ENTERPRISE RESOURCE PLANNING

IMPLEMENTATION IN HIGHER EDUCATION

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A Dissertation

presented to

the Faculty of the Graduate School

at the University of Missouri-Columbia

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

Educational Leadership and Policy Analysis

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by

James F. Graham

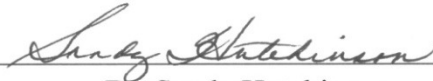Dr. Sandy Hutchinson, Dissertation Supervisor

April, 2009

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

ENTERPRISE RESOURCE PLANNING
IMPLEMENTATION IN HIGHER EDUCATION

presented by James F. Graham,

a candidate for the degree of Educational Leadership and Policy Analysis,

and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION PAGE

First and foremost, I want to thank my wife for her support, encouragement, and prayers throughout this doctorate program, including specifically the dissertation process. My wife is my best friend, and she was a great source of encouragement and motivation to complete the program. Many sacrifices were made throughout the program, but her love never wavered. In so many ways this degree is as much hers as it is mine.

I want to thank my sons for their assistance in the home environment during the course of this program. They too dealt with sacrifices in the family environment throughout the program, but they also did their part to maintain our home environment. All three of my sons provided support, encouragement, and prayers throughout the completion of this degree program.

My Mom, Dad, and many of my church family provided encouragement to me and my family during the process of completing this degree program. In addition, countless prayers were offered on behalf of me and my family throughout the degree program. Thank you each for your encouragement and support.

I also want to say thanks to my immediate supervisor Dr. F. Russell Helm for his support in my pursuit of this degree. Dr. Helm was very accommodating in my work schedule throughout the degree program. .

ACKNOWLEDGEMENTS

I would like to thank Dr. Sandy Hutchinson for her help, assistance, and encouragement in putting this research project together. Sandy's insight into the process and her guidance on the multiple components of the dissertation were invaluable. Thank you Sandy.

I want to thank Dr. Patricia Antrim, Dr. Linda Bigby, Dr. Jim Bowman, and Dr. Doug Thomas for serving on my committee. Each of these great individuals offered suggestions and input to the project that made the project much stronger and more meaningful. Thank you to each of them for their oversight of the research project.

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ABSTRACT

Enterprise resource planning (ERP) implementation projects are unique to each institution and yet are expensive, time consuming, and result in change across the institution. Five Midwest public and private 4-year higher education institutions were studied to determine the impact of five specific key factors on the overall success of the ERP implementation project. These factors were, (1) the definition and communication of goals, reasons, and expectations, (2) stakeholders perceptions of values and benefits, (3) investment of the financial and human resources, (4) steps taken to prepare and protect against potential drawbacks, pitfalls, and shortcomings, and (5) measures taken to prepare stakeholders for changes in work functionality. The data indicated each of the ERP implementation projects were highly successful. The definition and communication of goals, visions, and expectations to the campus community was important, even at the level to ensure the success of the project. Value and benefits were achieved with conducting and implementing the outcomes of the business process analysis/re-engineering activities, but did not ensure the success of the projects. The investment in financial and human resources was important to the success of the ERP implementation project. Preparing the campus for the potential drawbacks, pitfalls, and shortcomings was also important, and at a level that ensured the success of an ERP implementation project. Preparing for the many changes associated with an ERP implementation project is important and is a key factor to the success of the project.

CHAPTER ONE

INTRODUCTION TO STUDY

Enterprise resource planning (ERP) was introduced in the early 1990s by the Gartner Group (Arif, Kulonda, Proctor, & Williams, 2004; Swartz, 2000). The term ERP was coined to describe an emerging category of hardware and software solutions that expanded upon and extended the scope of traditional manufacturing resource planning (MRP) systems (Al-Mashari, 2003; Arif, et al.; Kvavik & Katz, 2002). Whereas the focus of MRP is on manufacturing processes, ERP systems look at a much broader integration of information or data management functions within the organization. In higher education, ERP systems include not only the traditional functions of finance, human resources, and payroll, but also the unique functional operations of advancement, development, student information, enrollment, recruitment, and financial aid, to name just a few. Therefore, ERP is essentially defined as a multi-module packaged software application, or system, in pursuit of the organization's business processes and information-processing needs. Furthermore, ERP utilizes a common centralized database to provide organizations the opportunity for more efficient and effective use of human, financial, material, and other organizational informational resources (Al-Mashari, 2003; Fui-Hoon Nah, Zuckweiler, & Lee-Shang Lau, 2003; Holsapple & Sena, 2003; Sawyer & Southwick, 2002). At its most basic level, ERP is simply using computer technology, consisting of hardware and software components, to store and track data and information in support of the institutional mission and objectives.

Background

The reliance and dependence on ERP systems have grown substantially since the early 1990s, and the purchase and implementation of ERP systems continues to be one of the fastest growing segments of the information technology sector (Lou & Strong, 2004). Within the software and application industry, no other segment comes close to competing with the sales of ERP systems (Arif, et al., 2004; Luo, & Strong; Sawyer & Southwick, 2002). According to Luo and Strong, "The reason behind this phenomenal growth is the promise that ERP systems can provide an integrated business computing solution and improve a company's ability to compete in the marketplace" (p. 322). During the mid to late 1990s, emphasis was placed on ERP systems to address the real and perceived problems of *Year 2000* (Y2K) (Kvavik & Katz, 2002). According to the Arif, et al., (2004), Swartz (2000), and Sawyer and Southwick (2002), current purposes, emphases, and reasons for ERP purchases and implementation projects are much more concrete now than ever before. Furthermore, emphasis is placed on putting an ERP system in place to provide a self-service environment to the organizational customers and users via a web-based technology that can be accessed on both local private Intranets and the public Internet.

Although many reasons exist for the growth in ERP systems, the core emphasis on ERP implementation focuses primarily on processes of re-engineering, business process analysis, best practice analysis, and utilization of transaction processing systems (Al-Mashari, 2003; Arif, et al., 2004; Esteves & Pastor, 2004; Gattiker & Goodhue, 2005; Holsapple & Sena, 2003; Kock, 2002; Kvavik & Katz; Mahil, 2004; Songini, 2003; Swartz, 2000). Arif, et al. specifically stated that the tools of business process re-

engineering and ERP are closely united, which has resulted in an undeniable source of gains in productivity, effectiveness, and efficiency for the organization. The bottom line is that organizations employ ERP systems to make important and critical decisions using vital and timely knowledge from a central repository of accurate data that cuts through the organization's functional departments and environments (Arif, et al.; Holsapple & Sena).

A consequence of the growing trend to purchase and install ERP systems is the organizational financial commitment for implementing and maintaining the systems. Organizations have spent billions of dollars implementing ERP systems, and the expenditure of budgeted and non-budgeted funds on ERP systems is regarded as the single largest investment made by organizations in the arena of technology (Al-Mashari, 2003; Dong-Gil Ko, Kirsch, & King, 2005; Holsapple & Sena, 2003). Dong-Gil Ko, et al. further reported that between the years of 2000 and 2005 inclusive, annual ERP sales increased by over 150% each year, reaching a level of over $31 billion in sales on ERP systems. Implementation of an ERP system is one of the single largest investments in dollars and human resources that institutions of higher education might ever make (Kvavik & Katz, 2002). Given the cost of purchasing, implementing, and maintaining ERP systems, organization leaders must strive to be good stewards of organizational funds and make wise decisions how best to utilize available and limited financial and personnel resources.

Many goals, expectations, and opportunities exist for ERP implementations in higher educational organizations. These goals, expectations, and opportunities frequently are very different from institution to institution; however, each of the goals, expectations,

and opportunities are quite relevant to the way each institution of higher education conducts its business. Goals, expectations, and opportunities can range from being very specific in nature to global generalities. What is a primary goal, expectation, or opportunity of one institution's ERP implementation project may not even be a consideration in another institution's ERP implementation project. The overarching goal of every organization however, is to successfully complete the ERP implementation project, which in general terms involves automation, standardization, and integration of shared common data and practices in a real-time mode across the entire organization (Fui-Hoon Nah, 2003).

Statement of the Problem

Implementation projects for ERP packages are big business for the vendors offering their specific system solutions to higher education institutions. Tremendous marketing efforts are put forth by vendors on higher education institutions to purchase specific vendor supplied applications, products, and services (Arif, et al, 2004; Proctor & Williams, 2004). Every vendor wants institutions to succeed with the implementation of their ERP system; otherwise, the livelihood of the vendor becomes jeopardized (Sawyer & Southwick, 2002; Trott & Hoecht, 2004). All higher education institutions require access to relevant and timely data that can be utilized to make the difficult and hard decisions that will have consequences for the daily and future institutional operations, structure, and culture (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Yakovlev, 2002). With the advances in technology, the logical conclusion and expectation is that an ERP system will provide the basis and foundation for any organization to meet data requirements for decision making purposes.

Goals and Expectations

Any institution engaging in an ERP implementation project must have clearly

defined goals and expectations (Fui-Hoon Nah, et al., 2003; Kvavik & Katz, 2002).

However, even when organizations take all the correct steps to clearly define goals and

expectations, there are reports that organizations failed to partially, and in some cases

fully, implement ERP packages into a production capacity (Frantz, Southerland, &

Johnson, 2002). Appropriate considerations must be given as organizations define and

communicate the goals and expectations of the implementation project.

Costs

Implementation of an ERP system is one of the single largest investments in

dollars and human resources that institutions of higher education might ever embark upon

(Al-Mashari, 2003; Dong-Gil Ko, et al, 2005; Holsapple & Sena, 2003). Yet, many

higher education institutions have already implemented ERP solutions, are in the process

of an ERP implementation project, or are contemplating ERP implementation projects.

Given the overarching costs associated with implementation of ERP systems, it is

important to understand the interest and investment of financial and human resources by

higher educational institutions into the implementation of any ERP system.

