is significant at the .05 level (2-tailed).

Table 10. *H2 Phi and Cramer's V Tests*

Test	Category	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	3.000			.231
	Cramer's V	1.000			.231
Ordinal by Ordinal	Kendall's tau_b	.511	.186	2.741	.006
N of Valid Cases		10			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Further testing of the significance of the relationship of the correlation was performed using the Phi correlation coefficient and Cramer's V. These tests demonstrated that no significant difference exists. Differences between the Phi value and the results determined from Kendall's tau_b and Spearman's Rank Order Correlation Coefficient may be explained by the size of the sample. The Phi value of 3.000 and an approximate significance of .231 indicate the assumption of "no significant difference" is supported.

Hypothesis 3

$H3_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects in this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

$H3_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects as a result of this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

The Green (1989) research included participants from various non-healthcare related industries. The results of the Green study included a ranking of the importance of the 21 behavioral and technical skills of the systems analyst leading projects in which the participants (non-project managers) were involved. Green (1989, p. 115) states "The relationship between analysts and users could translate directly to success or failure of major development projects (Lucas, 1975) and indirectly to job-related stress (Ivancevich, Napier, & Wetherce, 1983)."

Table 11. *H3 Ranking of the Behavioral and Technical Skills by Non-Project Managers in the Green Research and Current Study*

Skill	Current	Green
Management	1	
Listening	2	
Leadership	3	
Writing	4	
Directing	5	1
Speaking	6	2
Diplomacy	7	5
Cooperation	8	
Interviewing	9	
Politics	10	8
Patience	11	
Organizational Communications	12	6
Non-verbal Communications	13	10
Sensitivity	14	
Assertiveness	15	7
Application Knowledge	16	
Empathy	17	
Salesmanship	18	9
Training	19	3
Analysis and Design	20	
Programming	21	4

The ranking of the perceived importance of the 21 behavioral and technical skills based on the mean values derived from the responses to the seven-level Likert scale utilized in the current research and the research conducted by Green (1989) is shown in Table 11.

The statistical tests used to determine if a significant difference exists between the current research ranking and the ranking presented by Green (1989) included Kendall's tau_b and Spearman's Rank Order Correlation Coefficient, which are designed to determine the strength of a linear relationship between two ordered lists (Sekaran, 2000).

Table 12 shows the results of the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests. The mean ranking of the top ten behavioral and technical skills from the Green research was compared to the mean ranking of the top ten behavioral and technical skills from the current research.

Table 12. *H3 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Statistical Analysis of Non-Project Manager Responses*

Test	Category	Analysis	Current	Green
Kendall's tau_b	CURR	Correlation Coefficient	1.000	.289
		Sig. (2-tailed)	.	.245
		N	21	10
	GREEN	Correlation Coefficient	.289	1.000
		Sig. (2-tailed)	.245	.
		N	10	10
Spearman's *rho*	CURR	Correlation Coefficient	1.000	.333
		Sig. (2-tailed)	.	.347
		N	21	10
	GREEN	Correlation Coefficient	.333	1.000
		Sig. (2-tailed)	.347	.
		N	10	10

The results of Kendall's tau_b shows a Correlation Coefficient of .289 and Spearman's Rank Order Correlation Coefficient of .333 indicate that the ranking of the top ten items in the Green (1989) research and the ranking of the top ten items from the current research have a moderate positive correlation. However, the significance level of .245 calculated for Kendall's tau_b and .347 calculated for Spearman's Rank Order Correlation Coefficient negate the implication of correlation, indicating instead that any correlation observed was not significantly different from random noise.

No further analysis was necessary because the correlation and the significance of Spearman's Rank Order Correlation Coefficient and Kendall's tau_b indicates that there was a significant difference between the ranking of the perceived importance of the 21 behavioral and technical skills in the current research and research conducted by Green (1989) when responses from those participants who indicated they are not project managers was compared.

Hypothesis 4

$H4_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H4_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within

for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

There were 78 participants who worked in a for-profit healthcare environment and 118 participants who worked in a not-for-profit healthcare environment. The responses of all participants were ranked based on the mean of the responses to the seven-level Likert scale (see Table 13).

Table 13. *H4 Ranking of Behavioral and Technical Skills by Participants in For-Profit and Not-For-Profit Environments*

Behavioral and Technical Skill	Rank For-Profit	Rank Not-For-Profit
Listening	1	1
Diplomacy	6	2
Management	3	3
Speaking	2	4
Writing	5	5
Cooperation	7	6
Leadership	4	7
Directing	8	8
Interviewing	11	9
Patience	9	10
Politics	12	11
Organizational Communications	10	12
Sensitivity	15	13
Empathy	14	14
Assertiveness	13	15
Non-verbal Communications	18	16
Analysis and Design	19	17
Application Knowledge	17	18
Salesmanship	16	19
Training	20	20
Programming	21	21

In order to determine if there was a significant difference between the perceived importance of the categorized behavioral and technical skills as viewed by participants who are associated with for-profit and those participants associated with not-for-profit environments results from the Spearman Rank Order Correlation Coefficient and Kendall's tau_b tests were analyzed.

A Spearman Rank Order Correlation Coefficient was calculated for all participants and the relationship between those who indicated they worked in a for-profit environment and those who indicated they worked in a not-for-profit environment. A strong positive correlation was found ($rho(21)= .957$, $p < .001$), indicating a significant relationship between the two variables. Participants in the current research appear to perceive the importance of the 21 behavioral and technical skills in a similar manner. This finding was confirmed by the results of the Kendall's tau_b.

Table 14. *H4 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of For-Profit and Not-For-Profit Rank Order*

Test	Category	Analysis	For Profit	Not For Profit
Kendall's tau_b	For Profit	Correlation Coefficient	1.000	.829**
		Sig. (2-tailed)	.	.000
		N	21	21
	Not For Profit	Correlation Coefficient	.829**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	For Profit	Correlation Coefficient	1.000	.957**
		Sig. (2-tailed)	.	.000
		N	21	21
	Not For Profit	Correlation Coefficient	.957**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

Since the results of the previous tests could not be considered conclusive, it was determined that further analysis required pursuing additional testing of the results. Data regarding the responses to the seven-level Likert scale was available from the results of the current research making it possible to pursue further analysis to determine precisely where the nonparametric data differed between the responses from those participants involved with for-profit environments and those participants involved with not-for-profit organizations. The additional tests found to be appropriate to further analyze the data were the Mann-Whitney *U* test, Kolmogorov-Smirnov two-sample test, and the Kruskal-Wallis analysis of ranks.

Table 15. *H4 Mann-Whitney U Test*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)
Diplomacy	3928.000	6413.000	-.552	.581
Interviewing	3922.500	6407.500	-.532	.595
Directing	4028.500	10931.500	-.025	.980
Patience	3966.500	10869.500	-.388	.698
Assertiveness	3697.000	10483.000	-1.106	.269
Leadership	3598.000	10384.000	-1.492	.136
Programming	3844.500	10747.500	-.710	.478
Speaking	3974.500	10877.500	-.207	.836
Writing	4025.500	10928.500	-.222	.824
Listening	4000.000	10903.000	-.358	.721
Empathy	3800.000	10703.000	-.718	.473
Salesmanship	3009.500	9912.500	-3.053	.002
Politics	4060.000	10963.000	-.105	.916
Management	3979.000	10882.000	-.193	.847
Training	3843.500	10746.500	-.733	.463
Cooperation	3985.500	6470.500	-.341	.733
Application Knowledge	3055.500	9958.500	-3.086	.002
Organizational Communications	3648.500	10551.500	-1.344	.179
Analysis and Design	3826.500	10729.500	-.618	.537
Non-verbal Communications	3828.500	10498.500	-.587	.557
Sensitivity	4042.000	6527.000	-.161	.872

The results of the Mann-Whitney *U* test (see Table 15) indicate that significant differences between the two tests occur in the areas of salesmanship (p = .002) and application knowledge (p = .002). The Mann-Whitney *U* test is described as the "nonparametric counterpart of the *t* test in parametric statistics" (Leedy & Ormrod, 2005, p. 274).

Table 16. *H4 Kolmogorov-Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.035	.000	-.035	.234	1.000
Interviewing	.083	.001	-.083	.550	.923
Directing	.004	.004	.000	.029	1.000
Patience	.058	.058	-.023	.385	.998
Assertiveness	.079	.079	.000	.522	.948
Leadership	.105	.105	.000	.697	.717
Programming	.116	.116	-.062	.766	.600
Speaking	.043	.043	-.001	.282	1.000
Writing	.013	.013	.000	.086	1.000
Listening	.019	.019	.000	.128	1.000
Empathy	.041	.041	-.003	.272	1.000
Salesmanship	.176	.176	.000	1.160	.135
Politics	.029	.018	-.029	.189	1.000
Management	.020	.020	-.015	.130	1.000
Training	.102	.102	-.034	.677	.749
Cooperation	.046	.000	-.046	.304	1.000
Application Knowledge	.224	.224	-.029	1.484	.025
Organizational Communications	.079	.079	.000	.525	.945
Analysis and Design	.042	.042	-.029	.277	1.000
Non-verbal Communications	.045	.045	-.011	.299	1.000
Sensitivity	.021	.009	-.021	.137	1.000

The results of the Kolmogorov-Smirnov *Z* test (see Table 16) indicate no significant difference in the area of salesmanship (p = .135), but the Kolmogorov-Smirnov *Z* test confirms the significant difference in the area of application knowledge (p < .05).

The final nonparametric test utilized to analyze the data from the current research was the Kruskal-Wallis analysis of ranks (see Table 17). The Kruskal-Wallis test demonstrated again that the areas of significant difference are salesmanship (p = .002) and application knowledge (p = .002).

Table 17. *H4 Kruskal Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.304	1	.581
Interviewing	.283	1	.595
Directing	.001	1	.980
Patience	.151	1	.698
Assertiveness	1.223	1	.269
Leadership	2.226	1	.136
Programming	.504	1	.478
Speaking	.043	1	.836
Writing	.049	1	.824
Listening	.128	1	.721
Empathy	.515	1	.473
Salesmanship	9.319	1	.002
Politics	.011	1	.916
Management	.037	1	.847
Training	.538	1	.463
Cooperation	.116	1	.733
Application Knowledge	9.526	1	.002
Organizational Communications	1.806	1	.179
Analysis and Design	.381	1	.537
Non-verbal Communications	.344	1	.557
Sensitivity	.026	1	.872

a. Kruskal Wallis Test

Of the 21 behavioral and technical skills only application knowledge appears to show a significant difference consistently in all of the nonparametric tests performed on the current data. While Kendall's tau_b and Spearman's Rank Order Correlation Coefficient indicate that there was no significant different, further evaluation shows a significant difference in at least one of the 21 behavioral and technical skills. This single

difference negates the null hypothesis that there is no significant difference between the mean rankings of the two categories.

Based on the results from the five tests used to determine if there is a significant difference between the perceived importance of the 21 behavioral and technical skills as they relate to the responses from all participants where the responses from those participants who indicated they were associated with for-profit organizations and those who indicated they were associated with not-for-profit organizations confirms that there was a significant difference between the two groups in the area of application knowledge ($p = .002$) based on the Kruskal-Wallis test and the Mann-Whitney *U* test and ($p = .025$) in the Kolmogorov-Smirnov *Z* test. The Kruskal-Wallis test and the Mann-Whitney *U* test also confirmed a significant difference between the mean rankings of the two categories in the behavioral and technical skill of salesmanship.

Hypothesis 5

$H5_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H5_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Of the 171 participants who indicated they were project managers, 64 participants indicated that they worked in a for-profit healthcare environment and 107 participants indicated that they worked in a not-for-profit healthcare environment.

Hypothesis 5 was tested using the rankings of the mean values calculated for the responses to the seven-level Likert scale evaluation provided to the participant for each of the 21 behavioral and technical skills as they relate to the perceived importance to project managers in either for-profit organizations or not-for-profit organizations (see Table 18).

Table 18. *H5 Ranking of Behavioral and Technical Skills by Project Manager Participants in For-Profit and Not-For-Profit Environments*

Behavioral and Technical Skill	Rank PM For Profit	Rank PM Not for Profit
Listening	1	1
Diplomacy	6	2
Management	3	3
Speaking	2	4
Writing	5	5
Cooperation	7	6
Leadership	4	7
Directing	8	8
Interviewing	11	9
Patience	9	10
Politics	12	11
Organizational Communications	10	12
Sensitivity	15	13
Empathy	14	14
Assertiveness	13	15
Non-verbal Communications	18	16
Analysis and Design	19	17
Application Knowledge	17	18
Salesmanship	16	19
Training	20	20
Programming	21	21

The rankings are compared using the Spearman Rank Order Correlation Coefficient and Kendall's tau_b tests (see Table 19). Analysis of the significance of the correlation between the ranked lists based on the mean values derived for project managers in for-profit and not-for profit was performed to determine if there was a significant difference between the two lists. A Spearman Rank Order Correlation Coefficient was calculated using the responses form those participants who indicated they were project managers and the relationship between those project managers who indicated they worked in a for-profit environment and those who indicated they worked in a not-for-profit environment.

Table 19. *H5 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of For-Profit and Not-For-Profit Rank Order*

Test	PM status	Analysis	PM for profit	PM not for profit
Kendall's tau_b	PM for profit	Correlation Coefficient	1.000	.829**
		Sig. (2-tailed)	.	.000
		N	21	21
	PM not for profit	Correlation Coefficient	.829**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	PM for profit	Correlation Coefficient	1.000	.957**
		Sig. (2-tailed)	.	.000
		N	21	21
	PM not for profit	Correlation Coefficient	.957**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

A strong positive correlation in the ranking was found ($rho(21) = .957$, $p < .001$), indicating a significant relationship between the two variables. Project managers who

participated in the current research appear to perceive the importance of the 21 behavioral and technical skills in a similar manner. This finding was confirmed by the results of the Kendall's tau_b (see Table 19).

Table 20. *H5* Mann-Whitney *U*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)
Diplomacy	3198.000	5278.000	-.862	.389
Interviewing	3288.500	5368.500	-.479	.632
Directing	3351.000	9129.000	-.070	.944
Patience	3292.500	9070.500	-.456	.648
Assertiveness	3081.000	8752.000	-1.086	.278
Leadership	2931.000	8602.000	-1.689	.091
Programming	3223.500	9001.500	-.650	.516
Speaking	3295.000	9073.000	-.289	.772
Writing	3380.500	9158.500	-.159	.874
Listening	3379.500	9157.500	-.192	.848
Empathy	3173.500	8951.500	-.688	.491
Salesmanship	2468.000	8246.000	-3.067	.002
Politics	3394.000	5474.000	-.103	.918
Management	3300.500	9078.500	-.265	.791
Training	3365.000	9143.000	-.197	.844
Cooperation	3293.500	5373.500	-.466	.641
Application Knowledge	2612.000	8390.000	-2.757	.006
Organizational Communications	3093.000	8871.000	-1.141	.254
Analysis and Design	3123.500	8901.500	-.832	.405
Non-verbal Communications	3249.500	8814.500	-.379	.705
Sensitivity	3384.500	9162.500	-.137	.891

Further research was performed using the data collected from the current research to confirm there was a significant difference found to exist in the ranking of the perceived importance the participants placed on the 21 behavioral and technical skills from the results of Kendall's *tau_b* and Spearman's Rank Order Correlation Coefficient tests. The additional tests determined to be appropriate for this data were the Mann-Whitney *U*, Kolmogorov-Smirnov *Z*, and the Kruskal-Wallis test.