Project Methodologies

There are many reports of successful ERP implementation projects. While no one

correct method exists to plan, coordinate, and oversee an ERP implementation project,

Fui-Hoon Nah, et al. (2003), and Kvavik and Katz (2002) suggest that any institution

engaging in an ERP implementation project must have clearly defined goals,

organizational vision, and developed business plans. Even when institutions clearly

define goals, lay out the organizational vision, and develop re-engineered business plans, institutions have failed partially or in full to implement ERP packages into a production capacity. According to Fowler and Gilfillan (2003), ERP implementation problems and failures that come to the general public light are not truly representative of the frequency and scale of ERP implementation projects that fail or have significant problems. In other words, ERP implementation problems and failures are more prevalent than reported. It is unclear why some institutions have success with ERP implementation projects while other institutions that follow the same basic guidelines and methodologies end up with anything but a successful implementation. It is important to understand the significance of defining the organizational vision as it applies to ERP implementation projects and the value of going through the re-engineering of business processes across all levels of the organizational structure on the overall success of an ERP implementation project.

Change Management Theory

The very nature of an ERP implementation project suggests change, which must be accommodated within the scope of the overall project in order to raise the chances of success (Al-Mashari, 2003; Fui-Hoon Nah, et al., 2003; Holsapple & Sena, 2003; Siau & Mesersmith, 2003; Soh, et al., 2003). Al-Mashari further reported that organizations typically are so concerned and focused on the technical changes of an ERP implementation project that the impact and consequences of change management elements are overlooked and ignored. A number of elements are associated with change management, including organizational realignment, idealized influence, individualized consideration, inspirational motivation, and intellectual stimulation (Bolman & Deal,

1997; Fui-Hoon Nah, et al.; Yukl, 2002). According to Fui-Hoon Nah, et al., fundamental elements of change management simply cannot be underestimated.

Although change can be considered a fixture in any organization, people typically are resistant to change (Bolman & Deal, 1997). As changes in business processes and practices are reviewed, updated, and realigned throughout the implementation process of an ERP project, so must appropriate changes be implemented in the organizational, management, and information systems that will impact groups of people (Al-Mashari, 2003). Otherwise, as reported by Nicolaou (2004), ineffective change management will result in an extended dip in productivity, and potentially, failure of the overall ERP implementation project. Simply put, no aspect of an ERP implementation project can be taken for granted.

Benefits

The benefits of ERP implementation projects are important to know and understand. In addition to goals and expectations, many other potential benefits are associated with an ERP implementation project that can range from being very specific in nature to quite general and broad as it applies to the organization. Institutions that engage in an ERP implementation project anticipate and expect both tangible and intangible benefits (Nicolaou, 2004). According to Al-Mashari (2003), Debreceny, Gray, Jun-Jin, Siow-Ping Lee, and Yau (2005), Fowler and Gilfillan (2003), Frantz, et al. (2002), Fui-Hoon Nah, et al. (2003), Gattiker and Goodhue (2005), Luo and Strong (2004), Nicolaou (2004), Trott, and Hoecht (2004), Yakovlev (2002), benefits of ERP implementations can consist of the following:

1. More efficient business processes.

2. Lower costs to business procedures.

3. Better coordination and cooperation among the different functional departments.

4. Better management for monitoring and controlling functions.

5. Modified adaptation of abilities to organizational requirements.

6. More competitive and efficient entrance to electronic markets and electronic commerce.

7. Probable redesign of ineffective business processes to gain efficiencies.

8. Greater access to globalization and integration to the global economy.

9. Better decision support and decision making using higher quality data.

10. More effective utilization of active technology research, media, and advertisement in the general market environment.

11. Improved communications and flow of data.

12. Better integration of data and applications via relational database methodology.

13. Easier replacement of old and fragmented legacy systems.

14. Greater cost advantages and quicker deployment of packaged systems as compared with in-house development.

15. Easier adoption and transition to best practices in the organizational process.

Given the list of potential benefits, and the expectations associated with the benefits, it is important to understand if institutions fully receive value of the expected potential benefits, and if not, why not.

Drawbacks, Pitfalls, and Shortcomings

Just as there are benefits from an ERP implementation to the organization, there are potential obstacles to any ERP implementation. Because individual organizations are unique, any one organization may be impacted differently by the many various drawbacks, pitfalls, and shortcomings of an ERP implementation. According to Al-Mashari (2003), Debreceny, et al. (2005), Fowler and Gilfillan (2003), Frantz et al. (2002), Fui-Hoon Nah et al. (2003), Gattiker and Goodhue (2005), Luo and Strong (2004), Nicolaou (2004), Trott and Hoecht (2004), and Yakovlev (2002), potential negative impacts to the overall success of an ERP implementation project include, but are not limited to, the following:

1. Consequences and unplanned misalignments between ERP system features and the organization requirements.

2. Failure to rely on best practices of the ERP system, which are the results of vendor contact with existing customers.

3. Lack of preparation for the organizational and cultural transformation and change that comes with ERP implementation projects.

4. Deficiencies of available and unavailable pre-defined reports.

5. Costs associated with training, consultants, back-filling of resources, add-ons, and contracted services.

6. Attempts to make an ERP system fit every aspect and diverse need of the organization.

7. Lack of preparation for dealing with the consequences and ramifications of installing an ERP system through a team/group process.

8. Improper allocation of human and fiscal resources.

9. Lack of, or no emphasis on, the re-engineering of business processes.

10. Over reliance on the vendor during the implementation process.

11. Lack of buy-in by the organization as a whole.

12. Ignorance of the true costs involved for the implementation period and on-going basis.

13. Dip in performance for a period during and immediately following an ERP implementation system.

14. Underestimating the level and amounts of required and needed training and testing.

15. Lack of true knowledge and understanding of core processes.

16. Not allocating proper time frame for implementation.

17. Lack of appropriate knowledge transfer from consultants and trainers to organizational staff.

18. Employee turnover during implementation.

19. Difficulty of changing, modifying, and maintaining an ERP system.

20. Over reliance on ERP vendors and providers to conduct installation and implementation without core understanding by institutional members.

21. The complexity and largeness of the implementation.

Organizations must be aware of these potential issues that will impact the success of an ERP implementation project. Steps should be taken at all organizational levels to guard against the negative consequences associated with as many disadvantages as feasibly possible (Al-Mashari, 2003; Soh, Kien Sia, Fong Boh, & Tang, 2003; Trott &

Hoecht, 2004; Wognum, Krabbendam, Huhl, Ma, and Kenett 2004). However, even with

the prior knowledge of potential drawbacks, pitfalls and shortcomings of an ERP

implementation project, organizations often fall prey to the very issues the organization is

trying to avoid in order to achieve a successful ERP implementation. Therefore, it is

important to know what organizations must do to prepare and protect themselves from

drawbacks, pitfalls, ands shortcomings of ERP implementations.

Successful Implementations

Lessons can be learned from the experiences of other organizations that went

through the process of implementing an ERP system that include both successful and

unsuccessful implementation projects (Fowler & Gilfillan, 2003; Frantz, et al., 2002; Luo

& Strong, 2004; Trott & Hoecht, 2004). Yet, even with all the evidence, information, and

reported outcomes of implementing an ERP system, institutions continue to struggle

through an ERP implementation project, and in some cases, fail to complete the

implementation process (Luo & Strong; Soh, et al., 2003). A reoccurring theme is that

organizational leaders do not pay specific attention to issues of change management as

they apply to the organizational structure, culture, norms, and values during an ERP

implementation project. These leaders are likely to find the institution enmeshed in

bigger issues and problems associated with the overall ERP implementation project

(Fowler & Gilfillan). Organizations need to take measures and steps to ensure the success

of an ERP implementation. One step or measure that can be taken is for organizations to

learn from the experiences from organizations that have gone through the ERP

implementation process. In addition, it is important that organizational leaders implement

an ERP system in light of change management as it applies to organizational structure and organizational culture.

<div align="center">Purpose of the Study</div>

Important lessons can be learned from educational institutions where ERP solutions have already been implemented. Some of these lessons learned are from institutions that experience the very costly mistakes while conducting an ERP implementation project. If institutions, and their leaders, contemplating ERP solutions were to consider the lessons learned by sister institutions, the odds of successful ERP implementations are greatly enhanced (Frantz, et al., 2002; Gattiker & Goodhue, 2005; Soh, Kien Sia, & Tay-Yap, 2000; Ying & HeuyWen, 2005). According to Kvavik and Katz (2002), a significant number of higher education institutions across all categories of the Carnegie-classification of higher education institutions have not yet been involved with ERP implementations. Thus, the more those institutions that are considering ERP implementation projects can learn from the ERP implementation experiences of other organizations, the higher the chances of being prepared for their own ERP project and the greater the chances for overall success of the implementation project.

Overview

The investment of financial and human resources in higher education institutions is very high for ERP implementation projects (Dong-Gil Ko, et al., 2005; Fui-Hoon Nah, 2003; Haines, 2003). In addition, the rollout of ERP implementations is very complex (Songini, 2003). In the higher education environment, virtually no other single item or event can change the organizational structure and organizational culture, norms, and values as dramatically as an ERP implementation (Siau & Mesersmith, 2003). An ERP

implementation has both direct and indirect impact on the direction of the institution. Therefore, attention must be given to the ERP implementation process by the governing boards, administrations, faculty, and staff of higher education institutions. Higher education institutions considering ERP implementation should learn from the experiences of other higher educational institutions and organizations across the globe (Luo & Strong, 2004; Tott & Hoecht, 2004). No ERP implementation, however, is exactly the same because of the differences that exist within each institution.

Between January, 2003, and June, 2004, five higher education institutions in the Midwest embarked upon ERP implementation projects. Each of the respective institutions purchased the primary modules of the selected vendor ERP system. These ERP implementation projects were each completed during the time frame between January, 2006, and October, 2007. These five institutions are included in this current study. One of the higher education institutions for this research project started their ERP implementation project in October, 2003, with the last core module going live in January, 2006. Another institution started their ERP implementation project in December, 2003, and completed the implementation project in June, 2006. The third institution in this research project started their ERP implementation in May, 2004, and reported completion of the project as of October, 2007. Another institution began their ERP implementation project in January 2003, and reported completing their project in June, 2005. The final institution started their ERP implementation project in June, 2004 with the last module going into production mode in March, 2006.

Every institution undertaking an ERP implementation project is unique and different. ERP implementation projects impact organizations in ways not fully known or

expected prior to the start of the implementation project (Nicolaou, 2004). The

ramifications and consequences to institutions during and following an ERP

implementation may not be known until much later in the life of the organization (Fowler

& Gilfillan, 2003; Gattiker & Goodhue, 2005; Nicolaou). Therefore, the purpose of this

project was to conduct a case study of the ERP implementation at five Midwest higher

education institutions and to share the results with other institutions preparing to engage

in an ERP implementation project.

Rationale for Study

Implementation of ERP systems continues to involve major financial

commitments by higher education institutions. There is little room for error in order to

achieve a successful, efficient, and effective ERP implementation given the financial

investment. In addition, any knowledge and information pertaining to the ERP

implementation process that can be obtained from the experience of other higher

education institutions can be of great value and benefit for institutions that have not gone

through the process. Therefore, conducting a multiple case study qualitative and

quantitative research project on several higher education institutions has the ability and

opportunity to provide and share experiences, lessons learned, and other valuable

information to those entities yet to embark upon an ERP implementation project.

A qualitative study involves several key components and characteristics (Bogdan

& Bilken, 1998; Merriam, 1998). According to Bogdan and Bilken (1998), the major

features of qualitative research are naturalistic, descriptive data, concern with process,

inductive, and perspective of the participants. Implementation of these components into a

structured methodology provides an opportunity to learn what it takes to install an ERP

system. Merriam defines qualitative research as "an effort to understand situations in their uniqueness as part of a particular context and the interactions there" (p. 6). Information generated from the open-ended data collected from the various sources of the ERP implementation projects can be used to create more appropriate theories and methodologies that in turn are available for utilization by other institutions and organizations to successfully implement their own ERP system.

A quantitative research project strives for depth of understanding. Generally speaking, quantitative research consists of measurements that are objective, quantitative, and statistically valid. In essence, quantitative research is about numbers and objective hard data. According to Fowler (2004), "Quantitative research designs involve the collection and statistical analysis of numerical data" (p.310). Quantitative research involves the use of structured questions that include predefined response options.

Research Questions

The research questions to be addressed by this study all pertain to acquiring knowledge and comparing how the higher education institutions that implemented vendor purchased ERP systems measured up against reported findings of ERP implementations obtained in the review of literature. In addition, the basic role and impact of change management on the organizational structure and the organizational culture, values, and norms through the ERP implementation process and in the first 18 to 36 months following completion of the scheduled ERP implementation project will be explored. According to Wognum, et al. (2004), there is a need for in-depth case studies of ERP implementation projects in order to obtain a better understanding of the process dynamics within specific contexts of the ERP implementation process. Thus, the intent of this study

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is to contribute to the body of knowledge pertaining to ERP implementations that can benefit other higher educational institutions in their quest to evaluate, purchase, install, configure, and implement an ERP system package.

The research questions guiding this study are as follows:

1. What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?

2. What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?

3. What were the results of investing the financial and human resources of the institutions into the ERP implementation project?

4. What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?

5. What, if any, steps were taken to prepare stakeholders for the changes in work functionality as a result of the ERP implementation project?

Limitations of the Study

Several limitations could potential impact this research project. The first potential limitation identified was the full objectiveness of the researcher throughout the study. This first concern was the result of the researcher's participation as a member of the Project Management Team (PMT) in the ERP implementation project at one of the institutions studied. During the implementation process, the PMT consisted of the Chief Information Officer, the Chief Executive Officer, the Director of Information Technology Services, the Director of Management Information Systems, and a Management

Information Systems Application Manager. By including several other higher educational institutions in this research project, the researcher hoped to keep in check the impact of the researcher's preconceptions of the implementation process. In addition, the researcher's predominant role in this ERP implementation project was oversight of the technical and hardware level.

A second limitation potentially impacting this study was the researcher's work experience with ERP implementation projects. The researcher's experience consisted of more than 20 years with technology resources in higher education, implementation of three ERP implementation projects, and several major ERP upgrade projects. The researcher possessed a foundation of knowledge built upon past experiences that resulted in certain beliefs, thoughts, and expectations of what works and what does not work from the technical, administrative, and project management perspective. It was imperative for the researcher to divorce any comparisons of thoughts and beliefs from the findings as reported by the respondents. As mentioned above, given the number of higher educational institutions that participated in this research project, the shared role of the PMT, and the specific role of technical and hardware responsibility, this potential limitation was thought to be significantly eliminated.

Another limitation potentially affecting the research project was obtaining input from all appropriate project participants. For any given number of reasons, input from the entire selected sample was not received. Every effort was made to keep all responses anonymous. Multiple requests for input were distributed; however, some participants of the selected sample did not reply. Even though three of the five higher education institutions had survey return rates in excess of 50%, the survey return rate from one

institution was below 20% while the return rate for the final institution was at 30%. The overall rate of survey returns was 44.9%.

Given upward of 36 months elapsed since the survey was distributed and the ERP implementation project completed, the potential limitation existed that members of the implementation teams may have departed from their roles at their respective university. With the departure of those individuals from the university goes a potential source for a wealth of knowledge. Turnover is a concern in any ERP implementation project, but because this research project obtained the input from five different institutions, it is assumed that the departure of key individuals across all the institutions was unlikely. In addition, the departure of the person in position roles at each of the institutions is unlikely. Therefore, including multiple institutions in the study greatly reduces, if not eliminates, the concern of staff turnover.

A final limitation of the study identified that potentially impacts this research project was the genuine responses from those participants of the sample who completed the survey. The concern existed that the responses provided were the desired answers as opposed to the true thoughts and beliefs of the respondents. There is no way to decipher whether the answers from each respondent were what they actually thought or whether the answers were provided so as not to "rock the boat". However, input was obtained from five different higher education institutions and the replies from each respondent were anonymous.

Definition of Key Terms

Several key terms of this research study are operationally defined as follows:

Business Process Analysis: Business Process Analysis (BPA) is a methodology for process improvement or organizational change. As it applies to this ERP implementation project, BPA consists of the tasks, acquired knowledge, and techniques utilized to identify existing business needs of the organization and determine how to improve those business needs in conjunction with implementation of the ERP system.

Business Process Re-engineering: Business process re-engineering is the process of analyzing and redesigning workplace business processes with the goal and intent to increase organizational efficiency and productivity. Generally speaking, organizations have conducted business the same way for such a long that it is time to review the very processes that make up the existing business workflows. Coupled with ERP implementations, business process re-engineering provides institutions an opportunity to better utilize limited resources.

Enterprise Resource Planning (ERP): For the purpose of this research study, ERP is defined as a multi-module packaged software application that utilizes a common database to provide organizations the opportunity for more efficient and effective use of human, financial, material, and other organizational resources in pursuit of the organization's business processes and information-processing needs (Al-Mashari; Fui-Hoon Nah, et al., 2003; Holsapple & Sena, 2003; Sawyer & Southwick, 2002).

Functional Team Leads: The person who has operational responsibility to lead a module implementation team is known as a functional team lead. The functional team lead is the person who generally knows the business processes of the functional area that person represents. The functional team lead works collaboratively and in conjunction with the technical team lead. The functional team lead is generally assigned from the

respective functional area represented by the core module being implemented. From the chain of command standpoint, the functional team lead reports to the Project Manager or the Project Management Team.

Layered Products: Institutions often purchase additional applications to meet specific needs not addressed by the ERP system. These applications must interface with the core modules of the ERP system. These additional applications are purchased because no ERP system can meet every need of any given institution (Sawyer, & Southwick, 2002; Soh, et al., 2003). These additional applications are referred to as layered products. Layered products may be available through the ERP vendor, but often a layered product is available and purchased from third party vendors in support of the base ERP application.

Legacy Systems: Legacy systems are a collection of older computer hardware and software application systems that continue to be used because of the high cost of replacing or redesigning the systems. Legacy systems generally are difficult to upgrade, build interfaces for, and modify.

Modules: An ERP system is constructed of individual components and sub-systems. Each of these components and sub-systems is referred to a module. ERP modules are defined as either core modules or add-on modules. The primary modules of an ERP system for the higher education environment are human resources (including payroll), finance, financial aid, student, and alumni with each component installed as part of the base ERP implementation project.

Project Management Team (PMT): The PMT is the entity that oversees the appropriate execution of the ERP implementation project plan. Project direction is

coordinated and executed through the PMT. Each PMT is comprised of individuals with different roles and responsibilities that are different from institution to institution. Issues encountered through the day-to-day implementation of the ERP application were addressed by the PMT. Where necessary, topics and decisions of greater importance and impact are escalated to the Steering Committee. The PMT is created, approved, and sanctioned by the executive leadership of each institution.

Project Manager: The duties of the Project Manager are to ensure the ERP implementation project moves forward in the direction outlined by the Steering Committee and PMT. The Project Manager is responsible for the day-to-day activities of the ERP implementation project. The Project Manager has the authority to direct functional and technical staff to meet the objectives and goals for the specific assigned tasks of the overall ERP implementation project. In some cases, the Project Manager is a designated employee of the institution conducting the ERP implementation, and in other cases, the Project Manager is hired from outside the institution for the duration of the ERP implementation project.