Table 21. *H5 Kolmogorov Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.064	.000	-.064	.402	.997
Interviewing	.078	.002	-.078	.496	.966
Directing	.009	.009	-.005	.056	1.000
Patience	.045	.045	-.006	.285	1.000
Assertiveness	.090	.090	.000	.566	.906
Leadership	.128	.128	.000	.808	.531
Programming	.117	.117	-.071	.742	.641
Speaking	.037	.037	.000	.235	1.000
Writing	.012	.012	.000	.078	1.000
Listening	.019	.019	.000	.118	1.000
Empathy	.045	.045	.000	.284	1.000
Salesmanship	.184	.184	.000	1.156	.138
Politics	.031	.000	-.031	.198	1.000
Management	.027	.027	-.017	.173	1.000
Training	.084	.084	-.064	.530	.941
Cooperation	.035	.000	-.035	.219	1.000
Application Knowledge	.214	.214	-.031	1.354	.051
Organizational Communications	.074	.074	.000	.470	.980
Analysis and Design	.095	.095	-.032	.601	.863
Non-verbal Communications	.028	.028	-.012	.175	1.000
Sensitivity	.025	.025	-.005	.157	1.000

The results of the Mann-Whitney *U* test (see Table 20) indicate that there was a significant difference between the responses received from the project managers who participated in the current research. The areas of difference are salesmanship and application knowledge. Further analysis was performed using the Kolmogorov-Smirnov *Z* test (see Table 21), which indicates no significant differences exist between the responses from the project managers involved with for-profit organizations and those involved in not-for-profit organizations.

The final test utilized to determine if there was a significant difference between the results of the current research relative to project managers involved with for-profit

environments and those involved in not-for-profit environments was the Kruskal-Wallis test (see Table 22). The results indicate a significant difference in the areas of salesmanship (p = .002) and application knowledge (p = .006).

Table 22. *H5 Kruskal-Wallis Test*

Kruskal-Wallis Test Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.743	1	.389
Interviewing	.229	1	.632
Directing	.005	1	.944
Patience	.208	1	.648
Assertiveness	1.179	1	.278
Leadership	2.854	1	.091
Programming	.422	1	.516
Speaking	.084	1	.772
Writing	.025	1	.874
Listening	.037	1	.848
Empathy	.474	1	.491
Salesmanship	9.408	1	.002
Politics	.011	1	.918
Management	.070	1	.791
Training	.039	1	.844
Cooperation	.217	1	.641
Application Knowledge	7.602	1	.006
Organizational Communications	1.301	1	.254
Analysis and Design	.693	1	.405
Non-verbal Communications	.143	1	.705
Sensitivity	.019	1	.891

Based on the results from the five tests used to determine if there was a significant difference between the perceived importance of the 21 behavioral and technical skills as it relates to the responses from the project managers who indicated they were associated with for-profit organizations and those who indicated they were associated with not-for-profit organizations confirms that there was significant difference between the two groups in the areas of salesmanship (p = .002) and application knowledge (p = .006).

Hypothesis 6

$H6_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

$H6_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Of the 16 participants who indicated that they were not project managers, 10 participants indicated that they worked in a for-profit healthcare environment and 6 participants indicated that they worked in a not-for-profit healthcare environment. The responses of the two groups of participants were ranked based on the mean of the responses to the seven-level Likert scale (see Table 23). The ranked lists are compared using Spearman Rank Order Correlation Coefficient and Kendall's tau_b. Analysis of the significance of the correlation between the ranked lists based on the mean values derived for those participants who indicated they were not currently acting in the position of project manager and that they were involved with for-profit compared to those who indicated they were involved with not-for profit organizations was performed to determine if there was a significant difference between the two lists.

Table 23. *H6 Ranking of Behavioral and Technical Skills by Non-Project Manager Participants in For-Profit and Not-For-Profit Environments*

Behavioral and Technical Skill	Rank For-Profit	Rank Not-for-Profit
Management	1	1
Listening	3	2
Leadership	2	3
Writing	4	4
Directing	5	5
Speaking	6	6
Diplomacy	7	7
Cooperation	9	8
Politics	11	9
Organizational Communications	13	10
Interviewing	8	11
Application Knowledge	18	12
Assertiveness	14	13
Non-verbal Communications	15	14
Training	20	15
Patience	10	16
Salesmanship	17	17
Sensitivity	12	18
Empathy	16	19
Analysis and Design	19	20
Programming	21	21

The analysis of the results needed to indicate both a high correlation and significance less than .05 in order to indicate that the two ranked lists exhibited no significant difference. The overall mean for the 16 respondents to the seven-level Likert scale was 6.036 while the mean determined for each of the 21 behavioral and technical skills ranged from 4.0 to 6.882 with a mean of 6.036, a median of 6.176, and a mode of 6.765. Analysis of the mean, median, and mode analysis present a result that does not present a normal distribution making an independent *t* test inappropriate. Correlation of the rankings will be evaluated using the above mentioned tests.

A Spearman Rank Order Correlation Coefficient (see Table 24) was calculated for participants who indicated they were project managers and the relationship between those who indicated they worked in a for-profit environment and those who indicated they worked in a not-for-profit environment. A strong positive correlation was found (*rho*(21)= .860, p < .001), indicating a significant relationship between the two variables. Participants who indicated they were not project managers participating in the current research appear to perceive the importance of the 21 behavioral and technical skills in a similar manner. This finding was confirmed by the results of the Kendall's tau_b (see Table 24).

Table 24. *H6 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of For-Profit and Not-For-Profit Rank Order*

Test	Organization	Analysis	For Profit	Not For Profit
Kendall's tau_b	For Profit	Correlation Coefficient	1.000	.733**
		Sig. (2-tailed)	.	.000
		N	21	21
	Not For Profit	Correlation Coefficient	.733**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	For Profit	Correlation Coefficient	1.000	.860**
		Sig. (2-tailed)	.	.000
		N	21	21
	Not For Profit	Correlation Coefficient	.860**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

A review of the results from Kendall's tau_b and Spearman's Rank Order Correlation Coefficient indicate a significant high correlation between the two ranks. However, further analysis was deemed necessary to confirm this conclusion from the ranked list of mean results.

Table 25. *H6* Mann-Whitney *U*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
Diplomacy	24.000	79.000	-.717	.473	.562[a]
Interviewing	28.000	49.000	-.236	.814	.875[a]
Directing	28.500	49.500	-.185	.853	.875[a]
Patience	27.500	48.500	-.285	.776	.792[a]
Assertiveness	28.000	83.000	-.232	.816	.875[a]
Leadership	26.000	47.000	-.577	.564	.713[a]
Programming	26.500	81.500	-.387	.699	.713[a]
Speaking	28.500	49.500	-.185	.853	.875[a]
Writing	28.000	83.000	-.258	.796	.875[a]
Listening	26.000	81.000	-.577	.564	.713[a]
Empathy	28.500	49.500	-.170	.865	.875[a]
Salesmanship	27.500	82.500	-.293	.769	.792[a]
Politics	25.000	80.000	-.591	.554	.635[a]
Management	28.000	49.000	-.378	.705	.875[a]
Training	16.000	71.000	-1.559	.119	.147[a]
Cooperation	27.500	82.500	-.309	.758	.792[a]
Application Knowledge	17.000	72.000	-1.501	.133	.181[a]
Organizational Communications	23.000	78.000	-.808	.419	.492[a]
Analysis and Design	18.000	39.000	-1.359	.174	.220[a]
Non-verbal Communications	23.500	78.500	-.741	.458	.492[a]
Sensitivity	22.500	43.500	-.879	.379	.428[a]

a. Not corrected for ties

The additional testing included tests that are suggested as appropriate for nonparametric data. These tests include Mann-Whitney *U* (see Table 25), Kolmogorov-Smirnov *Z* (see Table 26), and the Kruskal-Wallis test (see Table 27). These tests confirm that the underlying data do not indicate a significant difference in the ranking of any of

the 21 behavioral and technical skills when comparing the responses from participants who indicated they were not project managers and that they were associated with either for-profit or not-for-profit healthcare related organizations.

Including the additional tests in the analysis of this hypothesis was necessary because of the small number of participants in the survey who indicated they were not-project managers. The number of participants in each of the two categories of not-for-profit organization and for-profit organization further reduced the number of participants per variable. Further analysis served to confirm the results despite the small number of participants.

Table 26. *H6 Kolmogorov-Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.267	.267	-.067	.516	.952
Interviewing	.133	.000	-.133	.258	1.000
Directing	.100	.100	-.100	.194	1.000
Patience	.300	.200	-.300	.581	.888
Assertiveness	.133	.133	-.033	.258	1.000
Leadership	.133	.000	-.133	.258	1.000
Programming	.233	.233	-.167	.452	.987
Speaking	.100	.100	-.100	.194	1.000
Writing	.067	.067	.000	.129	1.000
Listening	.133	.133	.000	.258	1.000
Empathy	.333	.233	-.333	.645	.799
Salesmanship	.233	.233	-.167	.452	.987
Politics	.267	.267	-.033	.516	.952
Management	.067	.000	-.067	.129	1.000
Training	.400	.400	.000	.775	.586
Cooperation	.200	.200	-.167	.387	.998
Application Knowledge	.333	.333	.000	.645	.799
Organizational Communications	.200	.200	.000	.387	.998
Analysis and Design	.667	.167	-.667	1.291	.071
Non-verbal Communications	.233	.233	-.167	.452	.987
Sensitivity	.500	.133	-.500	.968	.306

The results of the Kruskal-Wallis test confirm the results of the previous nonparametric tests. The chi square goodness of fit test was used to analyze the results of those participants who indicated they were not project managers comparing the frequency of similarity between the perceived importance of the 21 behavioral and technical skills among participants who were associated with for-profit healthcare organizations and those who indicated they were associated with not-for-profit healthcare organizations. None of the 21 behavioral and technical skills was found to demonstrate a significant difference between the two categories. No significant difference from the null hypothesis as stated was found (chi-square(1) range from .029 and 2.431, $p > .05$).

Table 27. *H6 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.514	1	.473
Interviewing	.056	1	.814
Directing	.034	1	.853
Patience	.081	1	.776
Assertiveness	.054	1	.816
Leadership	.333	1	.564
Programming	.150	1	.699
Speaking	.034	1	.853
Writing	.067	1	.796
Listening	.333	1	.564
Empathy	.029	1	.865
Salesmanship	.086	1	.769
Politics	.350	1	.554
Management	.143	1	.705
Training	2.431	1	.119
Cooperation	.095	1	.758
Application Knowledge	2.253	1	.133
Organizational Communications	.653	1	.419
Analysis and Design	1.846	1	.174
Non-verbal Communications	.550	1	.458
Sensitivity	.773	1	.379

Hypothesis 7

$H7_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

$H7_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

The participants, in responding to this question, were asked to respond with the type of healthcare organizations with which they were associated. The six suggested organizational types were Corporate, Hospital, Clinic, Physician's Office, Retirement community, and other. If the participant selected the organizational type of "Other" they were given the opportunity to respond with the specific type of organization in which they participated. A review of the responses to the "Other" category found that, because of the variation in the responses to the "Other" category, there were no specific additional groups or categories that could be recognized based on the responses to the other types of facilities or organizations provided by the participants. It was apparent that the participants represented a broad range of business entities involved in healthcare delivery and governance. The frequency of the respondents was reported in Table 28.

The low number of consistent responses found from the explanations provided in the "Other" category and the low number of responses to the Clinic, Physician's Office,

and Retirement Community categories resulted in the decision to combine the Other category and the Clinic, Physician's Office, and Retirement Community categories. The remaining three categories of Other, Corporate Office, and Hospital have a sufficient frequency to continue with the data analysis.

Table 28. *H7 Frequency of Responses to the Six Types of Organization*

Type of organization	Frequency (n)
Other	68
Corporate Office	51
Hospital	62
Clinic	4
Physician's Office	1
Retirement Community	0
No Response	35

Table 29. *H7 Combined Categorization of the Frequency of Responses to the Six Types of Organization*

Type of organization	Frequency (n)
Other	108
Corporate Office	51
Hospital	62

The mean values determined from the three organizational types selected for this research were ranked in descending order. The mean values calculated from the results of the survey reflecting the perceived importance of the 21 behavioral and technical skills were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient to determine if there was a significant difference between the ranking of the 21 behavioral and technical skills among the participants associated with three types of organization (see Table 30).

Table 30. *H7 Ranking by Type of Facility*

Behavioral and Technical Skill	Ranking Other	Ranking Corporate	Ranking Hospital
Listening	1	1	1
Speaking	2	2	2
Management	5	5	3
Diplomacy	3	4	4
Writing	4	6	5
Leadership	7	3	6
Cooperation	6	9	7
Directing	8	8	8
Interviewing	10	7	9
Patience	9	13	10
Politics	11	11	11
Organizational Communications	12	10	12
Sensitivity	14	12	13
Empathy	13	15	14
Assertiveness	15	16	15
Non-verbal Communications	16	14	16
Application Knowledge	18	18	17
Salesmanship	17	17	18
Analysis and Design	19	19	19
Training	20	20	20
Programming	21	21	21

The results of Kendall's tau_b (see Table 31) indicate a high correlation among the three categories with a correlation coefficient of between .848 and .943. The significance of the correlation coefficient was low (p = .000) among all three correlations. The results of Kendall's tau_b also indicate that there was no significant difference between the categories when considering the results from all participants and the type of organization with which they are associated. The results of Kendall's tau_b were confirmed by the Spearman's Rank Order Correlation Coefficient test. Spearman's Rank

Order Correlation Coefficient resulted in a correlation between .953 and .991 with a significance level of .000 ($p < .05$) for all three relationships being considered.

Table 31. *H7 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Other, Corporate, and Hospital Organization Type Rank Order*

Test	Organizatio	Analysis	Other	Corporate	Hospital
Kendall's tau_b	Other	Correlation Coefficient	1.000	.848**	.943**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.848**	1.000	.867**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.943**	.867**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21
Spearman's *rho*	Other	Correlation Coefficient	1.000	.953**	.991**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.953**	1.000	.971**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.991**	.971**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

Additional analysis was performed using the Kruskal-Wallis test recommended for nonparametric data with multiple parameters. In the analysis of the three parameters of other, corporate, and hospital environments and the ranking of the perceived importance of the 21 behavioral and technical skills resulting from the all participants in the current research it was determined that there were individual skills that demonstrated significant differences among the participants in the various groups (see Table 32).

Patience (p = .002), management (p = .010), and training (p = .011). When comparing two of the three ranked groups, as Kendall's tau_b and Spearman's Rank Order Correlation Coefficient do, the correlations were found to be significant high correlations. Further analysis utilizing the Kruskal-Wallis test, however, indicates significant differences do exist at the individual skill level of Patience (p = .002), Management (p = .010) and Training (p = .011).

Table 32. *H7 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.269	2	.874
Interviewing	.077	2	.962
Directing	3.516	2	.172
Patience	12.448	2	.002
Assertiveness	.104	2	.949
Leadership	2.419	2	.298
Programming	1.447	2	.485
Speaking	1.429	2	.490
Writing	.180	2	.914
Listening	3.891	2	.143
Empathy	.710	2	.701
Salesmanship	5.546	2	.062
Politics	.175	2	.916
Management	9.284	2	.010
Training	9.027	2	.011
Cooperation	5.680	2	.058
Application Knowledge	.902	2	.637
Organizational Communications	.526	2	.769
Analysis and Design	5.087	2	.079
Non-verbal Communications	4.245	2	.120
Sensitivity	2.218	2	.330

Hypothesis 8

$H8_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers

involved in healthcare projects that take place within various types of healthcare environments.