Steering Committee: The purpose of the Steering Committee is to provide overall general direction of the ERP implementation project as it applies to the university environment. The membership of the Steering Committee for the ERP implementation projects is different from institution to institution, but generally the Steering Committee consists of the President and the President's Cabinet. Decisions and direction from the Steering Committee are turned over to the Project Management Team for full implementation.

Technical Team Leads: A technical team lead is generally a person with the technical knowledge and skills to support the module designed for the specific functional area. The technical team lead generally has a solid understanding of the functional operations of the functional area being represented. The technical team lead works in conjunction and collaboration with the functional team lead. Each individual works from their specific perspective with the same goal to implement the assigned core module. The technical team lead is normally assigned out of the technology related department. From the chain of command standpoint, the technical team lead reports to the Project Manager or the PMT.

Summary

The growth in the implementation of ERP systems over the past 10 to 15 years is at an all time high. Although there are many reasons for institutions of higher education to engage in ERP implementation projects, the bottom line is that the demand for higher levels of information in a timely fashion and meeting the needs of institutions' constituents has never been greater. Therefore, it is essential that appropriate resources for any ERP implementation project be properly allocated and aligned from the start of the ERP implementation project in order to achieve a successful implementation.

CHAPTER TWO

REVIEW OF LITERATURE

There are many attributes associated with enterprise resource planning (ERP)

implementation projects that each institution and organization must evaluate

independently. What is important to one institution may or may not be important to

another institution. Each organization must evaluate all the different attributes of an ERP

system package and the overall implementation process as it applies to that organization

(Al-Mashari, 2003; Fui-Hoon Nah, 2003; Siau & Mesersmith, 2003; Sawyer &

Southwick, 2002; Trott & Hoecht, 2004). Key attributes of an ERP package purchase and

implementation process to consider include, but are not limited to: knowing and

understanding the benefits; goals; costs; project methodologies; drawbacks, pitfalls, and

short comings; successful implementations strategies; and lessons learned (Fowler &

Gifillan, 2003; Frantz, et al., 2002; Fui-Hoon Nah, et al., 2003, Luo & Strong, 2004; Trott

& Hoecht; Wognum, et al., 2004).

Benefits

Organizations can obtain many benefits and advantages through the successful

implementation of an ERP system. A number of the major benefits of ERP system

implementations have been identified with the investigation of stated goals, which

include the following: (a) replacing legacy systems (Arif, et al., 2004; Esteves & Pastor,

2004; Kock, 2002; Kvavik & Katz, 2002; Mahil, 2004; Songini, 2003; Swartz, 2000;

Yakovlev, 2002); (b) obtaining the benefits of re-engineering, evaluations of best

practices, and business process analysis (Al-Mashari, 2003; Arif, et al.; Esteves & Pastor,

2004; Frantz, et al., 2002; Gattiker & Goodhue, 2005; Holsapple, & Sena, 2003; Kock;

Kvavik & Katz; Mahil; Soh, et al.; Songini; Swartz); and (c) tracking data in a centralized

database that is much easier to maintain and is available to all appropriate users for

critical decision making efforts (Arif, et al.; Fowler & Gilfillan, 2003; Siau & Mesersmith,

2003; Soh, et al.; Yakovlev). However, many additional benefits exist for installing an

ERP system. According to Al-Mashari, the massive organizational changes that

accompany an ERP implementation product allow an institution to go from a fragmented,

functional-based organization to a process-based organization with an integrated system.

This benefit is more accentuated when taking advantage of business process analysis and

re-engineering efforts. Basic reasons for adopting an ERP system include cost reduction,

improved efficiencies, improved customer service and satisfaction, and enabling of

Internet functionality (Fowler & Gilfillan; Nicolaou, 2004; Trott & Hoecht, 2004).

Other benefits and advantages exist with ERP implementation projects. Even

though these additional benefits and advantages may not be on the same scale as the

primary benefits previously listed, each adds supportive reasons for engaging in an ERP

implementation project. According to Fowler and Gilfillan (2003) and Trott and Hoecht

(2004), some of the additional benefits, which in many ways are subsets of the goals,

benefits, and advantages already listed, include the following:

(1) Improving coordination and cooperation between the various functional

departments across the organization.

(2) Adapting organizational abilities accordingly to organizational functional

requirements.

(3) Improving decision support and decision making using higher quality data;

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(4) Improving communication channels and flow of information and data across the organizational boundaries.

(5) Utilizing software that has already been tested and proven to be functional in the market place as opposed to developing an internal system in-house.

(6) Receiving and installing updates and patches provided by the ERP vendor.

(7) Increasing report accuracy that leads to more informed decision making processes.

In summary, organizations reap many benefits during and after an ERP implementation project, but they will not occur through happen-chance.

Goals

Organizations contemplating an ERP implementation project may set many different goals. Organizational goals can be mutually exclusive, tightly interwoven, or can overlap with one another (Fui-Hoon Nah, 2003). One organization may have only a few all-encompassing goals as each pertains to the ERP implementation project, while another organization may have a large number of very specific and pointed goals. The primary goals identified in the review of literature for an ERP implementation project are enhanced customer service, replacing legacy systems, implementation of best practices, re-engineering the business processes, and accurate and readily accessible information via a centralized relational database (Dong-Gil Ko, et al., 2005; Fui-Hoon Nah, et al., 2003; Holsapple & Sena, 2003; Nicolaou, 2004; Trott & Hoecht, 2004; Yakovlev, 2002). Regardless of the goals, it is essential that institutional leaders define and clearly communicate those goals across all organizational boundaries (Fui-Hoon Nah, et al).

Enhanced Customer Service

One goal of ERP implementation is enhanced customer service for institutional constituents, especially students, faculty, staff, and administrators. Providing better administrative and management tools through ERP implementation for decision making, reporting, and making institutions more competitive is essential in any ERP implementation project (Al-Mashari, 2003; Yakovlev, 2002). According to Hosapple and Sena (2003), more demand than ever before is being placed on data retrieval and data manipulation, as institutional leaders must acquire knowledge to make informed decisions. It is now more critical that information be entered quickly and accurately into the ERP system, so that the desired information can be retrieved in a timely capacity (Frantz, et al., 2003). Higher education institutions are becoming more dependent and reliant on technology resources and the use of information (Arif, et al., 2004). Thus, the expectations of improved efficiency and effectiveness in the day-to-day functional activities of the institution, along with the other benefits brought to the organization, is an expected result of implementing an ERP system.

Replace Legacy Systems

A second goal of an ERP implementation, and perhaps one of the more traditional and most frequently stated of objectives, is to replace out-dated, cumbersome, and batch-oriented legacy systems (Arif, et al., 2004; Esteves & Pastor, 2004; Kock, 2002; Kvavik & Katz, 2002; Mahil, 2004; Songini, 2003; Swartz, 2000; Yakovlev, 2002). Yakovlev further stated that the biggest challenge for an institution undergoing an ERP implementation is dealing with the consequences and impact of changes to the existing organizational business processes and practices that developed around the legacy systems.

Users become engrained in existing processes without fully understanding the foundation and basis for the processes, even to the point when asked why they do something, the answer given is, "that is the way it has always been done." Fui-Hoon Nah, et al. (2003) and Yakovlev reported that the more complexity associated with a legacy system, the greater the level of change in the technological and organizational environments as a result of an ERP system implementation project.

A major problem with legacy systems is that many of the existing systems are no longer supported (Arif, et al., 2004). In addition, the cost to maintain the hardware that the legacy systems run on is increasing dramatically to the point it is more cost effective to purchase new hardware than to pay for maintenance support on that existing hardware (Lou & Strong, 2004). However, in many instances the legacy application systems may not run on new hardware. Another problematic concern with legacy systems is the inability to provide accurate information on a timely basis (Al-Mashari, 2003; Siau & Mesersmith, 2003; Songini, 2003). Existing legacy systems frequently are so convoluted that it is difficult to obtain relevant information that should be used in decision making processes. In addition, Soh, et al. (2003) reported that information requested by administrative decision makers often is not available because the necessary data were never collected, not available, or were stored in ways that make it difficult, if not impossible, to retrieve (Soh, et al., 2003). Finally, the shift in how business is conducted in higher education is radically changing. The "green screen" and client-server processing are rapidly becoming terms of the past and replaced by web services via the Internet and Intranets. Addressing issues of growth and scalability, while providing appropriate constituent functional services in a timely capacity, are important factors in any ERP

implementation (Arif, et al., 2004; Koch). Thus, in regards to legacy systems, it is becoming more and more costly to maintain these legacy systems in terms of financial and personnel dollars. In addition, decisions are made without adequate information that impact current and future direction of higher education institutions. Finally, changes in technology lead institutions to more effective and efficient alternatives for conducting daily business when compared against legacy systems.

Best Practices

Establishing, modifying, and conforming an institution's functional and operational procedures and methodologies to industry best practices is another goal of ERP implementation projects. Best practices are defined as the best way to conduct a specific business or organizational function within an industry (higher education for purposes of this study), but modified to meet the specific needs of the organization (Fowler & Gilfillan, 2003; Fui-Hoon Nah, 2003; Gattiker & Goodhue, 2005; Nicolaou, 2004; Soh, et al., 2003). Although ERP vendors advocate the use of best practices in conjunction with implementation of their ERP package, most organizational members differ greatly on how they define best practices as it applies to their environment (Siau & Mesersmith, 2003).

The templates built into any ERP system generally are based on best practices that have a foundation based on the experience harnessed by the vendor from its current and potential customer base. According to Al-Mashari (2003), however, research indicates that an effective ERP package centers best practices on an integrative approach between key organizational functional elements. Best practices tend to be more associated with the specific ERP package templates and how the vendor developed the overall application in

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consultation with the vendor's existing clients and potential customers (Fowler &

Gilfillan, 2003). Soh, et al. suggested many best practices are developed as the result of

the re-engineering of business and functional processes, which is based on the movement

of continual improvement that has been in practice in many organizations over the past

15 years prior to 2003.

From an operational standpoint, best practices are tied more directly to the way

ERP applications permit and allow an institution to complete functional and operational

activities as opposed to the best way functional and operational activities are conducted

across the higher education environment. According to Nicolaou (2004) and Fowler and

Gilfillan (2003), the best practices built into each ERP package often determine the extent

that an organization will adapt existing and new processes to the ERP package

capabilities. In order to reduce and restrict ERP package customization efforts,

organizations need to be flexible in allowing existing business processes to be modified

to fit existing ERP package processes (Fui-Hoon Nah, et al., 2003). Therefore, it is

imperative and paramount that institutions select the ERP solution that will best fit the

specific needs of their overall organization.

Re-engineering Business Processes

A fourth goal of an ERP implementation project is to improve performance within

the organization, which is accomplished through the integration of the various re-

engineered business processes across the institution's different functional and operational

departments, better known as business process re-engineering (BPR), or business process

analysis (BPA) (Al-Mashari, 2003; Frantz, et al., 2002). Tightly woven with re-

engineering business processes is the activity known as business process analysis, which

is simply the analysis, identification, redesign, and documentation of business or functional processes (Soh, et al., 2003). The intent of the re-engineering or business process analysis efforts is to provide the capability to integrate functions, processes, and procedures within the selected ERP solution in the most efficient way feasible (Fowler & Gilfillan, 2003). Re-engineering is time consuming and requires all entities affected by the ERP solution to be involved in the process. However, it is wise to utilize re-engineering processes within the institution to align institutional policies, procedures, and processes to include best practices where appropriate (Kvavik & Katz, 2002).

The terms best practices and business process re-engineering are used in conjunction with one other. In essence, it is nearly impossible to implement best practices without conducting business process re-engineering. The critical component of any business process re-engineering effort is change management (Fui-Hoon Nah, et al., 2003; Siau & Mesersmith, 2003). Organizations must be proactive regarding change management because of the impact business process re-engineering has upon the organizational structure and the organizational culture, values, and norms (Fowler & Gilfillan, 2003; Yakovlev, 2002). In addition, institutions must encourage employees to forget the traditional ways of conducting business and be open-minded about the new functionalities of the various modules of the ERP system being implemented. Fui-Hoon Nah, et al. further reported that organizations need to be willing to alter and modify existing business processes to adapt to the ERP package in order to reduce and minimize the degree of customizations required to the ERP base system. Through business process re-engineering, business and functional processes in the organization are often modified

to accommodate how the new ERP application accomplishes specific functional and operational tasks (Frantz, et al., 2002; Wognum, et al., 2004).

Accurate and Accessible Online Data in Relational Database

Another goal of ERP implementation often associated with being a key selling point by vendors for their ERP package is the ability to enter, maintain, and keep information in a single relational database that is accurate, available in a real-time capacity, and permits integration across the entire organization (Fowler & Gilfillan, 2003; Siau & Mesersmith, 2003; Soh, et al., 2003; Yakovlev, 2002). Both the day-to-day users of the ERP system and the decision makers of the organization must have access to accurate data that are available in a very timely fashion. Because of the integration of a relational database, ERP systems generally provide the ability for increased knowledge across departmental and functional lines that support cross-functional processes (Arif, et al., 2004; Fowler & Gilfillan; Soh, et al., 2000; Yakovlev). Thus, data common to multiple areas need to be entered only once, so that the data can be shared across all functional and departmental units of the organization. In addition, when a data element must be changed, any functional or departmental area with appropriate access and permissions can make the change, which will immediately be available to all other functional and departmental areas (Soh, et al.; Yakovlev). No longer do students need to go to multiple departments to change their current address, but rather an address can be changed from a single location and made available to all other areas. And because all data are in a common relational database, the changed data are immediately available across the organization. Finally, the ability to create a report with information that crosses functional and departmental lines can be accomplished within a relational database (Luo

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& Strong, 2004; Soh, et al.). The result is that decision makers can now make those tougher decisions based on more meaningful data that are accurate and much more easily accessible on very short notice.

In addition to the goals listed above, other goals, expectations, and benefits exist for higher education institutions that choose to implement an ERP system solution. Some of these goals, expectations, and benefits include (a) the ability to provide better information for planning and management decisions, (b) increased productivity, (c) reduction of costs, and (d) integration of all campus departments and functions onto a single computer system to better serve those departments and functions (Kvavik & Katz, 2002; Swartz, 2000). Kvavik and Katz further reported that institutions can expect to lower their business risks and increase revenue opportunities as a result of an ERP implementation project.

<center>Costs</center>

It is no secret that the purchase, installation, and implementation of an ERP system is expensive in terms of both financial and human resources costs. As reported by Dong-Gil Ko, et al. (2005), over $31 billion were spent on ERP systems in 2005. Yet, the base purchase price of the ERP application is only a part of the total cost of implementing an ERP package. According to Fui-Hoon Nah (2003), Haines (2003), and Sawyer and Southwick (2002), one of the biggest costs of an ERP implementation is attributed to the cost of consulting fees. Sawyer and Southwick further reported that when an organization implements an ERP system solution, on the average between $3 and $5 will be spent on consulting fees for every $1 spent on purchasing the application.

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Another cost to be considered when contemplating an ERP implementation project is the time and dollars needed to train existing staff on the new ERP package (Siau & Mesersmith, 2003). Although different staff will be trained at unique levels, generally the technical staff supporting the ERP system will be trained at a high level. One major consequence of ERP implementation as it pertains to staff is the increase of staff turnover (often attributed to working too many hours during the implementation process and the lure of more salary at another organization) resulting in increased costs associated with replacing these key individuals (Yakovlev, 2002).

An additional factor that contributes to the cost of any ERP implementation is the amount and level of customizations made to the system (Soh, et al., 2003). Customizations can be costly on a number of fronts, which include the cost to conduct the customizations, the cost to maintain the customizations, and future costs to change updates to the ERP application that do not take into consideration customizations made at the organizational level. Generally speaking, the costs associated with customization are very difficult to ascertain, and often are really not known until long after the customizations were conducted and put into production (Luo & Strong, 2004; Soh, et al., 2003).

From a historical standpoint, higher education institutions have difficulty in tracking information technology related expenses. In addition, real and perceived inequities arise regarding the funding of an ERP package, especially in light of the politics that are involved in an enterprise-wide ERP software implementation. The absence of an implementation budget to cover all aspects of an ERP implementation project puts severe constraints on the institution's ability and effort to complete a

successful implementation project (Frantz, et al., 2002). According to Wognum, et al. (2004), many ERP implementation projects suffer greatly from budget and time over-runs even with the best of budget plans. Therefore, according to Siau and Mesersmith (2003), resource allocation through some type of organized budget is a very important component for successful ERP implementation projects and controlling costs, which includes allocations for consultants, ERP system software, training, and backfilling of positions.

<div align="center">Project Methodologies</div>

ERP implementation project methodologies can vary from project to project as well as from institution to institution. Although no single correct methodology exists for an ERP package installation and implementation project that guarantees success, multiple components exist for any ERP installation and implementation project that each institution must consider independently when building the overall project plan. ERP installation and implementation components requiring consideration include the use of consultants, implementation by teams, project manager, customizations, selection of ERP vendor, change management, and product and organizational fit (Dong-Gil Ko, et al., 2005; Frantz, et al., 2002; Fui-Hoon Nah, et al., 2003; Haines, 2003; Sawyer & Southwick, 2002; Siau & Mesersmith, 2003; Soh, Kien Sia, & Tay-Yap, 2000).

Use of Consultants

Nearly every institution engaging in an ERP implementation project enlists the assistance of consultants in some capacity. Consultants can be used in many capacities in regards to an ERP implementation project with the primary purpose of facilitating implementation efforts (Dong-Gil Ko, et al., 2005; Frantz, et al., 2002; Haines, 2003). According to Haines, the use of the right consultants along with their respective skill sets,

knowledge, and experience is essential to a successful ERP system implementation.

Consultants can be used to install the software, install hardware, install operating systems, train technical staff, train functional staff, and direct the implementation project. Three key components pertaining to the use of consultants that organizations should address are appropriate levels of budget funding, outlining specific goals and outcomes, and knowledge transfer to appropriate organizational staff. Properly defining consultant requirements is essential when employing their services (Fowler & Gilfillan, 2003; Haines).

A common mistake made by many organizations undertaking an ERP implementation project is failure to budget for consultants or to severely underestimate the budget allocation for the use of consultants (Haines, 2003; Sawyer & Southwick, 2002). For every $1 spent on the application software, a minimum of $3 to $5 should be allocated and budgeted for the use of the various types of consultants (Sawyer & Southwick). According to Luo and Strong (2004), if a consultant is not a good match for the specific function and task of the institution, the consultant should be removed and replaced with a different consultant. Most vendors offer consulting services with the purchase of their application (Fowler & Gilfillan, 2003; Haines). However, there are many consulting firms that specialize in ERP implementations. Each organization must independently evaluate the source of consultants in order to choose the right consultant. After the consultants are selected, the organization needs to rely on the consultants' skills, experience, and knowledge accordingly as it applies to the ERP implementation project (Haines).

The use of consultants does not guarantee a successful ERP implementation. Not only must generally accepted specific ERP implementation goals be defined for each consultant, but it is equally as important that less-tangible goals be defined as well (Fowler & Gilfillan, 2003). These less-tangible goals might include operational maintenance, implementation methodologies, training objectives, detailing database fields, functionality, and output walkthrough (Dong-Gil Ko, et al., 2005; Soh, et al., 2000). Organizations must make consultants accountable for the outcomes of their efforts during the duration of the ERP implementation project.