$H8_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

The participants, in responding to this question, were asked to respond if they belonged to various types of healthcare organizations. The six specific types of organization were categorized as Corporate, Hospital, Clinic, Physician's Office, Retirement community, and other. If the participant selected the organizational type of "Other" they were given the opportunity to respond with the specific type of organization in which they participated. A review of the responses to the "Other" category found that, because of the variation in the responses to the "Other" category, there were no specific additional groups or categories that could be recognized based on the responses to the other types of facilities or organizations provided by the participants. It was apparent that the participants represented a broad range of business entities involved in healthcare delivery and governance.

The low number of consistent responses in the other category and the low number of responses to the Clinic, Physician's Office, and Retirement Community categories resulted in the decision to combine the Other category and the Clinic, Physician's Office, and Retirement Community categories. The resulting frequency of responses by type of organization is shown in Table 33.

Table 33. *H8 Combined Categorization of the Frequency of Responses to the Six Types of Organization*

Type of organization	Frequency (n)
Other	101
Corporate Office	47
Hospital	56

Table 34. *H8 Ranking by Other, Corporate and Hospital for Project Managers*

Behavioral and Technical Skill	Other	Corporate	Hospital
Management	6	5	1
Listening	1	2	2
Diplomacy	4	3	3
Cooperation	5	10	4
Speaking	2	1	5
Writing	3	6	6
Directing	8	11	7
Interviewing	10	7	8
Leadership	7	4	9
Patience	9	13	10
Politics	11	9	11
Organizational Communications	12	8	12
Sensitivity	14	12	13
Analysis and Design	19	19	14
Empathy	13	14	15
Assertiveness	15	16	16
Application Knowledge	18	18	17
Non-verbal Communications	17	15	18
Training	20	20	19
Salesmanship	16	17	20
Programming	21	21	21

The mean values determined from the responses to the seven-level Likert scale by participants who indicated they were project managers associated with the three types of organization were ranked in descending order and the values determined from the perceived importance of the 21 behavioral and technical skills were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient to determine if there

was a significant difference between the ranking of the 21 behavioral and technical skills among the participants associated with three types of organization (see Table 34).

Only the responses from those participants who indicated they were project managers were included in the test of hypothesis 8. The rankings demonstrate what appears to be a wide range of ranking differences as in the case of the number one ranked behavioral and technical skill being listening in the other category, speaking in the corporate category, and management in the hospital category. Correlations resulting from the ranking of the means are shown in Table 34.

Table 35. *H8 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Other, Corporate, and Hospital Organization Type Rank Order*

Test	Organization	Analysis	Other	Corporate	Hospital
Kendall's tau_b	Other	Correlation Coefficient	1.000	.800**	.790**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.800**	1.000	.705**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.790**	.705**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21
Spearman's *rho*	Other	Correlation Coefficient	1.000	.927**	.931**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.927**	1.000	.879**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.931**	.879**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

The results of Kendall's tau_b (see Table 35) indicate a high correlation among the three categories with a correlation coefficient of between .705 and .800. The significance of the correlation coefficient was low (p = .000) among all three correlations. The results of Kendall's tau_b indicate that there was no significant difference between the categories when considering the results from all participants and the type of organization with which they are associated. The results of Kendall's tau_b were confirmed by the Spearman's Rank Order Correlation Coefficient test. Spearman's Rank Order Correlation Coefficient resulted in a correlation between .879 and .931 with a significance level of .000 (p < .05) for all three relationships being considered.

Table 36. *H8 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.045	2	.978
Interviewing	.449	2	.799
Directing	3.501	2	.174
Patience	10.671	2	.005
Assertiveness	.504	2	.777
Leadership	1.670	2	.434
Programming	2.248	2	.325
Speaking	1.319	2	.517
Writing	.067	2	.967
Listening	3.532	2	.171
Empathy	.625	2	.731
Salesmanship	5.796	2	.055
Politics	.739	2	.691
Management	10.208	2	.006
Training	12.019	2	.002
Cooperation	6.189	2	.045
Application Knowledge	2.229	2	.328
Organizational Communications	1.203	2	.548
Analysis and Design	7.323	2	.026
Non-verbal Communications	4.068	2	.131
Sensitivity	3.187	2	.203

Additional analysis was performed using the Kruskal-Wallis test (see Table 36) recommended for nonparametric data with multiple parameters. In the analysis of the three parameters of other, corporate, and hospital environments and the ranking of the perceived importance of the 21 behavioral and technical skills resulting from the participants who indicated they were project managers in the current research it was determined that there were individual skills that demonstrated significant differences among the participants in the various groups (see Table 36). Patience ($p = .005$), management ($p = .006$), training ($p = .002$), cooperation ($p = .045$), and analysis and design ($p = .026$). When comparing two of the three ranked groups, as Kendall's tau_b and Spearman's Rank Order Correlation Coefficient do, the correlations were found to be significant high correlations. Further analysis using the Kruskal-Wallis test, however, indicates significant differences do exist at the individual skill level in the areas of patience ($p = .005$), Training ($p = .002$), Cooperation ($p = .045$) and Analysis and Design ($p = .026$).

Hypothesis 9

$H9_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

$H9_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project

managers involved in healthcare projects that take place within various types of healthcare environments.

The participants, in responding to this question, were asked to respond if they belonged to various types of healthcare organizations. The six specific types of organization were categorized as Corporate, Hospital, Clinic, Physician's Office, Retirement community, and other. There were no specific additional groups recognized in the responses to the other types of facilities or organizations provided by the participants. The frequency of the respondents is reported in Table 37. There were a total of 17 participants who indicated that they were not project managers and only 16 of these participants indicated the type of organization with which they are associated.

The low number of consistent responses in the other category and the low number of responses to the Clinic, Physician's Office, and Retirement Community categories resulted in the decision to combine the Other category and the Clinic, Physician's Office, and Retirement Community categories. The remaining three categories of Other, Corporate Office, and Hospital have a sufficient frequency to continue with the data analysis.

Table 37. *H9 Combined Categorization of the Frequency of Responses to the Six Types of Organization*

Type of organization	Frequency (n)
Other	7
Corporate Office	4
Hospital	6

Only the responses from those participants who indicated they were not project managers was included in the test of hypothesis 9. The ranking of the mean scores determined for each of the 21 behavioral and technical skills among the responses from those participants who indicated they were not project managers is shown in Table 38. There appear to be some wide range differences among some of the skills based on the mean ranking.

Table 38. *H9 Ranking of Other, Corporate, and Hospital*

Behavioral and Technical Skill	Other	Corporate	Hospital
Management	1	2	1
Listening	4	3	2
Writing	5	4	3
Directing	8	6	4
Speaking	10	7	5
Leadership	3	1	6
Interviewing	15	5	7
Cooperation	7	8	8
Diplomacy	2	10	9
Politics	6	12	10
Organizational Communications	12	13	11
Sensitivity	17	15	12
Patience	9	11	13
Assertiveness	13	14	14
Application Knowledge	11	17	15
Non-verbal Communications	14	9	16
Empathy	16	18	17
Training	19	20	18
Salesmanship	18	16	19
Analysis and Design	20	19	20

The mean values determined from the three categories of organization were ranked in descending order and the values determined from the perceived importance of the 21 behavioral and technical skills were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient to determine if there was a significant

difference between the ranking the 21 behavioral and technical skills among the participants indicating they were not project managers and were associated with one of the three types of organization (see Table 39).

Table 39. *H9 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Other, Corporate, and Hospital Organization Type Rank Order*

Test	Type of Organization	Analysis	Other	Corporate	Hospital
Kendall's tau_b	Other	Correlation Coefficient	1.000	.648**	.686**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.648**	1.000	.790**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.686**	.790**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21
Spearman's *rho*	Other	Correlation Coefficient	1.000	.804**	.835**
		Sig. (2-tailed)	.	.000	.000
		N	21	21	21
	Corporate	Correlation Coefficient	.804**	1.000	.916**
		Sig. (2-tailed)	.000	.	.000
		N	21	21	21
	Hospital	Correlation Coefficient	.835**	.916**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

The results of Kendall's tau_b (see Table 39) indicate a moderate to high correlation among the three categories with a correlation coefficient of between .648 and .790. The significance of the correlation coefficient was low (p = .000) among all three correlations. The results of Kendall's tau_b indicate that there was no significant

difference between the categories when considering the results from all participants and the type of organization with which they are associated.

The results of Kendall's tau_b were confirmed by the Spearman's Rank Order Correlation Coefficient test. Spearman's Rank Order Correlation Coefficient resulted in a correlation between .804 and .916 with a significance level of .000 ($p < .05$) for all three relationships being considered.

Table 40. *H9 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	5.055	2	.080
Interviewing	1.408	2	.495
Directing	.715	2	.699
Patience	3.003	2	.223
Assertiveness	2.510	2	.285
Leadership	3.670	2	.160
Programming	.759	2	.684
Speaking	.715	2	.699
Writing	.349	2	.840
Listening	.619	2	.734
Empathy	3.544	2	.170
Salesmanship	2.833	2	.243
Politics	2.202	2	.333
Management	1.644	2	.439
Training	1.686	2	.430
Cooperation	1.473	2	.479
Application Knowledge	6.934	2	.031
Organizational Communications	2.061	2	.357
Analysis and Design	1.267	2	.531
Non-verbal Communications	1.501	2	.472
Sensitivity	1.128	2	.569

Further analysis using the Kruskal-Wallis test, however, indicates significant differences do exist at the individual skill level of application knowledge ($p = .031$). The use of the Mann-Whitney *U* test and Kolmogorov-Smirnov two-sample test was not appropriate for testing when there are more than two variables. Kruskal-Wallis is the only

recommended test for analysis of correlations when the sample is nonparametric and includes multiple groups.

Additional analysis was performed using the Kruskal-Wallis test recommended for nonparametric data with multiple parameters. In the analysis of the three parameters of other, corporate, and hospital environments and the ranking of the perceived importance of the 21 behavioral and technical skills resulting from the participants who indicated they were project managers in the current research it was determined that there the individual skill of application knowledge demonstrated a significant differences ($p < .05$) among the participants in the various groups (see Table 40). When comparing two of the three ranked groups, as Kendall's tau_b and Spearman's Rank Order Correlation Coefficient do, the correlations were found to be significant high correlations.

Hypothesis 10

$H10_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H10_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment was determined by the approximate number of employees of the organization.

Participants in the current research indicated associations with healthcare organizations with as few as 100 employees and organizations with more than 10,000 employees. The largest number of participants ($N = 60$) in the current research represented organizations of between 1,000 and 5,000 employees. The total number of participants in each size of organization is provided in Table 41. Based on the distribution and the limited number of participants in each of the categories, the six categories of employee count used to measure the size of the organization in the questionnaire was reduced to two categories.

Table 41. *H10 Distribution of all Participants by Size of Organization Determined by the Number of Employees*

Size of the organization by number of employees	Participants in each category
Raw data by organization size	
1 = < 100	26
2 = 100 – 500	23
3 = 501 – 1000	22
4 = 1000 – 5000	60
5 = 5000 – 10000	35
6 = > 10000	55
Consolidated by organization size	
1 = <5000	131
2 = >5000	90

The two categories selected are those organizations with fewer than 5,000 employees and organizations with more than 5, 000 employees. Consolidation of the data in this way allowed for a more condensed statistical evaluation of the data.

There were 131 participants who indicated they were associated with healthcare organizations with fewer than 5,000 employee and 90 participants who reported working in healthcare organizations with more than 5,000 employees. The responses of all

participants were ranked based on the mean of the responses to the seven-level Likert scale. Table 42 shows the mean ranking of the participant's perceived importance of the behavioral and technical skills. The group statistics are shown in Table 42 indicating 131 participants from a healthcare organization with fewer than 5,000 employees and 90 participants are associated with healthcare organization with more than 5,000 employees.

Table 42. *H10 Ranking of Organizations with Fewer Than 5,000 Employees and Those With More Than 5,000 Employees*

Behavioral and Technical Skill	Organization with <5,000 employees	Organization with >5,000 employees
Listening	1	1
Speaking	2	2
Management	3	3
Diplomacy	5	4
Writing	4	5
Leadership	6	6
Cooperation	7	7
Directing	8	8
Interviewing	9	9
Politics	12	10
Patience	10	11
Organizational Communications	11	12
Sensitivity	13	13
Empathy	14	14
Assertiveness	15	15
Non-verbal Communications	16	16
Analysis and Design	19	17
Salesmanship	18	18
Application Knowledge	17	19
Training	20	20
Programming	21	21

The mean values determined from the two categories of organization size were ranked in descending order. The values determined from the participant ranking of

perceived importance of the 21 behavioral and technical skills were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient to determine if there was a significant difference between the ranking the 21 behavioral and technical skills among all participants and whether or not the participants were associated with the an organization with fewer than 5,000 employees and those participants who indicated they were associated with healthcare organizations with more than 5,000 employees. No significant difference was determined to exist based on the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests as shown in Table 43.

Table 43. *H10 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Organization With More Than 5,000 Employees and Organizations With Fewer Than 5,000 Employees Rank Order*

Test	Number of Employees	Analysis	Fewer than 5,000 employees	More than 5,000 employees
Kendall's tau_b	<5000	Correlation Coefficient	1.000	.943**
		Sig. (2-tailed)	.	.000
		N	21	21
	>5000	Correlation Coefficient	.943**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	<5000	Correlation Coefficient	1.000	.990**
		Sig. (2-tailed)	.	.000
		N	21	21
	>5000	Correlation Coefficient	.990**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

When comparing two of the three ranked groups, as Kendall's tau_b and Spearman's Rank Order Correlation Coefficient do, the correlations were found to demonstrate significant high correlations. Additional analysis was performed using the Mann-Whitney *U* test recommended for nonparametric data with two parameters.

Analysis of the ranking of the 21 behavioral and technical skills using data from the two parameters based on size of the organization being fewer than 5,000 employees and the size of the organization being more than 5,000 employees it was determined that no individual skill demonstrated a significant difference ($p < .05$) among the participants in the two groups (see Table 44).

Table 44. *H10* Mann-Whitney *U*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)
Diplomacy	5806.500	9901.500	-.224	.823
Interviewing	5772.000	9867.000	-.291	.771
Directing	5462.000	9557.000	-.933	.351
Patience	5745.000	14391.000	-.347	.729
Assertiveness	5531.000	9626.000	-.745	.456
Leadership	5723.000	9818.000	-.310	.756
Programming	5703.500	14349.500	-.416	.677
Speaking	5229.500	13875.500	-1.523	.128
Writing	5864.500	14510.500	-.074	.941
Listening	5262.000	13908.000	-1.830	.067
Empathy	5745.500	14391.500	-.195	.846
Salesmanship	5661.500	9756.500	-.429	.668
Politics	5259.000	13905.000	-1.460	.144
Management	5443.500	13958.500	-.864	.387
Training	5745.500	14391.500	-.334	.738
Cooperation	5792.500	9887.500	-.138	.890
Application Knowledge	5506.000	9601.000	-.885	.376
Organizational Communications	5573.000	14088.000	-.641	.521
Analysis and Design	5583.000	14098.000	-.599	.549
Non-verbal Communications	5691.500	9696.500	-.214	.831
Sensitivity	5570.000	14216.000	-.757	.449

Additional analysis was performed using the Kolmogorov-Smirnov *Z* test (see Table 45). The Kolmogorov-Smirnov Z test resulted in a similar finding supporting Kendall's tau_b and Spearman's Rank Order Correlation Coefficient, that there was no

significant difference between the responses from all the participants in the online survey and the size of their organization being either fewer than 5,000 employees or more than 5,000 employees. None of the 21 behavioral and technical skills were determined to have a significance of less than .05 indicating no significant difference between the two lists.

Table 45. *H10 Kolmogorov-Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.023	.023	-.019	.167	1.000
Interviewing	.045	.038	-.045	.332	1.000
Directing	.093	.037	-.093	.679	.745
Patience	.036	.036	-.013	.266	1.000
Assertiveness	.050	.000	-.050	.368	.999
Leadership	.045	.000	-.045	.330	1.000
Programming	.083	.083	-.036	.606	.856
Speaking	.113	.113	-.014	.822	.509
Writing	.024	.017	-.024	.178	1.000
Listening	.105	.105	.000	.764	.603
Empathy	.018	.015	-.018	.131	1.000
Salesmanship	.076	.054	-.076	.555	.918
Politics	.097	.097	-.015	.707	.700
Management	.064	.064	-.006	.462	.983
Training	.054	.041	-.054	.396	.998
Cooperation	.015	.007	-.015	.106	1.000
Application Knowledge	.050	.005	-.050	.366	.999
Organizational Communications	.065	.065	-.011	.474	.978
Analysis and Design	.053	.053	-.047	.386	.998
Non-verbal Communications	.036	.032	-.036	.262	1.000
Sensitivity	.043	.043	-.011	.314	1.000

A final test was used to determine if a significant difference existed between the ranking of all participants and the size of their organization. The Kruskal-Wallis test (see Table 46) was used to determine if there were significant differences at the individual behavioral and technical skill between responses from all the participants associated with

organizations with fewer than 5,000 employees and participants associated with organization with more than 5,000 employees. No significant differences ($p < .05$) were found.

Table 46. *H10 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.050	1	.823
Interviewing	.084	1	.771
Directing	.871	1	.351
Patience	.120	1	.729
Assertiveness	.555	1	.456
Leadership	.096	1	.756
Programming	.173	1	.677
Speaking	2.320	1	.128
Writing	.006	1	.941
Listening	3.350	1	.067
Empathy	.038	1	.846
Salesmanship	.184	1	.668
Politics	2.131	1	.144
Management	.747	1	.387
Training	.112	1	.738
Cooperation	.019	1	.890
Application Knowledge	.783	1	.376
Organizational Communications	.411	1	.521
Analysis and Design	.359	1	.549
Non-verbal Communications	.046	1	.831
Sensitivity	.573	1	.449

Hypothesis 11

$H11_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of

healthcare environments where the size of the environment was determined by the approximate number of employees of the organization.

$H11_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Table 47. *H11 Distribution of Project Managers by Size of the Organization*

Size of the organization by number of employees	Participants in each category
Raw data by organization size	
1 = < 100	23
2 = 100-500	22
3 = 501-1000	21
4 = 1000-5000	55
5 = 5000-10000	34
6 = > 10000	49
Consolidated by organization size	
1 = <5000	121
2 = >5000	83

There were 121 project managers who participated in the current research who indicated they were associated with healthcare organizations with fewer than 5,000 employee and 83 participating project managers indicating they worked in healthcare organizations with more than 5,000 employees. The responses of all participants were ranked based on the mean of the responses to the seven-level Likert scale (see Table 48).

Table 48. *H11 Ranking by Size of the Organization*

Behavioral and Technical Skill	< 5,000 employees	> 5,000 employees
Listening	1	1
Speaking	2	2
Diplomacy	3	3
Management	5	4
Writing	4	5
Cooperation	7	6
Leadership	6	7
Directing	8	8
Interviewing	9	9
Politics	12	10
Patience	10	11
Organizational Communications	11	12
Sensitivity	14	13
Empathy	13	14
Assertiveness	15	15
Analysis and Design	19	16
Non-verbal Communications	16	17
Salesmanship	17	18
Application Knowledge	18	19
Training	20	20
Programming	21	21

A total of 204 participants in the current research indicated they were a project manager and responded to the size of their organization in the questionnaire. Based on the distribution and the limited number of participants in each of the categories, the six categories of employee count used to measure the size of the organization in the questionnaire was reduced to two categories (see Table 47).

Table 49. *H11 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Organization With More Than 5,000 Employees and Organizations With Fewer Than 5,000 Employees Rank Order*

Test	Number of Employees	Analysis	Fewer than 5,000 employees	More than 5,000 employees
Kendall's tau_b	< 5000	Correlation Coefficient	1.000	.924**
		Sig. (2-tailed)	.	.000
		N	21	21
	> 5000	Correlation Coefficient	.924**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	< 5000	Correlation Coefficient	1.000	.984**
		Sig. (2-tailed)	.	.000
		N	21	21
	> 5000	Correlation Coefficient	.984**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

The mean values determined from the responses of those participants who indicated they were project managers and categorized by size of the organization were ranked in descending order. Ranking of the mean values from the perceived importance of the 21 behavioral and technical skills were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient (see Table 49). No significant difference was found to exist between the mean ranking of the 21 behavioral and technical skills among participants who indicated they were project managers when considering whether they were associated with organizations with fewer or more than 5,000 employees.

Additional analysis was performed using the Mann-Whitney *U* test recommended for nonparametric data with two parameters (see Table 50). In the analysis of the data from the two parameters of the size of the organization being fewer than 5,000 employees and the size of the organization being more than 5,000 employees and the ranking of the

perceived importance of the 21 behavioral and technical skills resulting from participants who indicated they were project managers in the current research it was determined that no individual skill demonstrated a significant differences ($p < .05$) among the participants in the two groups (see Table 50).

Table 50. *H11* Mann-Whitney *U*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)
Diplomacy	4917.500	8403.500	-.299	.765
Interviewing	4627.000	8113.000	-1.052	.293
Directing	4479.500	7965.500	-1.356	.175
Patience	4986.500	12367.500	-.091	.927
Assertiveness	4656.500	8142.500	-.853	.394
Leadership	4708.000	8194.000	-.743	.457
Programming	4769.000	12150.000	-.619	.536
Speaking	4567.500	11948.500	-1.129	.259
Writing	4907.500	8393.500	-.312	.755
Listening	4503.000	11884.000	-1.689	.091
Empathy	4856.000	8259.000	-.276	.782
Salesmanship	4641.000	8127.000	-.870	.384
Politics	4536.000	11917.000	-1.258	.208
Management	4689.000	11949.000	-.653	.514
Training	4872.500	12253.500	-.376	.707
Cooperation	4709.000	8195.000	-.735	.463
Application Knowledge	4785.500	8271.500	-.606	.545
Organizational Communications	4854.500	12114.500	-.328	.743
Analysis and Design	4670.000	11930.000	-.786	.432
Non-verbal Communications	4666.000	8069.000	-.657	.511
Sensitivity	4923.000	12304.000	-.259	.795

Additional analysis using the Kolmogorov-Smirnov *Z* test (see Table 51) resulted in a similar finding that there was no significant difference between the responses from participants who indicated they were project managers in the online survey and the size

of their organization being either fewer than 5,000 employees or more than 5,000 employees.

Table 51. *H11 Kolmogorov-Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.026	.025	-.026	.185	1.000
Interviewing	.096	.017	-.096	.673	.756
Directing	.139	.052	-.139	.977	.296
Patience	.017	.017	-.015	.117	1.000
Assertiveness	.055	.000	-.055	.383	.999
Leadership	.049	.000	-.049	.345	1.000
Programming	.108	.108	-.043	.757	.615
Speaking	.084	.084	-.012	.587	.881
Writing	.026	.000	-.026	.186	1.000
Listening	.100	.100	.000	.704	.705
Empathy	.016	.000	-.016	.110	1.000
Salesmanship	.097	.022	-.097	.678	.748
Politics	.078	.078	-.016	.550	.923
Management	.051	.051	-.007	.359	1.000
Training	.047	.036	-.047	.328	1.000
Cooperation	.059	.000	-.059	.412	.996
Application Knowledge	.042	.005	-.042	.297	1.000
Organizational Communications	.048	.048	-.025	.333	1.000
Analysis and Design	.076	.076	-.039	.530	.942
Non-verbal Communications	.060	.012	-.060	.420	.995
Sensitivity	.042	.042	-.015	.295	1.000

A final test was used to determine if a significant difference existed between the ranking of all participants and the size of their organization. The Kruskal-Wallis test (see Table 52) was used to determine if there were significant differences at the individual behavioral and technical skill between responses from all the participants associated with organizations with fewer than 5,000 employees and participants associated with

organizations with more than 5,000 employees. No significant differences ($p < .05$) were found.

Table 52. *H11 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.089	1	.765
Interviewing	1.106	1	.293
Directing	1.840	1	.175
Patience	.008	1	.927
Assertiveness	.727	1	.394
Leadership	.553	1	.457
Programming	.383	1	.536
Speaking	1.275	1	.259
Writing	.097	1	.755
Listening	2.853	1	.091
Empathy	.076	1	.782
Salesmanship	.757	1	.384
Politics	1.584	1	.208
Management	.426	1	.514
Training	.142	1	.707
Cooperation	.540	1	.463
Application Knowledge	.367	1	.545
Organizational Communications	.108	1	.743
Analysis and Design	.618	1	.432
Non-verbal Communications	.432	1	.511
Sensitivity	.067	1	.795

Hypothesis 12

$H12_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

$H12_{A:}$ There is a significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

The count of the participants who indicated that they were not project managers and indicated the size of organization with which they were associated is provided in Table 53. Based on the distribution and the limited number of participants in each of the categories, the six categories of employee count used to measure the size of the organization in the questionnaire was reduced to two categories. The two categories selected are those organizations with fewer than 5,000 employees and organizations with more than 5, 000 employees. This consolidation of the data allowed for a more condensed statistical evaluation of the data.

Table 53. *H12 Distribution of Non-Project Managers by Size of the Organization*

Size of the organization by number of employees	Participants in each category
Raw data by organization size	
1 = < 100	3
2 = 100-500	1
3 = 501-1000	1
4 = 1000-5000	5
5 = 5000-10000	1
6 = > 10000	6
Consolidated by organization size	
1 = <5000	10
2 = >5000	7

There were 10 participants who were not project managers and who worked in healthcare organizations with fewer than 5,000 employee and 7 participants who indicated they were not project managers who were working in healthcare organizations with more than 5,000 employees. The responses of all participants were ranked based on the mean of the responses to the seven-level Likert scale (see Table 54).

Table 54. *H12 Ranking by Size of the Organization*

Behavioral and Technical Skill	Organization with fewer than 5,000 employees	Organization with more than 5,000 employees
Management	1	1
Leadership	3	2
Listening	2	3
Writing	4	4
Interviewing	12	5
Directing	6	6
Speaking	7	7
Cooperation	9	8
Diplomacy	5	9
Politics	8	10
Organizational Communications	11	11
Non-verbal Communications	15	12
Patience	13	13
Sensitivity	16	14
Assertiveness	14	15
Salesmanship	20	16
Empathy	17	17
Application Knowledge	10	18
Training	18	19
Analysis and Design	19	20
Programming	21	21

The mean values determined from the two categories of organization size were ranked in descending order and the values determined from the perceived importance of the 21 behavioral and technical skills among participants who indicated they were not

project managers were then analyzed using Kendall's tau_b and Spearman Rank Order Correlation Coefficient to determine if there was a significant difference between the ranking the 21 behavioral and technical skills among the participants indicating they were not project managers and were associated with the size of the organization.

Additional analysis was performed using the Mann-Whitney *U* test recommended for nonparametric data with two parameters (see Table 56). In the analysis of the data from the two parameters of the size of the organization being fewer than 5,000 employees and the size of the organization being more than 5,000 employees and the ranking of the perceived importance of the 21 behavioral and technical skills resulting from participants who indicated they were not project managers in the current research it was determined that the skill of interviewing demonstrated a significant differences ($p < .05$) among the participants in the two groups (see Table 56).

Table 55. *H12 Kendall's tau_b and Spearman's Rank Order Correlation Coefficient Analysis of Organization With More Than 5,000 Employees and Organizations With Fewer Than 5,000 Employees Rank Order*

Test	Number of Employees	Analysis	Fewer than 5,000 employees	More than 5,000 employees
Kendall's tau_b	< 5000	Correlation Coefficient	1.000	.762**
		Sig. (2-tailed)	.	.000
		N	21	21
	> 5000	Correlation Coefficient	.762**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21
Spearman's *rho*	< 5000	Correlation Coefficient	1.000	.891**
		Sig. (2-tailed)	.	.000
		N	21	21
	> 5000	Correlation Coefficient	.891**	1.000
		Sig. (2-tailed)	.000	.
		N	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

Table 56. *H12* Mann-Whitney *U*

Behavioral and Technical Skills	Mann-Whitney *U*	Wilcoxon *W*	*Z*	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
Diplomacy	33.500	88.500	-.163	.871	.887[a]
Interviewing	13.500	68.500	-2.305	.021	.033[a]
Directing	22.000	77.000	-1.460	.144	.230[a]
Patience	27.000	82.000	-.825	.409	.475[a]
Assertiveness	32.500	87.500	-.263	.793	.813[a]
Leadership	21.000	76.000	-1.856	.063	.193[a]
Programming	30.000	58.000	-.497	.619	.669[a]
Speaking	22.000	77.000	-1.460	.144	.230[a]
Writing	22.500	77.500	-1.471	.141	.230[a]
Listening	29.500	84.500	-.729	.466	.601[a]
Empathy	23.000	78.000	-1.221	.222	.270[a]
Salesmanship	21.500	76.500	-1.414	.157	.193[a]
Politics	27.000	82.000	-.860	.390	.475[a]
Management	28.000	83.000	-1.222	.222	.536[a]
Training	34.500	62.500	-.050	.960	.962[a]
Cooperation	16.000	71.000	-2.094	.036	.070[a]
Application Knowledge	26.000	54.000	-.929	.353	.417[a]
Organizational Communications	24.500	79.500	-1.095	.274	.315[a]
Analysis and Design	28.500	56.500	-.658	.511	.536[a]
Non-verbal Communications	22.500	77.500	-1.290	.197	.230[a]
Sensitivity	19.000	74.000	-1.676	.094	.133[a]

a. Not corrected for ties

Further analysis using the Kolmogorov-Smirnov *Z* test (see Table 57) resulted in a similar finding to the previous tests. The Kolmogorov-Smirnov Z test indicates that there was no significant difference between the responses from participants who indicated they were not project managers in the online survey and indicated the approximate size of the healthcare organization with which they were associated as being either fewer than 5,000 employees or more than 5,000 employees. None of the test utilized to test hypothesis 12 indicated any significant difference between the ranked order of the 21 behavioral and technical skills by the participants who indicated they were not project managers.