No matter how good a consultant is, if the knowledge, skills, and experience possessed by that consultant cannot be transferred to organizational staff, then the worth of that consultant is dramatically reduced (Soh, et al., 2000). From day one, consultant knowledge transfer must be planned with such tasks as providing training, data detailing, process flow, module functionality, outcome processing, and the like. All of these components must be incorporated into the daily objectives of each consultant. According to Dong-Gil Ko, et al. (2005) and Nonaka and Takeuchi (1995), knowledge exists in two primary forms: explicit knowledge and tacit knowledge. Nonaka and Takeuchi describe explicit knowledge as something formal and systematic, and tacit knowledge as something not easily explained. "Explicit knowledge can be expressed in words and numbers, and easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles" (Nonaka & Takeuchi, p. 8). "Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or to share with others" (Nonaka & Takeuchi, p. 8). Dong-Gil Ko, et al. (2005) further explained workplace explicit and tacit knowledge as the effective performance as a result

of knowledge transfer, or in other words, what works best for the organization. The earlier the knowledge transfer processes can begin in the consulting engagement, the more effective the knowledge transfer is likely to be and the more likelihood of an overall successful ERP implementation.

Any institution considering an ERP implementation project must budget for consultants, outline the goals to be completed by the consultants, and then make sure knowledge transfer is incorporated into the process. The success of an ERP implementation project is very much connected to the ability to properly utilize consultants (Dong-Gil Ko, et al., 2005; Haines, 2003; Soh, et al., 2003).

Implementation by Teams

According to Frantz, et al. (2002), the use of teams is one of the best strategies an organization can utilize when it comes to an ERP implementation project. Regardless of the project purpose, Katzenbach and Smith (1993) discuss how the effective and productive outcome of team projects generally is greater than the outcomes of individual efforts. Another advantage of using teams is the project buy-in that occurs at the multiple levels of the organization that are involved through the team process (Siau & Mesersmith, 2003). With so much emphasis on the use of teams, organizations would do well to explore methodologies of how best to use teams to conduct an ERP implementation.

Before creating project teams and providing assignment to these teams, the appropriate foundation must be laid on how best to utilize project teams in the ERP implementation process (Ying & HeuyWen, 2005). It is not the same as asking for volunteers and then giving the team a charge. Instead, the appropriate issues, concerns, and philosophies of using project teams must be addressed as organizations commence

the use of teams for the implementation of an ERP system. Topics that must be addressed when developing and defining project teams are functional and departmental representation, team composition, group size, group dynamics, training on how to work as a team, group cohesiveness, individual characteristics, empowerment, leadership, problem solving strategies, group norms, social strategies, individual diversity, and organizational support (Frantz, et al., 2002; Fui-Hoon Nah, et al., 2003; Katzenbach & Smith, 1993; Siau & Mesersmith, 2003; Ying & HeuyWen). Siau and Mesersmith further reported that because of the many types of individuals involved in an ERP implementation project, group dynamics is perhaps the most important aspect of building project teams.

Several other important factors are associated with the successful use of project teams. One factor is to enhance team performance by the understanding and development of learning behaviors, which includes such behaviors as seeking and providing feedback, sharing information, asking for help, discussing errors in a non-confrontational capacity, and experimenting (Katzenbach & Smith, 1993; Ying & HeuyWen, 2005). A second factor is to allow a project team to focus on its objective by reducing or totally removing existing workloads and responsibilities until the project team completes the assigned objectives (Frantz, et al., 2002). As a potential alternative, consideration should be given to providing additional compensation during the project team operations if existing job responsibilities remain static. One of the reasons for staff turnover during ERP implementations is that many employees work numerous hours doing their normal work, learning a new system, and being a part of one or more project teams. According to Frantz, et al. and Katzenbach and Smith, providing a dedicated work area or room for

project teams is an important factor for team success. When the working environment of the project team is supportive of the objectives and tasks of the project team, generally the whole team attitude, experience, and productivity are increased. Frantz, et al. and Katzenbach and Smith further reported that the use of project teams coupled with appropriate training is advantageous to completing projects. The use of project teams does not just happen, but rather effort should be put forth to prepare the organizational culture, norms, and values for deployment of project teams during an ERP implementation project.

Project Manager

Project manager leadership is the key attribute to be considered for any ERP implementation. According to Fowler and Gilfillan (2003), Frantz, et al. (2002), Fui-Hoon Nah, et al. (2003), Kvavik and Katz (2002), and Songini (2003), the use of a project manager is highly recommended for an ERP implementation project. Fui-Hoon Nah, et al. further reported that project management is critical to the success of an ERP implementation project. Frantz, et al., as well as Kvavik, recommended the project manager be a full-time dedicated person for the duration of the ERP implementation. Luo and Strong (2004) and Songini also reported that the selected project manager should be experienced, and if an experienced project manager is not available, then the designated project manager should be sent to training prior to the start of the ERP implementation. On the average, an ERP implementation will take between 18 and 36 months with the benefits of the project not fully realized for another 24 months to 36 months (Arif, et al., 2004; Kock, 2002; Kvavik & Katz). Kock, Kvavik and Katz, and Mahil (2004) further stated that dedicated personnel leading an ERP implementation increases the odds of

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success. Due to the visibility, financial and human resource commitments, and length of ERP projects, a project manager should be dedicated to leading the institution through the full ERP implementation project.

The ERP project manager should be placed directly at the helm of the implementation project and be given the necessary control, authority, and power to navigate and lead the implementation project (Fowler & Gilfillan, 2003). In addition, the ERP project manager should be the primary change-agent who supports the requirement for appropriate skills and experience (Fowler & Gilfillan; Luo & Strong, 2004; Songini, 2003). Part of the change-agent process is the ability of the project manager to guide the direction for building the necessary project teams to implement the ERP package. According to Fui-Hoon Nah, et al. (2003), project manager scope and goals for the implementation project must include aspects and issues as related to organizational constituents, users, schedules, goals, time frames, and budgets. More importantly, broad authority to manage all aspects of an ERP implementation project must be given to the project manager in order to ensure a good balance of technical business and change management requirements of the project. As reported by Fowler and Gilfillan, "The research has identified a need for and the means of providing more effective project management for information systems implementation within universities" (p. 488).

Customizations

A major topic of debate with ERP implementations is whether or not customizations should be allowed during the life of the ERP project (Kock, 2002; Kvavik & Katz, 2002; Soh, et al., 2003; Soh, Kien Sia, & Tay-Yap, 2000; Yakovlev, 2002). The consensus of these researchers is that ERP packaged systems should not be customized,

or at the very least, customizations should be kept to a minimum. Fowler and Gilfillan,

Kvavik and Katz, and Soh, et al. each reported that institutional customization of the

programming code for delivered applications can result in both advantages and

disadvantages, but that in the long run it is disadvantageous to make customizations to

the base code of the ERP package. Kvavik and Katz further reported that customization

of ERP software is the number one reason for ERP implementation projects to go over

budget and extend projected time lines. In addition, full consequences of installing

customized programming code must be documented and understood.

Organizations embarking upon an ERP implementation project often do not have

a full appreciation of the long term consequences of customizing ERP code. Kock (2002)

and Kvavik and Katz (2002) each reported that there are long-term problems when

making customizations to the ERP applications. One major concern of software

customization is the impact of installing vendor upgrades in the future. Many institutions

do not realize the financial impact of having to re-work and modify customized software

to accommodate vendor upgrades and patches (Arif, et al., 2004; Kvavik & Katz).

Considering that institutions can expect to install patches and upgrades to the primary and

secondary modules of the ERP package on at least a quarterly basis, the requirement for

re-work and modification grows significantly. In addition, many of the patches and

upgrades are the result of changes to state and federal regulations, especially in payroll

systems and financial aid systems, which must be implemented in a very timely basis to

comply with new and updated federal and state regulations (Soh, et al., 2003; Yakovlev,

2002).

ERP vendors and their consultants strongly advocate no customizations be applied to the base-line package. According to Fui-Hoon Nah, et al. (2003), Soh, et al. (2003), and Soh, et al. (2000), by not customizing application source code, implementation risks are greatly reduced, implementation costs are less, negative impact on system performance is avoided, maintenance costs are reduced, and the results of best-practices and re-engineered processes can be fully utilized. Many customizations are unnecessarily implemented because the organization and project management team do not conduct a best practices analysis or re-engineering process to more fully integrate a fit between the organizational requirements and the ERP system package (Dong-Gil Ko, et al., 2005; Fui-Hoon Nah, et al., 2003). Moreover, software customizations add to the overall challenge of implementing an ERP system and the ability to transfer knowledge to the stakeholders. The bottom line is that the decision to make customizations must be carefully considered.

Selection of ERP Vendor

There are a number of options and methodologies for installing an ERP system in higher education. Prior to selecting a specific vendor or a set of vendors, the institution must evaluate several attributes independently associated with ERP implementations. One attribute of an ERP implementation is the overall scope of the project (Kvavik & Katz, 2002; Mahil, 2004; Sawyer & Southwick, 2002; Swartz, 2000). Before engaging in an ERP implementation, institutions must determine whether to encompass a suite of modules from one vendor or pursue the best application from a multitude of vendors, also known as best of breed (Swartz). The primary advantages for utilizing a single vendor with a suite of products are that generally the interfaces between the different modules

are already in place, there is better modularity between the suite of applications, less

work on behalf of the institution is required to implement a suite of products, the

organization has only one entity to turn to when problems occur, and the installation of

patches and upgrades are accepted as easier to perform (Gattiker & Goodhue, 2005;

Sawyer & Southwick).