Table 57. *H12 Kolmogorov-Smirnov Z*

Behavioral and Technical Skills	Most Extreme Differences			Kolmogorov-Smirnov *Z*	Asymp. Sig. (2-tailed)
	Absolute	Positive	Negative		
Diplomacy	.071	.071	-.043	.145	1.000
Interviewing	.557	.557	.000	1.131	.155
Directing	.457	.457	-.143	.928	.356
Patience	.271	.271	.000	.551	.922
Assertiveness	.086	.086	.000	.174	1.000
Leadership	.400	.400	.000	.812	.525
Programming	.229	.100	-.229	.464	.983
Speaking	.457	.457	-.143	.928	.356
Writing	.357	.357	.000	.725	.670
Listening	.157	.157	.000	.319	1.000
Empathy	.329	.329	-.143	.667	.766
Salesmanship	.429	.429	.000	.870	.436
Politics	.314	.314	.000	.638	.811
Management	.200	.200	.000	.406	.997
Training	.229	.229	-.186	.464	.983
Cooperation	.514	.514	.000	1.044	.226
Application Knowledge	.371	.086	-.371	.754	.621
Organizational Communications	.271	.271	.000	.551	.922
Analysis and Design	.214	.043	-.214	.435	.992
Non-verbal Communications	.271	.271	.000	.551	.922
Sensitivity	.471	.471	.000	.957	.319

A final test was used to determine if a significant difference existed between the ranking of participants who indicated they were not project managers and the size of their organization. The Kruskal-Wallis test (see Table 58) was used to determine if there were significant differences between the ranking of the individual behavioral and technical skill between responses from the participants who indicated they were not project managers and were associated with organizations with fewer than 5,000 employees and participants who indicated they were not project managers and that they were associated

with organization with more than 5,000 employees. A significant differences ($p < .05$) was found to exist with the skills of interviewing ($p = .021$) and cooperation ($p = .036$).

Table 58. *H12 Kruskal-Wallis Test*

Behavioral and Technical Skills	Chi-Square	*df*	Asymp. Sig.
Diplomacy	.026	1	.871
Interviewing	5.314	1	.021
Directing	2.132	1	.144
Patience	.681	1	.409
Assertiveness	.069	1	.793
Leadership	3.446	1	.063
Programming	.247	1	.619
Speaking	2.132	1	.144
Writing	2.165	1	.141
Listening	.532	1	.466
Empathy	1.490	1	.222
Salesmanship	2.000	1	.157
Politics	.740	1	.390
Management	1.493	1	.222
Training	.003	1	.960
Cooperation	4.384	1	.036
Application Knowledge	.862	1	.353
Organizational Communications	1.198	1	.274
Analysis and Design	.433	1	.511
Non-verbal Communications	1.663	1	.197
Sensitivity	2.810	1	.094

Summary of Quantitative Analysis

The results of the quantitative analysis indicates that there was a significant difference between the perceived importance of the 21 behavioral and technical skills derived from the current research in the healthcare environment and the perceived importance of the same 21 behavioral and technical skills as determined by the research conducted by Green (1989). Hypotheses 1, 2 and 3 relate to the comparative analysis of

the ranking provided by Green and the ranking determined from the current research. The null hypotheses 1, 2 and 3 are rejected.

Hypotheses 4, 7, and 10 compared the ranking of the 21 behavioral and technical skills developed from the results of all participants in the current research. Hypothesis 4 compared the responses of all participants in the for-profit environment to those in the not-for-profit environment. Hypothesis 7 compared the responses of all participants in three different types of organization: corporate, hospital, and other. Hypothesis 10 compared the responses of all participants in organizations with fewer than 5,000 employees to those participants associated with organizations with more than 5,000 employees. Testing hypotheses 4 and 7 resulted in rejecting the null hypotheses while testing of hypothesis 10 failed to reject the null hypothesis stating no significant difference exists in rankings of the mean scores of the categories among all participants.

Hypotheses 5, 8, and 11 included only participants who indicated they currently held the position of project manager. Hypotheses 5 compared the ranking of the perceived importance of the 21 behavioral and technical skills of the project managers associated with for-profit and project managers associated with not-for-profit organizations. Hypothesis 8 compared the ranking of the perceived importance of the 21 behavioral and technical skills by project managers involved with three different types of organizations – corporate, hospital, and other. Hypothesis 11 compared the perceived importance of the same behavioral and technical skills among project managers in organizations with fewer than 5,000 employees to project managers associated with organizations with more than 5,000 employees. Testing of hypotheses 5 and 8 resulted in rejecting the null hypotheses, while testing of hypothesis 11 failed to reject the null

hypothesis based on testing of the mean ranking of the perceived importance of the 21 behavioral and technical skills.

Hypotheses 6, 9, and 12 excluded those participants who indicated they were project managers and compared the results of the mean ranking of all participants other than those indicating they held the position of project manager. Similar to the other hypothesis tests, the mean rankings of the 21 behavioral and technical skills of those participants who indicated they were not project managers was compared in three categories. The categories included only those participants who indicated they were not project managers and also indicated that they were associated with for-profit or not-for-profit organizations, various types of facilities, and worked at various sizes of organizations based on an estimated number of employees at that organization. Testing of hypotheses 6 and 12 resulted in a failure to reject the null hypothesis; however a comparison of the mean ranking results of the non-project manager participants in hypotheses 9 resulted in the determination that we must reject the null hypotheses.

Qualitative Results

This research used the mixed methodology of qualitative and quantitative research for the clarification of participant's responses to the quantitative survey. The online survey was developed to provide a similar experience to the participants in the earlier research through the use of similar phrases, Likert scale options, and the same behavioral and technical skills including the same explanation provided by earlier researchers (Green, 1989; Jiang et al., 1998). Selections possible on the Likert scale provided an

opportunity for the perceived importance of the behavioral and technical skills to be evaluated using statistical analysis.

Even though there were recognized differences in the results of the perceived importance of various behavioral and technical skills between earlier research and even within participants from differing groups in the current research, the answer to the question of why these differences exist was not possible using the online survey. The use of a qualitative approach in combination with the quantitative approach allowed for semi-structured interviews to be conducted with many of the participants who had agreed to participate in a phone interview regarding the topic of project management in healthcare.

As a sequential explanatory design for the research the standards of collection and analysis of the quantitative data preceded the collection of the qualitative data. The returned data was collected from the results of the quantitative research and analyzed. Based on the results of the quantitative data analysis specific questions were developed to provide clarification of the quantitative research results.

Three questions were developed based on the results of the statistical analysis process. The first question resulted from the fact that the category of Application Knowledge was consistently in the lower 20 percent of the rankings and was frequently seen as having a significantly different response between and among groups. The interview participants were asked if they felt that a successful project manager does not need to know about the functionality of the product but rather that the successful project manager has a more intimate knowledge of the Project Management process.

The second question developed from the results of the quantitative analysis dealt with the disagreement among participants in the online survey regarding the perceived

importance the role of diplomacy and the role of leadership. It was determined from the results of the online survey analysis that there were as many as six levels of difference among the response groups to the importance of diplomacy and leadership. The question was asked "Do you feel Diplomacy and Leadership are important to project success and why?"

The third question resulting from the review of the online survey data analysis dealt with the high ranking of listening and management in the results. Listening and management appear in the top ten ranking across all groupings. The question developed was "Do you feel that Listening and Management are important to project success and why or why not?"

Some of the participants in the telephone interviews did not agree with the results as explained in these questions and did not choose to respond to those with which they did not agree. For example, some participants in the phone interviews did not recognize a significant difference between the perceived importance of diplomacy and leadership in the delivery of successful projects. They simply answered that the two skills were important for successful project management.

The participants in the phone based interview process provided information that was used to contextualize the importance of the results found in the quantitative analysis of the online survey process. The responses to the online survey provided an overall picture of the participants' viewpoint whereas the participants in the phone interview process provided a more detailed insight and understanding of the quantitative results.

Creswell (2003) suggests that "The purpose of the sequential explanatory design typically is to use qualitative results to assist in explaining and interpreting the findings of

a primarily quantitative study" (p. 215). The results of the qualitative aspect of the current research are presented in an effort to provide clarification of the results defined during the quantitative research analysis.

The first question that related specifically to the purpose of clarification of the data gathered during the quantitative research was "Do you believe that project management in a healthcare environment is different than project management in other industries?" The response to this closed-ended question was further clarified by asking "Why?" the participant felt there was or was not a difference between project management skills necessary in healthcare and other environments. The following results segregate the responses of those participants who believed there was a difference and those who replied there was not a difference in the various environments.

Among the few participants who believed there was not a difference between the skills necessary for project managers to be successful in healthcare environments and project managers in other environments follow. It appears that, even though some of the participants believe that project management in healthcare is not different than other environments, they still provided comments that specify the differences they believe exist. One replied that it is more humanitarian and another replied that there is bigger risk in healthcare than in other organization types. The responses from those who believe that there is no difference include the following.

> I don't really think it is. I think there is more of a humanitarian concern that is brought to a project than I've seen in any other project I've worked on.
>
> Project management is similar across all industries.
>
> (One participant replied "maybe" and gave the following explanation.) There is a bigger significance of the risk.

Among those participants who believed that project management in a healthcare environment is different from project management in other industries the responses varied. There did not seem to be a consistent reason for believing that healthcare was different. Significant, however, was the belief that even within one healthcare organization there were various stakeholders, different priorities, and different ways of doing business that needed to be balanced and addressed in order to be successful.

> The process isn't different, but probably the work of the project manager is quite different.
>
> But every environment has its own…I don't think I'd be able to easily pop up and go to another industry and just be able to apply the project management. I'd have to be able to learn a little about the business side and the industry as well. I guess healthcare because of a lot of the regulations such as HIPAA and all these other rules we have to follow makes it even more stringent or maybe special I guess.
>
> Certainly yes…given the fact that I've worked in many other verticals…What I have seen in healthcare in the project execution and initiation phase you have to go more deeply because in healthcare we see there are multiple stakeholders…The biggest challenge in healthcare is to get everybody onto the same page.
>
> Yes…everybody who has done both I think would see a difference. The nature of the business where we have a whole different model…the nature of the business is different.
>
> I would say the approach in healthcare is less metrical and less scientific. Hospitals don't approach large projects in a measured methodical way…because a lot of people who work in hospitals don't see software as central to their mission.
>
> Sometimes I feel lost going to PMI meetings that are so technology heavy there are so many IT professionals there. A project is a project. It has a start date and an end date. The projects are the same…but the nuts and bolts of what we do are different.
>
> I truly believe they are. I truly believe they are because there are so many variables that are not discreet. Even within a hospital…their concept of what they do can vary. Project management in the healthcare industry is definitely understanding…not becoming a clinician…but understanding what their needs are

and what the critical workflow is like. You need to understand each position's workflow…knowing the questions that I need to ask.

Healthcare has some unique qualities and perspectives about them that you don't see in other industries. Essentially in hospitals…each one is a cottage industry. What you expect to see in standardization in other industries you don't see as much in healthcare.

Yes, definitely. I think some of it has to do with the nature of healthcare…especially in the not-for-profit. We're driven by timelines, but if there is an interruption because of patient care issues or other issues of that sort that take the priority.

Yes, I do, because the nature of the customer here is the patient.

Yes. There are a lot of things we have to consider in healthcare that you don't in other industries…like HIPAA and SOX…everything comes into play.

Yes there are some differences. I think we have to pay more attention to detail like having to mitigate risk for infection.

Relative to the question of whether or not application knowledge was necessary to be a successful project manager in healthcare there were numerous feelings. The question came down to whether or not knowledge of the functionality of the product was more important than knowledge of the project management process in order to be a successful project manager. Some participants simply responded that either knowledge of the functionality was most important while others responded only that knowledge of the project management process was most important. Some participants provided an explanation of their response.

None of the participants responded that knowledge of the functionality of the product was more important than knowledge of the project management process. However, nearly half of the participants replied that both functional knowledge of the

product and knowledge of the project management process were necessary for success.

The responses from those who believe that knowledge of both is necessary follow.

> I think it depends on the project. If it is a very sensitive software application that is going to deal with dispensing prescriptions then I prefer to have a project manager who has been skilled at both sides of implementations than to have someone just because they are popular.
>
> You can't rely on one and not know the other. I had that philosophy (that I could manage anything) for a while. It didn't work well.
>
> The one that is most successful is the one that has both characteristics. But I think that from a project management standpoint, it is more important to have that skill than just the functionality.
>
> We've had this debate in our department. I'd have to side more with at least having some understanding of the application…knowing the pieces that the project team is up against and what they are dealing with. I never want to know the intimacy of the system, but I at least want to go to the demonstration that shows what the system does.
>
> I think you need to know a little of both because if you don't understand the hospital and the healthcare environment at all you will not have credibility with the people. To do your role I don't think you need to be the certified clinician. I do think you need to have a good sense of your toolbox…not just project management skills but team building skills, process skills, data manipulation and presentation skills.

The participants who believed that knowledge of the project management process was more important replied with the following clarifications.

> I think you have to know the basic business but…I've implemented systems that I've never logged onto. You can't see the forest through the trees. You're so caught in the details of the system you don't manage the project.
>
> I think knowledge of the project management process is more important because a product may exist…how you apply your project management techniques matter most…not the product.
>
> Not as much. On a scale from one to ten I'd put application knowledge at a five, but the managing of the people that are involved and their expectations is more important.

> I'd say the project management process because…we're responsible for knowing the timing of things and which subject matter expert do I need to engage at specific points in time. My knowledge that I pick up as I go is based on sitting down with the subject matter experts.
>
> I think as a project manager you need to know the system better than the final product because you're directing the interaction…
>
> Process…you can't use the product if you don't know the process.
>
> Probably, five years ago (before my current position) I would have probably said product…today I would definitely say process.

The second question that was developed specifically from the results of the data from the online survey was relative to the disagreement on the role of Diplomacy and Leadership, which differed by as much as six levels in the rankings provided among various response groups studied in this research. The participants were asked "Do you feel Diplomacy or Leadership are important to project success and why?" A smaller number of participants replied that leadership alone was most important. Comments from other participants indicated either that both skills were necessary or that diplomacy was most important.

Responses from those participants who believe that Leadership is the more important skill replied with the following remarks.

> Leadership is most important to project success.
>
> I think a good leader, by default, would have the diplomatic skills necessary so I would believe Leadership is more important than Diplomacy.
>
> I would lean toward leadership because diplomacy is important to get everybody on the same page, but, if you're not going to keep that process going forward leading that group into each phase it doesn't congeal.

Among those participants who believed that both Diplomacy and Leadership were required to be a successful project manager there was some disagreement on the reason

why. The following are responses from those participants who believed that both skills were necessary for success.

> In my experience those two need to be at the top of your skill set because you can be an excellent leader but if you're unable to…sit down with the customer and negotiate trade-offs and functionality they expect…It is so important to have a good ability to negotiate.
>
> It depends upon the project itself. I think every project is different. And it depends upon the nature of the organization. Leadership is always important. I think there is a minimum level of leadership that is required. Diplomacy will come and go based upon the organization, I think.
>
> I think internally, Leadership…to the internal team. But externally, if you are a strong leader sometimes the Diplomacy of that is not good and you still fail. It depends on what you are talking about. If you are talking about interaction with the customer you have to be more diplomatic…
>
> I personally think Leadership is more important because if you have the right leader you can say we're in the wrong jungle or in the right jungle…let's move forward or stop. But, what I have experienced in project management in all the places that I've been at, Diplomacy is more important because everyone is making sure that I don't step on this person's toes or I don't offend this person.
>
> If you want to move up it is diplomacy. If you are a project manager in the trenches it is probably more leadership.
>
> It depends on who your audience is. I don't see how you can succeed without both of them.
>
> I don't know that I would separate them as widely (as they were in the results of the research). In a huge institution there is both a need for diplomacy and leadership. You are just crossing over so many boundaries…plus even in smaller institutions when you are dealing with three different stakeholder groups (the nurses, the doctors, and anyone in administration) I don't know how you could do one without the other.