Kvavik and Katz (2002) strongly recommended using a suite of products. In

addition, Kock (2002) reported that if installed correctly, an integrated ERP suite of

products can have tremendous payback. The primary advantage for utilization of

applications from multiple vendors is that an institution may end up with the best of each

application. However, the cost of individual applications from multiple vendors is likely

to be higher (Kock). In addition to determining whether to use best of applications or a

suite of applications, each higher education institution will need to determine whether to

formulate a planned approach for implementation or conduct a big-bang installation. The

planned approach for the ERP implementation is for the institution to determine the order

in which core modules and add-on modules will be implemented. A big-bang

implementation is installing all parts of a suite or all of the best of applications in the

same general time frame. Although using the big-bang approach can be completed much

faster, there are direct and indirect costs and consequences that are not easily accepted

(Kock). Thus, institutions engaging in ERP implementation projects must evaluate the

full scope of their implementation project.

For the most part, ERP systems today are vendor provided. In today's technology

world of higher education, there is very little new system development conducted in-

house to meet overall organizational requirements. Legacy systems are the result of in-

house developed systems that were not designed for flexibility and change (Arif, et al.,

2004; Esteves & Pastor, 2004; Mahil, 2004; Songini, 2003; Yakovlev, 2002). ERP

systems built and offered by ERP vendors today are not designed for any one specific

customer or organization, but rather the systems are constructed to be flexible to meet the

various needs of higher education institutions (Gattiker & Goodhue, 2005; Sawyer &

Southwick, 2002). Prior to the selection and implementation of an ERP package,

according to Gattiker and Goodhue, Kvavik and Katz (2002), Kock (2002), and Sawyer

and Southwick, some of the factors that should be considered in making the selection of

an ERP vendor and their respective package are as follows:

(a)   Importance of relationships with consultants

(b)   Core team characteristics

(c)   Business process re-engineering approach

(d)   Change management philosophies

(e)   User training

(f)   Top management support

(g)   Project champion

(h)   User involvement

(i)   Package and module choice

(j)   Package customization

(k)   Project management

(l)   Implementation strategies

(m) Clearly stated business case

Trott and Hoecht (2004) reported that other specific criteria organizations should

consider and weigh when selecting an ERP vendor and their product offering include the

stability and history of a vendor, record of sales, implementation methodologies,

availability of third party additional products to the base ERP package, and expected

improvements to the base package over the next 12 to 24 months.

Before an ERP vendor is selected, an organization should investigate and know

the stability and history of the vendor (Holsapple & Sena, 2003; Nicolaou, 2004; Trott &

Hoecht, 2004). Some information that should be known about a vendor is how long the

vendor has been in the market for providing ERP solutions, the track record the vendor

has in the ERP market, and how many current customers are supported by the vendor.

The key is to understand as much about the ERP vendor as possible before entering into a

contract with the vendor. According to Trott and Hoecht, the longer the vendor has been

in the market, the better the reputation and the higher expectations of a successful ERP

implementation project. In addition, the number of product installations supported by the

ERP vendor offers insight to the customer base of the ERP vendor (Trott & Hoecht). It is

also a good idea to make reference checks with new and established customers of the

vendor in order to obtain a better understanding of the vendor's capabilities (Nicolaou).

An ERP project should be a joint partnership between the organization and the ERP

vendor.

Another criterion on which a vendor should be evaluated is a record of sales

(Sawyer & Southwick, 2002; Trott &Hoecht, 2004). Information to be known about

potential vendors include the number of new customers who have purchased the vendor's

ERP package in the past year, the number of installations conducted by the vendor in the

past year, the current number of potential sales in the negotiation stage, and trend of sales

over the past year compared to sales each year for the previous several years Although

not an absolute, the key thought is that the more presence a vendor has in the market, the

higher the likelihood of ending up with a successful implementation project (Holsapple &

Sena, 2003; Sawyer & Southwick; Trott & Hoecht).

Knowing the installation methodologies of an ERP vendor is another criterion that

should be evaluated (Gattiker & Goodhue, 2005; Kvavik & Katz, 2002; Kock, 2002;

Sawyer & Southwick, 2002). Specific points of how an ERP vendor completes the

implementation process that should be known by the organization include knowing who

conducts the actual installation, user of internal or external sources for conducting the

training, and the amount of time spent onsite. In addition, an institution should know

whether or not the vendor supports the use of re-engineering, best practices, and business

process analysis as part of the implementation process. Another source of obtaining

information on the vendor's implementation methodology is to find out what other

organizations report based on their experience with the vendor. In addition, with the

constant change in technology and the current move to web based technology, ERP

vendors continue to write and re-write new code to meet the demands of technology and

organizations (Kvavik & Katz; Sawyer & Southwick). The consequences are that some

ERP systems are immature in the overall market place, and thus, organizations must

carefully consider the selection of an ERP system, whether from a single vendor or

multiple vendors. The fit between an organization and an ERP vendor is critical

(Holsapple & Sena, 2003; Kvavik & Katz; Nicolaou, 2004; Sawyer & Southwick; Trott

& Hoecht, 2004).

Change Management

Because an ERP implementation generally is the essence of a large-scale

organizational change that involves many, if not all, of the organizational participants, the

organization must recognize and address change management issues. Siau and

Mesersmith (2003) reported that the more employees are involved in the issues of change

management, the higher the success rate of ERP implementation projects. In addition, the

social issues and cultural environments of the organization must be managed throughout

the organization to build the foundation for a successful implementation of an ERP

system (Fowler & Gilfillan, 2003; Sawyer & Southwick, 2002; Trott & Hoecht, 2004;

Yakovlev, 2002). Fowler and Gilfillan further reported that cultural factors were more

influential than not in the success of an ERP implementation project, and thus, should

carry as much importance as the traditional technical and functional aspects of an

implementation project. The whole concept of change management is perhaps the most

important single factor that needs to be fully addressed by any organization embarking on

the journey to implement an ERP system (Fui-Hoon Nah, et al., 2003; Siau and

Mesersmith; Soh, et al., 2003).

Many institutions do not realize the impact of an ERP implementation project on

the culture, norms, values, traditions, practices, and communications of an institution

(Fowler & Gilfillan, 2003; Fui-Hoon Nah, et al., 2003; Luo & Strong, 2004; Soh, et al.,

2003; Morgan, 1997; Songini, 2003; Swartz, 2000; Yakovlev, 2002). Al-Mashari (2003)

and Kvavik and Katz (2002) reported a major cultural shift for those higher education

institutions implementing an ERP solution. ERP implementations will cause change, and

institutions must be ready to address the many changes that will occur to the people who

make up the institutional culture and into the traditional functional processes. Frantz, et al. (2002), Kock (2002), Sawyer and Southwick (2002), and Wognum, et al. (2004) reported that ERP implementation projects ask people to change how they do their jobs, which is very difficult for many people to accept and adapt to in their positions. Esteves and Pastor (2004) stated that ERP projects cannot be achieved without realizing and taking into account the impact on organizational context. Furthermore, Morgan reported that organizational change implies cultural change, which is above and beyond changes in technology, rules, systems, procedures, and polices. Institutions cannot take these factors for granted. According to Frantz, et al., Kock, Trott, and Hoecht (2004), and Wognum, et al., one of the biggest mistakes of ERP implementation projects is the failure to realize the impact of change on employees and processes. Stakeholders within the institution must be identified and made a part of the overall implementation (Esteves & Pastor). In the context of including employees in the ERP implementation project, communication is a key element. Unfortunately, few institutions do communications well even in the best of circumstances and environments (Kvavik & Katz).

As part of the change management process, organizations must be ready and willing to make changes that align the organizational structure and ERP system in context of the formal and informal interactions between each other. "ERP implementations usually require people to create new work relationships, share information that once was closely guarded, and make business decisions they were never required to make" (Frantz, et al., 2002, p. 40). Consequently, ERP systems are implemented as opposed to installed, which basically requires a paradigm shift throughout the organization.

According to Frantz, et al. (2002), Soh, et al. (2003), and Wognum, et al. (2004), because organizational change will occur and the organization cannot fully define the structure of the overall ERP implementation project as it is started, the implementation process becomes a dynamic process between the ERP package, the organization, and all the organizational members. Based on the experience of organizations that have gone through ERP implementation, the more an organization can determine and prepare for the anticipated change brought about by the ERP implementation process, the better the organization will respond to and deal with the overall change process (Soh, et al.; Trott & Hoecht, 2004). Furthermore, Al-Mashari (2003), Esteves and Pastor, and Trott and Hoecht reported that change management needs to be a continuous activity of any higher education institution prior to, during, and after the ERP implementation process. Finally, organizational changes need to be accompanied by transformational leadership behaviors as idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration so that those constituents highly involved in the ERP can develop a sense of trust, admiration, loyalty, and respect toward the administration and project management leadership (Yukl, 2002). Clearly, organizations need to emphasize the organizational leadership actively addressing all the issues of change management brought on by an ERP implementation project.

Fit/Gap Analysis (Product and Organization Fit)

Closely associated with re-engineering efforts, best practice evaluations, and conducting business process analysis is the fit/gap analysis. According to Fui-Hoon Nah (2003), Kvavik & Katz (2002), Luo and Strong (2004), and Songini (2003), a fit/gap analysis is the evaluation and determination of what an organization wants to accomplish

with an ERP system and how it can actually be accomplished with the software from the ERP system. Luo and Strong and Songini further reported that a fit/gap analysis is essential to ensure that the re-engineering, best practices, and business process analysis efforts conducted by an organization are maximized with the appropriately selected ERP vendor solution.

A fit/gap analysis is performed to determine the strengths and shortcomings of the ERP system against institutional requirements. Arif, et al. (2004) reported that the fit/gap analysis needs to be conducted with all potential vendors to learn what, if any, customizations might need to be made with the ERP solution. From a historical standpoint, gaps exist between the functionality of the ERP package and the functionality required by the organization implementing the ERP package (Gattiker & Goodhue, 2005; Soh, et al., 2000). The fit/gap analysis will be unique to each higher education institution because of the differences that prevail at each institution. According to Kvavik and Katz (2002), a fit/gap analysis needs to be conducted in most higher education institutions so that each organization knows where it stands in relation to the technology supporting all the business and functional processes. Upon completion of a fit/gap analysis, organizations must be ready and willing to change administrative processes to fit the assumptions built into the ERP vendor software or be willing to customize the ERP vendor software (Frantz, et al., 2002; Gattiker & Goodhue; Luo & Strong, 2004; Soh, et al.).