Other participants believed that diplomacy was more important than leadership. The reasons for the belief that diplomacy was more important than leadership follow.

> I would say that diplomacy is the most important factor in healthcare projects. That's very, very important. Influencing (the participants) to the proper goal is the biggest challenge.

> I think a lot depends on if you are in a global environment. When you are in a global environment…ten percent of what you say is all that people really hear…when you start factoring in different cultures, different languages, and different time zones and all the electronics even less getting across.
>
> Diplomacy…yes, because you can lead, but in a hospital with doctors you have to let them think that they are leading. It is more important to be diplomatic than to be seen as forcing something rather than getting them to work together.

The final question derived from the results of the quantitative data analysis dealt with the similarities and consistently high ranking of the skills of listening and management. The question read "The behavioral and technical skills of listening and management appear in the top ten ranking consistently. Do you feel that listening and management are important to project success and why or why not?" The responses of those who believed that listening was the most important skill were overwhelming. The following are some of the remarks.

> Listening to a client will enable you to lead the team.
>
> Communication is key…I don't think that would be just listening. I think it is interactive communication…in every direction...to management and to your team members as well and back and forth among them too.
>
> In order to be a good manager you need to be a good listener. You want to make sure you are hearing what people are saying…understanding what people are saying. You can try to manage, but if you don't listen to what is going on you won't be as effective.
>
> I think listening is most important. Listening is very important in healthcare.
>
> In our current position in this company now I think listening is far more important because there are so many intricate parts to what we are doing that if you are not paying attention and you are busy just managing that you have a potential for failure.
>
> If you don't listen you won't know how to bring what you have to say to the level of that person. You won't be able to make yourself heard if you don't do the active listening bit.

> Listening is very important and I think listening really is managing in a lot of ways. Because most of the people in a project know what they are doing and if you can listen and talk through something and they have arrived at the answer already. Managing through listening, I guess I would say.
>
> You have to be able to listen to that customer in order to understand what their needs are. You manage a relationship by listening. If you can't listen then you are going to have a hard time managing.
>
> If I had to pick one I'd say listening because I don't think you can manage well without listening well.
>
> Listening.
>
> I'd have to go with listening. We all say that is important to us and none of us listen.

Some of the participants seemed to indicate more strongly that management was more important, but listening was tightly aligned with management.

> Listening is key, and in order for you to be able to manage things correctly you need to be able to listen very thoroughly. They go hand in hand.
>
> Management involves a certain amount of listening either to subordinates or those people that you manage or listening to the customer, the clients, the vendor…whatever the case may be. I think management is the overarching domain and listening is just an element in that. It comes and goes based on the organization or the individual.
>
> Management is critical in the sense that I will sometimes listen to them, but that doesn't necessarily mean they are going to get what I hear them ask for. I will listen to the client and I will deliver what the client wants, but I may not be listening to my staff.

Summary of the Qualitative Research

The qualitative research confirmed the overall summary of the quantitative research that there is a significant difference between the perceived importance of the 21 behavioral and technical skills when comparing participants in the healthcare

environment with participants outside the healthcare environment. Over 90 percent of the participants in the interview process agreed that project management in healthcare institutions is different from project management in other arenas. The project managers who participated in the qualitative research indicated project success rates of 70 to 100 percent.

The consistency of the responses to the questions regarding process and product, diplomacy and leadership, and leadership and management indicates that project managers in healthcare have similar attitudes on the importance of these project management skills. One key area that was frequently mentioned during the interview was that a basic knowledge of the healthcare business is important to success in healthcare project management. Knowledge of healthcare idiosyncrasies was frequently credited by the participants in the interviews for their success in project delivery.

The fact that comparisons of project managers and non-project managers in healthcare environments of differing organizational type, profit initiative, and organizational size did not demonstrate a significant difference was not tested because all of the participants in the interviews were currently in the role of project manager. However, the consistency of the project managers' responses and the expression of project success indicate a knowledge and understanding of the stakeholders they work to satisfy. The overall results of the qualitative research also confirmed the findings of the quantitative research that listening is the most important aspect of project management in healthcare environment whether the project manager is listening to stakeholders or project team members, listening is seen as the most important skill of the 21 behavioral and technical skills included in the current research.

CHAPTER 5. SUMMARY AND CONCLUSIONS

Summary and Discussion of Results

Previous chapters have defined the problem that the behavioral and technical skills required to be an effective project manager in the healthcare environment may be different based on the perceived importance of individuals who take part in the healthcare environment from individuals in other environments. In earlier chapters you will find a discussion of this problem and the implications as it relates to the training and hiring of project managers in healthcare, a literature review defining and supporting this problem and the potential consequences, and an outline of the research methods and analysis used to collect and interpret the data from the online survey and phone interviews. Chapter 4 presents the analysis of the data collected from the online survey and the comments of the participants who agreed to be contacted to add clarity to the data collected in this research.

This chapter provides the summary and conclusion for the study where the points will be summarized and the hypotheses and arguments made in the research will be discussed. Chapter 5 includes the summary, limitations, conclusions, implications, and recommendations from the research conducted in this study. The summary presents the results of the research and analysis of the data used to develop the conclusions. The limitations discuss the areas where this research may not have met required criteria for universality. The conclusions represent the finding relative to the questions developed in

this research and the resulting hypotheses. The implications are critical to further efforts made within the study of the field of project management in general and project management in healthcare in particular. The recommendations developed from this research present the areas where this research did not fully address components of the topic and where further research is necessary to further clarify differences in project delivery within various organizational entities.

The purpose of this study was to determine the perceived importance of 21 behavioral and technical skills relative to project managers in healthcare environments. The concern was an identification of exorbitant project failure rates in all environments and in healthcare in particular. Money spent on failed projects could add to the overall cost of healthcare.

Comparative Analysis with Jiang et al. (1998)

This research was conducted specifically to compare the current perceived importance of project management's required behavioral and technical skills in healthcare with the perceived state of required behavioral and technical skills from research conducted outside the healthcare environment in 1989. Concern that there might be additional factors influencing the finding that there was a significant difference the rankings of the 21 behavioral and technical skills provided in the Green (1989) study and the rankings provided in the current research, additional testing was performed between the rankings presented in the Jiang et al. (1998) study and the rankings of the current research.

A later study by Jiang et al. (1998) was performed in a similar manner to the Green research, but the research was performed in 1998. The research by Jiang et al. did not include any healthcare organizations in their sample. While listening was determined to be the most important behavioral and technical skill by project managers in healthcare according to the current research, and listening was ranked number five in the study by Jiang et al., listening was not in the top ten behavioral and technical skills based on the results of the research conducted by Green (1989).

Table 59. *Comparison of Current Research and Jiang et al. Ranking*

Behavioral and Technical Skill	Green 1989	Current Research	Jiang et al.*
Listening		1	5
Speaking	2	2	4
Management		3	3
Diplomacy	3	4	11
Writing		5	6
Leadership		6	9
Cooperation		7	7
Directing	1	8	2
Interviewing		9	1
Patience		10	8
Politics	7	11	15
Organizational Communications	5	12	14
Sensitivity		13	10
Empathy		14	13
Assertiveness	9	15	17
Non-verbal Communications	10	16	18
Salesmanship	8	17	16
Application Knowledge		18	
Analysis and Design		19	
Training	4	20	12
Programming	6	21	

Other areas where the two studies differ include the perceived importance of the technical skills of training and programming. While programming had been perceived in the top ten behavioral and technical skills necessary for successful project management at the time of the Green (1989) study, programming was ranked last in the list of 21 behavioral and technical skills in the current research. Jiang et al. did not include the programming, application knowledge, and analysis and design because they did not "apply to any project development regardless of the environment" (Jiang et al., 1998). This opinion was based on recommendations considered and presented by Frame (1994).

Table 60. *Comparing Overall Ranking of Green, Jiang et al. and Current Research*

Behavioral and Technical Skill	Green 1989	Current Research	Jiang et al.
Listening		1	5
Speaking	2	2	4
Management		3	3
Diplomacy	3	4	11
Writing		5	6
Leadership		6	9
Cooperation		7	7
Directing	1	8	2
Interviewing		9	1
Patience		10	8
Politics	7	11	15
Organizational Communications	5	12	14
Sensitivity		13	10
Empathy		14	13
Assertiveness	9	15	17
Non-verbal Communications	10	16	18
Salesmanship	8	17	16
Application Knowledge		18	
Analysis and Design		19	
Training	4	20	12
Programming	6	21	

The ranking of the top ten most significant of the 21 behavioral and technical skills from the Green (1989) and the current research are shown in Table 60. Sensitivity, Empathy, Application Knowledge, and Analysis and Design did not appear in the top ten at the time of Green's research and they are still not in the top ten behavioral and technical skills as perceived necessary for project success. The last two items of the 21 behavioral and technical skills in the current research, Training and Programming, were ranked as number four and six in the Green research respectively. It is apparent that the shift in project delivery has been to a less technically capable project leader.

Table 61. *Correlation Between Jiang et al. and Current Rankings Using Kendall's tau_b and Spearman's Rank Order Correlation Coefficient*

Test	Research	Analysis	Results from current research	Results from research conducted by Jiang et al.
Kendall's tau_b	Current	Correlation Coefficient	1.000	.529(**)
		Sig. (2-tailed)	.	.002
		N	21	18
	Jiang et al.	Correlation Coefficient	.529(**)	1.000
		Sig. (2-tailed)	.002	.
		N	18	18
Spearman's *rho*	Current	Correlation Coefficient	1.000	.746(**)
		Sig. (2-tailed)	.	.000
		N	21	18
	Jiang et al.	Correlation Coefficient	.746(**)	1.000
		Sig. (2-tailed)	.000	.
		N	18	18

** Correlation is significant at the 0.01 level (2-tailed).

The results of Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 61) to determine a nonparametric correlation between the rankings from the Jiang et al. (1998) and the rankings of the current research found there

was a significant moderate positive correlation of the rankings at a significance level less than .05 ($p < .05$). Determination that there is a significant correlation between the data collected by Jiang et al. in 1998 and the current research may serve to indicate that the majority of change in a global perception of the importance of the various behavioral and technical skills may have taken place between 1989 and 1998. This change in perceived importance of various skills may have been impacted by changes in the governance of information technology (a major contributor of projects) or changes in the field of project management.

Further research was deemed necessary to determine if the significant moderate correlation determined through application of the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient was in fact indicative that there was no significant difference between the ranking of the current mean results and the ranking provided by Jiang et al. (1998). In order to determine if there is a significant difference in the ranked lists further testing was performed using Cramer's V test and the Phi test. The results are shown in Table 62.

Table 62. *Phi and Cramer's V Tests to Test Jiang et al. and Current Research Correlation*

Test	Analysis	Value	Approx. Sig.
Nominal by Nominal	Phi	4.123	.235
	Cramer's V	1.000	.235
N of Valid Cases		18	

Based on the results of the Phi test and Cramer's V test, there is no significant difference between the ranked list of 18 behavioral and technical skills resulting from the

research conducted by Jiang et al. (1998) and the ranked list of 21 behavioral and technical skills utilized in the current research.

Summary of Quantitative Research

The current research examined the perceptions of the importance of 21 behavioral and technical skills believed to be necessary for project managers to possess in order to successfully deliver projects within healthcare organizations. The 21 behavioral and technical skills were derived from a previous study performed in 1989 and utilized later in research conducted in 1998. These two previous studies did not include any healthcare organizations. Specifically, several hypotheses in this research focused on the differences that may or may not exist between the 1989 study and the current research.

Over 200 surveys were completed by the members of PMI Healthcare SIG following an invitation to participate from the leadership of the organization. Over fifteen percent of the participants in the quantitative survey agreed to participate in the personal interview process. Data from the online survey was first evaluated based on frequency counts for the 21 behavioral and technical skills. The frequencies were sorted by the highest mean to the lowest. Based on the frequency distribution, 4 of the 21 behavioral and technical skills were found to be considered very important, with a mean of greater than 6.5 when all responses were considered.

The previous studies by Green (1989) reported no skill with a mean above 6.5 and only one skill, Directing, with a mean above 6.0. Jiang et al. (1998) did provide a sorted list of the behavioral and technical skills perceived as most important to the participants

in their studies, however, they did not provide the mean values resulting from their research limiting the analysis that could be performed against their results.

One of the 21 behavioral and technical skills consistently ranked outside the top ten was empathy. Empathy was initially thought to be one of the skills that would have appeared higher in among project managers working in healthcare. It was also thought that empathy would be ranked higher because of the close association between listening, the number one ranked skill in the current study, and empathy. Segal (1997) writes that "Empathy won't make you a soothsayer, a seer, or a sorcerer. It simply ensures that you will perceive any cues sent via speech, gesture, facial expression, and body language" (p. 141).

Even though the technical skills of programming, analysis and design, and application knowledge were consistently ranked in the lower 20 percent, with a mean of 5.0362 overall it is apparent that the participants considered technical knowledge as "somewhat important." The ranking of the lowest behavioral and technical skill above the median of the Likert scale indicates that the respondents perceived all of the 21 behavioral and technical skills to be, at a minimum, "somewhat important" for project managers to possess to assure successful project delivery.

Analysis of hypotheses one through three was based on data representing the rank ordered list of the mean of the responses provided in the Green (1989) research and the rank ordered list derived from the mean of the responses from the current research. In order to determine if there was a significant difference between the two rank ordered lists there were two considerations that must be made when evaluating the analysis provided by the Spearman *rho* and Kendall's tau_b. The first consideration was the strength of the

correlation and the second was the significance of the correlation. "A significant correlation indicates a reliable relationship, not necessarily a strong correlation" (Cronk, 1999, p. 40). To make the analysis easier to understand, it might be appropriate to restate the first few words of the hypotheses to read "There is a significant strong correlation in the ordered ranking" which is equivalent to stating that "There is no significant difference." In order to show a significant correlation, the value of Kendall's tau_b and Spearman's Rank Order Correlation Coefficient would need to be above .7 and the two-tailed significance would need to be less than .05. A moderate correlation is indicated by Kendall's tau_b and Spearman's Rank Order Correlation Coefficient between .3 and .7 (Cronk, 1999).

Hypothesis 1

Using the data collected from the quantitative research activity in the current research to evaluate hypothesis 1, a Spearman Rank Order Correlation Coefficient (see Table 7) was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research. A moderate correlation that was not significant was found ($r(10) = .552$, $p > .05$). A Kendall's tau_b (see Table 6) was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research. A moderate correlation that was not significant was found (Kendall's tau_b$(10) = .378$, $p > .05$). We therefore reject null hypothesis 1 based on these results and instead accept the alternative hypothesis.

Hypothesis 1, which stated that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the

responses of all individuals involved in healthcare projects as a result of this research and all individuals involved in other types of project as determined by the Green study conducted in 1989 was rejected because no significant correlation was found to exist between the rankings of the mean responses provided by Green and the rankings of the means developed from the current research.

Hypothesis 2

As shown in Table 9, using the data collected from the quantitative research activity in the current research to evaluate hypothesis 2, a Spearman Rank Order Correlation Coefficient was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research based on the perceived importance placed on these skills by project managers only. A moderate correlation that was significant was found ($r(10) = .673$, $p < .05$). A Kendall's tau_b was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research. A moderate correlation that was significant was found (Kendall's tau_b$(10) = .511$, $p < .05$). A strong significant correlation was not found to exist between the two rank ordered lists.

Further analysis was warranted based on the lack of a strong correlation. A Phi test and Cramer's V test (see Table 10) were performed to test the significance of the correlation between the two ranked lists. These tests indicated no significant difference between the two lists ($p > .05$) therefore we fail to reject null hypothesis 2, which stated there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in

healthcare projects as a result of this research and project managers involved in other types of project as determined by the Green study conducted in 1989.

Hypothesis 3

An evaluation of the results of applying statistical analysis to the data gathered in response to hypothesis 3 was performed by selecting the data from the current research that included only those participants who indicated that they were not project managers (n = 21) for analysis using the Kendall's tau_b and Spearman's Rank Order Correlation Coefficient (see Table 12). Using the data collected from the quantitative research activity in the current research to evaluate hypothesis 3, a Spearman Rank Order Correlation Coefficient was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research. A moderate correlation that was not significant was found ($r(10) = .333$, $p > .05$). A Kendall's tau_b was calculated for the relationship among the 21 behavioral and technical skills utilized in the current research. A moderate correlation that was not significant was found (Kendall's tau_b$(10) = .289$, $p > .05$). We must reject null hypothesis 3 based on these results.

We find that there was not a significant correlation between the ranking provided by Green for the "user" and the current non-project manager. Therefore, we reject the null hypothesis 3 that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects in this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.

Hypothesis 4

Hypothesis 4 was evaluated based on the results of the statistical analysis performed on the data resulting from the current research. The analysis was performed on the ranking of the behavioral and technical skills by participants who indicated they were associated with for-profit healthcare environments and participants who indicated they were associated with not-for-profit healthcare environments (see Table 13). The results of Kendall's tau_b test and Spearman's Rank Order Correlation Coefficient test (see Table 14) indicate that there is a significant high positive correlation (Kendall's tau_b(21) = .829, $p < .05$) in the ranked list of means.

Further evaluation was performed in order to determine if there were significant differences among the individual behavioral and technical skills. The Mann-Whitney *U* test (see Table 15) indicates significant differences existed between salesmanship and application knowledge. A Kolmogorov-Smirnov *Z* test (see Table 16) confirmed a significant difference in the area of application knowledge and the Kruskal-Wallis test confirmed a significant difference in salesmanship and application knowledge.

Based on this information we must reject null hypothesis 4 which states that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 5

Hypothesis 5 required the evaluation of responses from the participants who indicated they were project managers. Results of Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 19) indicate that there is a significant positive correlation between the ranked lists of means derived from the responses of the project managers who indicated they were associated with for-profit organizations and those who indicated they were associated with not-for-profit organizations.

Further analysis utilized the responses rather than the ranked order lists of the means to determine if significant differences exist in specific behavioral and technical skills. The Mann-Whitney *U* test (see Table 20) and the Kruskal-Wallis test (see Table 22) show a significant difference ($p < .05$) for salesmanship and for application knowledge. The Kolmogorov-Smirnov *Z* test confirms no significant difference between the perceived importance of the behavioral and technical skills.

There is no assumption made that one test is superior to another when considering the results and making a determination to reject the null hypothesis. There was no research found to indicate that one test for significant difference applicable to nonparametric data was superior to another.

Based on the analysis demonstrating disagreement between the tests we must reject null hypothesis 5 which states that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-

profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 6

Hypothesis 6 evaluated the perceived importance of the participants who indicated they were not project managers comparing the responses of the participants who indicated they were associated with for-profit healthcare environments to those who indicated they were associated with not-for-profit healthcare environments. The results of the Kendall's tau_b and the Spearman's Rank Order Correlation Coefficient tests (see Table 24) indicate a significant positive correlation between the rankings of the mean values developed for these groups. Results of the Mann-Whitney *U* test (see Table 25), the Kolmogorov-Smirnov *Z* test (see Table 26) and the Kruskal-Wallis test (see Table 27) confirm that no significant difference was recognized.

Based on this information we must fail to reject null hypothesis 6 which states that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.

Hypothesis 7

Hypothesis 7 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in

healthcare projects that take place within various types of healthcare environments. The three environments categorized for the current research are the corporate office, hospital, and other environments.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 31) indicate a significant strong positive correlation between the three ranked lists in each of the healthcare environment categories. The Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test are not applicable when there is more than one variable. However, the Kruskal-Wallis test (see Table 32) indicates significant differences ($p < .05$) do exist for the skills of patience, management, and training.

Based on these results we reject the null hypothesis 7 that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 8

Hypothesis 8 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments. The three environments categorized for the current research were the corporate office, hospital, and other environments.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 35) indicated a significant strong positive correlation between the three ranked lists

in each of the healthcare environment categories. The Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test are not applicable when there is more than one variable. However, the Kruskal-Wallis test (see Table 36) indicated significant differences ($p < .05$) do exist for the skills of patience, management, training, cooperation, and analysis and design.

Based on these results we reject the null hypothesis 8 that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 9

Hypothesis 9 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments. The three environments categorized for the current research are the corporate office, hospital, and other environments.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 39) indicated a significant moderate positive correlation between the three ranked lists in each of the healthcare environment categories. The Mann-Whitney *U* test, the Kolmogorov-Smirnov *Z* test are not applicable when there is more than one variable. However, the Kruskal-Wallis test (see Table 40) indicated significant differences ($p < .05$) do exist for the skill of application knowledge.

Based on these results we reject null hypothesis 9 stating that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.

Hypothesis 10

Hypothesis 10 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments. The size of the organization was based on an estimate by the participant of the number of employees in the organization. Organization size was categorized as either having fewer than 5,000 employees or more than 5,000 employees.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 43) indicated a significant strong positive correlation between the two ranked lists of the means based on healthcare organization size categories. The Mann-Whitney *U* test (see Table 44), the Kolmogorov-Smirnov *Z* test (see Table 45) and the Kruskal-Wallis test (see Table 46) indicated no significant differences ($p < .05$).

Based on these results we fail to reject the null hypothesis 10 stating that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within

various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Hypothesis 11

Hypothesis 11 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments. The size of the organization was based on an estimate by the participant of the number of employees in the organization. Organization size was categorized as either having fewer than 5,000 employees or more than 5,000 employees.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 49) indicated a significant strong positive correlation between the two ranked lists of the means based on healthcare organization size categories. The Mann-Whitney *U* test (see Table 50), the Kolmogorov-Smirnov *Z* test (see Table 51) and the Kruskal-Wallis test (see Table 52) indicated no significant differences ($p < .05$).

Based on these results we fail to reject the null hypothesis 11 stating that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Hypothesis 12

Hypothesis 12 tested for a significant difference in the perceived importance of the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments. The size of the organization was based on an estimate by the participant of the number of employees in the organization. Organization size was categorized as either having fewer than 5,000 employees or more than 5,000 employees.

Kendall's tau_b and Spearman's Rank Order Correlation Coefficient tests (see Table 55) indicated a significant strong positive correlation between the two ranked lists of the means based on healthcare organization size categories. The Mann-Whitney *U* test (see Table 56) indicated a significant difference ($p < .05$) in the responses for the category of interviewing. The Kruskal-Wallis test (see Table 58) indicated significant differences ($p < .05$) in the skills of interviewing and cooperation. The Mann-Whitney *U* test (see Table 56) indicated no significant differences ($p < .05$) among the skills.

Based on these results we reject the null hypothesis 12 stating that there is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.

Summary of Hypotheses Analysis

The information gathered from the literature review indicated that previous research had presented a case where there might be a difference in the skills necessary to deliver a project successfully in various business environments. The results of this study confirm that a significant difference does exist between the mean ranking of the perceived importance of the 21 behavioral and technical skills developed from the research conducted by Green (1989) and the mean ranking of the 21 behavioral and technical skills from the data collected during the current research. Also, the mean ranking of the 21 behavioral and technical skills developed from the current research was contrasted within several categories including for-profit environments compared to not-for-profit environments, organizations with fewer than 5,000 employees and organizations with more than 5,000 employees, and various types of organizational structure including hospitals and corporate healthcare organizations.

Based on these comparative analyses it was determined that some of the business categories, but not all categories demonstrated a significant difference in perceived importance of at least one of the 21 behavioral and technical skills. While some comparative areas within healthcare environments show no significant difference, the current research confirmed that there are significant differences between the behavioral and technical skills perceived to be necessary for the project manager to possess in order for the project manager to be successful depending on whether or not they are working in the healthcare environment or other business environments based on a comparison of the current research and research conducted in 1989.

Table 63. *Summary of Hypothesis Evaluation*

Hypothesis	Conclusion
$H1_0$There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of all individuals involved in healthcare projects as a result of this research and all individuals involved in other types of project as determined by the Green study conducted in 1989.	Rejected the null hypothesis based on the lack of significant strong correlation between the ranking of the means determined from Kendall's tau_b and Spearman's Rank Order Correlation Coefficient.
$H2_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects in this research and project managers involved in other types of projects as determined by the Green study conducted in 1989.	Rejected the null hypothesis based on an inconclusive significant moderate correlation between the ranking of the means determined from Kendall's tau_b and Spearman's Rank Order Correlation Coefficient and the lack of significant correlation determined from the Phi test and Cramer's V test.
$H3_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects in this research and non-project managers involved in other types of projects as determined by the Green study conducted in 1989.	Rejected the null hypothesis based on the lack of significant strong correlation between the ranking of the means determined from Kendall's tau_b and Spearman's Rank Order Correlation Coefficient.
$H4_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and others (non-project managers) involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.	Rejected the null hypothesis based on significant difference reported by the Mann-Whitney *U* test, Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.
$H5_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.	Rejected the null hypothesis based on significant difference reported by the Mann-Whitney *U* test, Kolmogorov-Smirnov *Z* test, and the Kruskal-Wallis test.

Table 63. (continued)

Hypothesis	Conclusion
$H6_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within for-profit and those healthcare projects that take place within not-for-profit healthcare environments.	Failed to reject the null hypothesis.
$H7_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various types of healthcare environments.	Rejected the null hypothesis based on a demonstrated significant difference reported by the Kruskal-Wallis test.
$H8_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various types of healthcare environments.	Rejected the null hypothesis based on a demonstrated significant difference reported by the Kruskal-Wallis test.
$H9_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various types of healthcare environments.	Rejected the null hypothesis based on a demonstrated significant difference reported by the Kruskal-Wallis test.
$H10_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers and non-project managers (all respondents) involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.	Fail to reject the null hypothesis.

Table 63. (*continued)*

Hypothesis	Conclusion
$H11_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.	Fail to reject the null hypothesis.
$H12_{0:}$ There is no significant difference between the behavioral and technical skills that project managers should exhibit as perceived by the responses of non-project managers involved in healthcare projects that take place within various sizes of healthcare environments where the size of the environment is determined by the approximate number of employees of the organization.	Fail to reject the null hypothesis.

Table 63 shows a summary of the hypotheses considered in this research and the conclusions resulting from the analyses performed on the available data. The conclusions state whether or not the null hypothesis was rejected and the alternative hypothesis was accepted and the tests and results used to come to the conclusion. In several cases the null hypotheses were rejected based on one or several of the 21 behavioral and technical skills demonstrating a significant difference between the mean rankings of perceived importance. The null hypothesis was rejected because it stated that there was no significant difference between the rankings provided within the variables. The requirement to meet the requirements of the null hypothesis was that no significant difference was found to exist between any of the 21 behavioral and technical skills.

A summary of these results indicates that there is a difference in the perceived importance of the behavioral and technical skills between healthcare and non-healthcare environments, and that while a difference in the perceived importance of the behavioral

and technical skills appears to be present between for-profit and not-for-profit healthcare environments and among various organization sizes a difference does not appear to be present when comparing the type of healthcare facility.

Qualitative Analysis

A review of the words and phrases used as part of the responses to the question of why the participants felt that project management in healthcare was different posed during the phone interview reveals that there is a consistency in the answers even where the responses appear to differ in their content. There is a consistency in the fact that the process is considered to be different in healthcare. A consistent reason provided by the participants in the phone interview for this difference centered around the people who work in healthcare and the people who are affected by the projects in healthcare. The people who work in healthcare have a priority in the care and safety of their patients. The patients have an expectation that they will be safe and will receive the best care possible. Project management in healthcare must be considerate of these priorities in the healthcare environment. As one participant explained, "…the nuts and bolts of what we do are different." Another participant explained that "…if there is an interruption because of patient care issues or other issues of that sort, that takes priority."

Only one project manager who participated in the interviews mentioned the added burden of regulations such as the Health Insurance Portability and Accountability Act of 1996 (HIPAA, Title II) and Sarbanes-Oxley (SOX). Also, only one participant mentioned an issue with risk considerations in the healthcare environment. It can be assumed that many projects that take place in a healthcare environment are influenced to some degree

by HIPAA and that risk is an important consideration, however, many project managers realize that all industries deal with government regulations and risk, which may explain why these issues were not more frequently singled out as unique to healthcare.

In response to the question of whether knowledge of the product or knowledge of the project management process was more important to the project manager in order to be successful, it was apparent that the participants were consistent only in their belief that knowledge of the product was not most important on its own. The participants were nearly evenly divided in their perception that either knowledge of product and project management process was necessary or that knowledge of the project management process alone was most important. One participant responded that "To do your role I don't think you need to be the certified clinician." Another replied "On a scale from one to ten I'd put application knowledge at a five, but the managing of the people that are involved and their expectations is more important."

Confirmation of the importance of a knowledge of the process or the business as it relates to information technology projects in healthcare environments Austin et al. reported that "One organization reported projects led by technical staff members needed more institutional receptivity to user participation" (2000, p. 236).

Gokaydin (2007) concluded that project failure is not usually technical, but that project failure is frequently due to how the project is set up and how the project is managed. PMI's Project Management Body of Knowledge (PMBOK) Guide (PMI Standards Committee, 2004) specify five process groups (a) Initiating, (b) Planning, (c) Executing, (d) Controlling, and (e) Closing. PMI defines these five steps as the life cycle

of a project. What the participants in this research expressed was a desire to extend the meaning of a project life cycle in healthcare to include Caring.

In a research study conducted by Loppnow relative to the implementation of clinical information technology it was noted that "One element identified by all but one of the interviewees was the importance of active involvement of clinicians and other stakeholders in IT planning and implementation process" (2007, p. 78). The requirement for involvement by clinicians and stakeholders was confirmed in the interviews conducted as part of the current research, but the current research included a number of participants who commented that consideration for the needs of the clinician and the stakeholders in healthcare must also be a priority for the project manager.

Limitations

The current research encountered several limitations that influenced the universality of the results. The size of the research population was 224 project managers and non-project managers who are members of the Project Management Institute's Healthcare Specific Interest Group or were interested parties who had requested inclusion in the PMI Healthcare SIG email distribution list. The number of non-project managers who participated in this study was less than 20 resulting in fairly small groups representing categories of participants utilized in the comparative research between and among project managers and non-project managers. Participation by members of other healthcare organizations may have provided a broader range of non-project managers in the healthcare field which may have added to the applicability of the results. However, they may not have provided added participation by non-project managers who were

concerned with healthcare project success as those who did participate in the current research as indicated by their involvement and membership in the PMI Healthcare SIG.

Summary

Healthcare in general is the environment where the delivery of care is provided in the form of clinics, health services, healthcare corporations, and doctor's offices. There are healthcare related environments in support functions that deliver specialized services, such as the specialized testing and analysis functions. There are also healthcare related environments in the delivery of services as in the case of chemotherapy and dialysis units. The delivery of care is a complex and environmentally diverse function.

One study found that one of the aspects of project management success is "practices that represent the organization's culture" and that organizations should "develop a project management culture based on shared cultural values of the organization's members" (Kendra & Taplin, 2004, p. 43). The supposition that a shared value system between the project manager and the healthcare environment is supported in the comments from the participants in the interviews conducted as part of this research.

In addition to the cultural values, other studies have found that the human factors are more important than technical aspects on software development projects (Guinan, Cooprider, & Faraj, 1998; Howard, 2001; Rash & Tosi, 1992). The results of the current research confirm this finding by the fact that the technical knowledge category was consistently at the bottom of the list of 21 behavioral and technical skills in perceived importance by the participants in the current research.

Recommendations

The survey for this research was conducted to determine the difference between the perceived importance of behavioral and technical skills among project managers and non-project managers in healthcare and non-healthcare organizations. Further studies are recommended to broaden the results through more specific evaluations. A broad view of the aspects of the current research could have included a wide range of project managers and how they felt about the importance of the behavioral and technical skills.

Concentration on only project managers and a survey that included responses from a wide sampling of all project managers, such as all members of PMI, making a distinction among various types of organizations may have been more informative. For example, if project managers from healthcare, the service industry, manufacturing, construction, pharmaceuticals, and information technology were included, a view of the project managers across all industries could be evaluated.

Other studies could be performed to include the professionals in the healthcare field, such as doctors, nurses, and administrators, to determine what their perceived importance of the behavioral and technical skills for project managers would be when asked to rank the importance of these skills for successful project management.

There have been numerous research efforts into the skills necessary for project managers to be successful. Meredith, Posner, and Mantel (2000) suggested six skill areas as communications, organizational, team building, leadership, coping, and technological skills. The suggested list by Meredith et al. has some similarities to the Vitiello's (2001, July) list of project management skills. Other research studied the personality traits of the ideal manager (Allen, Lee, & Tushman, 1980; Allrid, Snow, & Miles, 1996; Drucker,

1986; El-Sabaa, 2001; Ford & McLaughin, 1992; Kloppenborg & Mantel Jr., 1990; Luthans, 1988; Patterson, 1991). Some of these studies concluded that project managers are often "sociable, tactful, friendly, understanding, and helpful" (El-Sabaa, 2001, p. 2).

Comparing the seven skills defined by Vitiello (2001, July) and "seven traits of effective project managers" (Turner & Müller, 2005, p. 50) developed from a study of project manager's leadership style as a success factor on project developed we find some similarities and some differences (see Table 64). The list of traits developed by Turner and Müller is Problem Solving, Results Orientation, Energy and Initiative, Self Confidence, Perspective, Communication, and Negotiation ability. Even though the two lists have differences, the significance is found in the similarities. For example, the skill of problem solving suggested by Turner and Müller and conflict resolution suggested by Vitiello could be considered similar. The following chart indicates a suggested comparison of the two lists of proposed traits necessary to be an effective project manager.

Table 64. *Comparing Necessary Project Manger Skills Suggested by Vitiello and Turner & Müller*

Project Management Skills suggested by Vitiello	Project Management skills suggested by Turner & Müller
Conflict resolution	Problem solving ability
Leadership	Results orientation
	Energy and initiative
	Self confidence
	Perspective
Communications	Communications
Negotiation	Negotiation ability
Team Building	
Relationship management	
Listening	

The significance of the three Turner and Müller (2005) traits that did not have corresponding skills in the Vitiello (2001, July) report (Energy and initiative, Self-confidence, and Perspective) appear to be personality traits and not skills. The three Turner and Müller traits that did not have an obvious match in the Vitiello list of skills, however, appear necessary to be effective when utilizing the three skills that did not have an obvious match in the Turner and Müller list (Team Building, Relationship management, and listening). For example, self confidence is necessary to build relationship management and team building. Perspective, energy and initiative are also necessary to be effective at team building and listening. Turner and Müller conclude that project managers do not believe that project managers need training. Turner and Müller present an opinion that project managers can gain their competence "through on-the-job experience."

El-Sabaa concluded that "There is little agreement among educators and training program directors of many leading universities and institutions on what makes a good project manager" (2001). This research found that the participants perceived the ability to listen as a key skill for project managers who work in healthcare environments. A complete literature review to compare and contrast the various studies of project management skills would appear necessary based on the few differences found among the several studies listed above.

Another area of future research that can be derived from the results of the current research is a study in the importance of the skills necessary for effective leadership of teams in healthcare. While the current research resulted in the skills of listening and

speaking being the number one and number two behavioral skills respectively, earlier research has shown that the use of project teams to be the most important management responsibility in a study of ten healthcare organizations (Austin et al., 2000). However, the current research did not rank leadership and management as high as listening and speaking. Austin et al. also found that most organizations utilized teams with a "multidisciplinary user involvement." One interpretation when contrasting the current research to the research by Austin et al. could be that effective management of multidisciplinary teams would require a project manager to be more adept at listening. As one participant in the interview commented "Listening to a client will enable you to lead the team."

Based on the finding from this research that there is a difference in the behavioral and technical skills necessary for successful project management in healthcare as opposed to other business environments, one possible outcome from this research is the development of a specialized certification for healthcare professionals working as project managers. Nursing, for example, applies certification to various skilled environments within healthcare. The American Board of Nursing Specialties suggests that certification of nurses is "an accepted method to validate that nurses have the knowledge, skills, and abilities fundamental to accomplishing their role functions" (American Board of Nursing Specialties, 2006).

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APPENDIX A. QUESTIONNAIRE

Project Management in Healthcare

This page provides the necessary information for full disclosure and requests consent from the participant.

* 1. Consent form for online surveys

Title of Research: Project Management Skills in the Healthcare Environment: Perceived Importance to Healthcare Project Success

Investigator: Ty J. Tabernik, PMP

The following informed consent is required by Capella University for any person involved in a University-sponsored research study. This study has been approved by the University's Institutional Review Board.

For this study, you will be completing a short survey about your perceived importance of various skills and behaviors utilized in project management and how these skills and behaviors relate to project success in healthcare environments. If you have any questions before you complete this survey, please email me (Ty J. Tabernik) at ty@rrgtech.com or Dr. Thomas Richards, Dissertation Mentor, at thomas.richards@faculty.capella.edu. All survey responses you provide for this study will be completely anonymous. When the results of the study are reported, you will not be identified by name or other information that could be used to infer your identity.

Questions or concerns regarding the research may also be directed to the Capella University IRB Reviewer – Courtney Jarboe.

By clicking "Yes" below you acknowledge that you have read and understand that:

- Your participation in this survey is voluntary. You may withdraw your consent and discontinue participation in the project at any time. Your refusal to participate will not result in any penalty.
- You do not waive any legal rights or release Capella University, its agents, or Ty J. Tabernik from liability for negligence.
- You have given consent to be a subject of this research.

Do you wish to participate in this study?

◯ Yes

◯ No

Project Management in Healthcare

This page provides the instructions for the survey.

Please answer all questions. Check the alternative that best applies or fill in the blanks where appropriate. All responses are anonymous.

After completing all questions please submit your response.

Thank you for your participation.

Background Information

This page provides some background on the participant.

2. Are you a Project Manager?

- ◯ Yes
- ◯ No

Project Manager experience

3. How many years have you been a project manager?

- ◯ Less than 10 years as a project manager
- ◯ 10 years or more as a project manager

Certifications and Credentials

4. Which certifications and credentials do you hold?

- ☐ PMP
- ☐ LPN
- ☐ MD
- ☐ Ph D
- ☐ RN
- ☐ CAPM

Other (please specify)

Organization

5. Do you work in an organization associated with Healthcare, Patient Care, or a Health Services Provider?

- ◯ Yes
- ◯ No

Facility Type

Project Management in Healthcare

6. If you work in or for a health care related organization, please indicate the type of facility in which you work:

- ◯ For-Profit
- ◯ Not-for-Profit

Type of organization

7. If you work in or for a health care related organization, please indicate the type of facility in which you work. Please select the category that best matches the area in which you work.

- ◯ Healthcare Organization Corporate Office
- ◯ Hospital
- ◯ Clinic
- ◯ Physician's Office
- ◯ Retirement Community
- ◯ Other (please specify)

Organization Size

8. What is the approximate size of your organization based on the estimated number of employees.

- ◯ 0 to 100 employees
- ◯ 101 to 500 employees
- ◯ 501 to 1,000 employees
- ◯ 1,001 to 5,000 employees
- ◯ 5,001 to 10,000 employees
- ◯ over 10,001 employees

Current employment

9. How many years have you worked for your current employer?

- ◯ Less than 10 years with current employer
- ◯ 10 years or more with current employer

IT Related

Project Management in Healthcare

10. Do your projects relate to Information Technology?

- ◯ Yes
- ◯ No

Number of projects

11. How many healthcare related projects have you been involved with during your career?

- ◯ 1 to 5
- ◯ 6 to 10
- ◯ 11 to 15
- ◯ 16 to 20
- ◯ More than 20

Instructions for Likert Scale questions

12. Instructions for the following section of questions...

Please rate the importance of each skill by selecting the appropriate number from the scale in terms of how important you perceive the skill is for the Project Manager in order to be successful in project delivery.

- ◯ Continue

Diplomacy

13. Diplomacy: Being able to say "no" without being too blunt; displaying tact in dealing with others.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Diplomacy	◯	◯	◯	◯	◯	◯	◯

Interviewing

14. Interviewing: asking the right question in order to obtain the information needed.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Interviewing	◯	◯	◯	◯	◯	◯	◯

Directing

Project Management in Healthcare

15. Directing: giving instructions and communicating user requirements to programming and support staff.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Directing	○	○	○	○	○	○	○

Patience

16. Patience: continually refining user requirements by requesting feedback, tolerating lack of computer literacy and specificity.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Patience	○	○	○	○	○	○	○

Assertiveness

17. Assertiveness: insisting on a course of action or what one believes in, even though it may be unpopular.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Assertiveness	○	○	○	○	○	○	○

Leadership

18. Leadership: getting work done while keeping the team satisfied, effectively giving rewards and punishment.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Leadership	○	○	○	○	○	○	○

Programming

19. Programming: converting system specifications into effective and efficient computer code.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Programming	○	○	○	○	○	○	○

Speaking

20. Speaking: presenting your ideas in a manner easily understood by your audience; both in group meetings and person-to-person.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Speaking	○	○	○	○	○	○	○

Writing

Project Management in Healthcare

21. Writing: preparing written documents that accurately communicate ideas in a manner that is easily understood by intended readers.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Writing	◯	◯	◯	◯	◯	◯	◯

Listening

22. Listening: paying attention to and concentrating on what is being said, and asking questions that refine points about which one is uncertain.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Listening	◯	◯	◯	◯	◯	◯	◯

Empathy

23. Empathy: being able to understand how others feel; accurately determining what someone else thinks about an issue.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Empathy	◯	◯	◯	◯	◯	◯	◯

Salesmanship

24. Salesmanship: promoting the system you advocate; persuading others to accept your viewpoint.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Salesmanship	◯	◯	◯	◯	◯	◯	◯

Politics

25. Politics: understanding what motivates individuals; determining sources of power and influence in an organization.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Politics	◯	◯	◯	◯	◯	◯	◯

Management

26. Management: planning, organizing, and controlling projects so that they get done on schedule and within budget.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Management	◯	◯	◯	◯	◯	◯	◯

Training

Project Management in Healthcare

27. Training: educating users and other non-technical groups on the capabilities of computers and systems.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Training	○	○	○	○	○	○	○

Cooperation

28. Cooperation: working with others productively; resolving conflict in an effective manner.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Cooperation	○	○	○	○	○	○	○

Functional Application Knowledge

29. Functional Application Knowledge: sufficiently knowing what the user's functional application entails to accurately interpret what he or she really needs.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Application Knowledge	○	○	○	○	○	○	○

Organizational Communications

30. Organizational Communications: having a broad view of company goals and operations; knowing the orientation of senior management.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Organizational Communications	○	○	○	○	○	○	○

Analysis and Design

31. Analysis and Design: translating user requirements into functional system specifications.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Analysis and Design	○	○	○	○	○	○	○

Non-verbal Communications

32. Non-verbal Communications: reinforcing the message to others through gestures and facial expressions.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Non-verbal Communications	○	○	○	○	○	○	○

Sensitivity

Project Management in Healthcare

33. Sensitivity: being aware of the implications of design and change for the user community.

	Very Unimportant	Unimportant	Somewhat unimportant	Not Sure	Somewhat important	Important	Very important
Sensitivity	◯	◯	◯	◯	◯	◯	◯

Instructions

Ranking the top five behavioral and technical skills.

In the section below, please indicate the five(5) most important behavioral and technical skills that a Project Manager should have. Ust the following scale:

1 for the most important behavioral and technical skill
2 for the second most important behavioral and technical skill
3 for the third most important behavioral and technical skill
4 for the fourth most important behavioral and technical skill
5 for the fifth most important behavioral and technical skill

Select the matching behavioral and technical skill from each column. In the first column select the most important behavioral and technical skill. In the second column select the second most important behavioral and technical skill. In the third column select the third most important behavioral and technical skill. In the fourth column select the fourth most important behavioral and technical skill. In the fifth column select the fifth most important behavioral and technical skill.

Ranking of the top five behavioral and technical skills

34. Please indicate the top five (5) most important behavioral and technical skills that a Project Manager should have.

	First	Second	Third	Fourth	Fifth
Diplomacy	◯	◯	◯	◯	◯
Interviewing	◯	◯	◯	◯	◯
Directing	◯	◯	◯	◯	◯
Patience	◯	◯	◯	◯	◯
Assertiveness	◯	◯	◯	◯	◯
Leadership	◯	◯	◯	◯	◯
Programming	◯	◯	◯	◯	◯
Speaking	◯	◯	◯	◯	◯
Writing	◯	◯	◯	◯	◯
Salesmanship	◯	◯	◯	◯	◯
Empathy	◯	◯	◯	◯	◯
Management	◯	◯	◯	◯	◯
Politics	◯	◯	◯	◯	◯
Cooperation	◯	◯	◯	◯	◯
Training	◯	◯	◯	◯	◯
Organizational Communications	◯	◯	◯	◯	◯
Functional Application Knowledge	◯	◯	◯	◯	◯
Non-verbal Communications	◯	◯	◯	◯	◯
Analysis and Design	◯	◯	◯	◯	◯

Project Management in Healthcare

Sensitivity ○ ○ ○ ○ ○

Thank You.

*** 35. Thank you for your participation in this survey.**

In order to further clarify the responses provided above, a phone survey is also being conducted for those who would like to participate. If you would like to participate in a brief phone survey to be conducted over the next few weeks, please click the Phone Survey button below.

Thank you for your help.

○ I wish to participate in phone survey ○ I do not wish to participate in the phone survey

Phone survey participation information

This page is provided for those participants who would like to take part in a brief phone survey over the next few weeks.

Several attempts will be made to contact you during the best days and times you provide.

36. Please provide your phone contact information below. All contact information will be discarded immediately following the phone conversation in order to maintain confidentiality. Responses will be referenced via a random number assigned at the time of the call.

First Name
Phone number
Extension
Best days to call
Best time to call

Thank you

Thank you for your participation.