Gattiker and Goodhue (2005) suggested that the first step organizations should take once the fit/gap analysis has been conducted is to adapt the organizational business and functional processes to the functionality of the new ERP system. The ERP system

becomes the driving force of how the business and functional processes are defined and altered from the existing processes. The assumptions of the purchased ERP system become the driving force for the ultimate business and functional processes.

The second step, according to Gattiker and Goodhue (2005), is to accept the specific shortfalls of the ERP system functionality and alter the way the organization will conduct business practices. Even though the ERP system will not meet the functionality desired by the organization, the limitations of the ERP system are accepted and permitted to drive the operational processes. This option is commonly referred to as organizational compromise.

Developing systematic or manual workarounds to provide desired functional processes is the third step after a fit/gap analysis (Gattiker & Goodhue, 2005). In essence, this option is also a compromise to the organization; however, the end result is the organizational requirements are still met but using different methodologies. Systematic workarounds require interfaces to be developed and deployed, which have obvious upfront costs and likely extended costs of maintaining the workarounds. In addition, manual workarounds generally require changes to how things are done, which is a matter of training and changing existing workflow processes (Al-Mashari, 2003).

The fourth step after the fit/gap analysis, according to Gattiker and Goodhue (2005), is to customize the ERP system to meet the organizational desired and required business and functional processes. Customization can be at the edge of the ERP system, but customization can also impact and have consequences on the core of the ERP system and structure. The advantages and disadvantages of utilizing customization were addressed earlier.

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Finally, the last step following the fit/gap analysis is for an organization to investigate third party products and applications that already interface with the specific ERP system obtained by the organization (Gattiker & Goodhue, 2005). This is a viable option if interfaces can be found; however, where no interfaces can be found, one of the other options of addressing gaps between the organizational requirements and system requirements of the ERP system must be investigated. For any ERP implementation project to be successful, prior to making ERP vendor and package decisions, organizations would be well served to execute a fit/gap analysis between the organizational business and functional processes and the ability of the individual ERP systems to meet those requirements (Luo & Strong, 2004).

<div align="center">Drawbacks, Pitfalls, and Shortcomings</div>

Not every ERP implementation is 100% successful. Even though ERP implementations often become operational, many of these implementation projects are completed at the expense of addressing any given number of issues and concerns that have undesired consequences and impact upon the organization (Fui-Hoon Nah, 2003; Nicolaou, 2004; Siau & Mesersmith, 2003). Many organizations reported that the expected and anticipated benefits and advantages of purchasing and implementing an ERP system are elusive and may never fully be realized (Al-Mashari, 2003; Fowler & Gilfillan, 2003; Soh, et al., 2003; Trott & Hoecht, 2004; Wognum, et al., 2004). The drawbacks, pitfalls, and shortcomings naturally associated with ERP implementation projects may not be an issue to every organization, but organizations must give attention to those factors that can prevent the successful ERP implementation project.

According to Arif, et al. (2004) and Trott and Hoecht (2004), ERP systems are expensive to install, large and complex, difficult to maintain, and consume large blocks of time to install and make fully operational. Dong-Gil Ko, et al. (2005) identified some of the specific reasons causing less than successful ERP implementations that include lack of in-house expertise and experience, poor employee retention, and difficulties keeping up with technologies (software and hardware). The literature also indicated that communication difficulties are a major impediment to ERP implementations, especially when the different functional and departmental entities need to share knowledge and understanding of data and information requirements across the organizational infrastructure (Dong-Gil Ko, et al.; Fowler & Gilfillan, 2003; Soh, et al., 2003; Trott & Hoecht). Moreover, those individuals involved with the ERP implementation may not be qualified to do what they have been tasked to do. Besides staff not being qualified for an ERP implementation, often the number of individuals dedicated to the project is insufficient to implement the new ERP system in a timely fashion and yet maintain existing systems (Al-Mashari, 2003; Wognum, et al., 2004). Attention must be given to that fine line of not over-tasking staff to implement a new integrated system while maintaining the existing system and doing so at a fair and equitable compensation.

Other factors can impede an ERP implementation project. Organizations do not realize that putting the ERP application into production is not the end of the story, but rather just the beginning. It is not uncommon for benefits of an ERP system not to be realized until several years after the primary implementation (Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005; Trott & Hoecht, 2004; Wognum, et al., 2004). In addition, the initial implementation pertains to the main modules while other minor systems and

sub-systems are installed at a later time after the overall ERP package has been in a production mode for a period of time. There is also the need to stay on top of the constant major and minor updates and patches released for all the modules associated with the ERP system.

Organizations fail to understand and anticipate the on-going costs associated with an ERP implementation (Arif, et al., 2004; Gattiker & Goodhue, 2005; Fowler & Gilfillan, 2003; Soh, et al., 2003). For example, accommodations for training are a constant requirement with any ERP system because of the many technical and functional changes that transpire in the life of an ERP package (Nicolaou, 2004; Trott & Hoecht, 2004). Another example is the annual cost associated with support and maintenance contracts, which allow organizations to maintain current version levels of all ERP system components, maintain federal and state mandated changes, and obtain technical and functional support for the ERP package (Soh, et al., 2003; Yakovlev, 2002). It is not uncommon for the cost of the support and maintenance to be a percentage of the price paid for the ERP system or a percentage of the current ERP list price. According to Fowler and Gilfillan, another unanticipated on-going cost is the expense associated to keep the ERP system fully functional. With the technologies in place today and the continual changes in technology, replacement of servers occurs on a more frequent basis than in the traditional mainframe world (Dong-Gil Ko, 2005; Lou & Strong, 2004; Sawyer & Southwick, 2002). In addition, on-going direct and indirect costs are associated with developing interfaces and purchasing third party systems designed to work in conjunction with the core of the ERP system. Gattiker and Goodhue (2005) reported that as a result of the misalignment or misfit of organizational requirements and the

functionality of the ERP package, it is not uncommon for departments to want more functionality with an internally developed interface or third party add-on product, which can be costly to maintain over the long run.

Organizations often do not anticipate the dip in performance immediately following the initial implementation of an ERP system (Arif, et al., 2004; Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005). Despite appropriate levels of training, the transition to a new system includes a level of overhead as users become acclimated with the new system. The drop in performance varies from organization to organization, but can be compounded with any turnover in the technical and functional staff (Yakovlev, 2002). A contributing factor to the dip in performance is the expected impact and change on the organizational culture, norms, and values (Wognum, et al., 2004).

Once an ERP vendor and package is selected, purchased, and implemented, the organization essentially becomes married to the vendor, which is known as supplier lock-in (Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005). It is very difficult to migrate from one ERP vendor package to another, especially given the financial implications. Vendors tend to be great to work with during the courtship, which is that time the decision to purchase a product is in progress; however, sometimes vendor responses deteriorate with existing customers over a period of time in order to focus on obtaining new customers (Nicolaou, 2004). Therefore, it is very important to select the best vendor before purchasing an ERP system because of the significance of the organization and vendor relationship.

Organizational requirements and functionality of the ERP system are not always compatible (Al-Mashari, 2003; Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005; Soh,

et al., 2003). According to Luo and Strong (2004), there will be misfits between organizational processes and the ERP system being implemented. Luo and Strong further reported that the options of dealing with the differences between what is desired by the organization and what can be done by the ERP system frequently are each very different. Typically each option will have a set of consequences. Regardless of the options an organization chooses to address the incompatibilities between organizational requirements and functionality of the ERP system, how each organization responds to the re-engineering efforts and business process analysis will impact the overall effectiveness and efficiency of the implementation project and the functionality of the ERP system (Arif, 2004; Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005).

One major complaint of ERP implementations as reported in the literature is in the area of report deficiencies (Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005; Soh, et al., 2003). Many of the pre-defined reports delivered with an ERP system are very generic in nature and must be flexible in meeting the reporting needs of the many organizations that may use the reports. The consequence is that organizations must either re-write existing reports or develop their own reports in response to specific organizational needs (Luo & Strong, 2004). In either case, particular attention should to be given to documenting details for creating new reports and the modifications made to existing reports. Luo and Strong further reported that as new versions of the ERP system are released, all reports that have been created or changed will need to be evaluated against each new update or upgrade of the ERP system. One other factor pertaining to reports is that often the needs for the report are immediate; however, the emphasis on investigating report requirements was not sufficient in the planning stages of the ERP

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implementation project (Soh, et al.). Organizations must start early in the process to obtain report requirements from all the various users that will be utilizing the new ERP system.

Organizations oftentimes do not take the opportunity and time to complete the organizational business analysis and re-engineering processes against the existing organizational business and functional workflows (Al-Mashari, 2003; Fowler & Gilfillan, 2003; Nicolaou, 2004; Wognum, et al., 2004). When organizations do not engage in these change management activities, the resulting ERP implementation generally misses out on the opportunities to make the organization more effective and efficient in how business and functional processes are handled (Fowler & Gilfillan). The consequences of not engaging in business process analysis or re-engineering processes evaluation may not be encountered until months or even years after the initial stages of the implementation project are completed (Soh, et al., 2003).

Organizations fail to weigh the impact of an ERP implementation on the organization from the perspective of organizational values, norms, and culture (Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005; Soh, et al., 2003). Every organization has formal and informal values, norms and cultures, and the more these organizational characteristics can be considered and addressed prior to and during the ERP implementation, the higher the levels of success associated with the implementation project. Change management is a critical component when it comes to organizational characteristics exhibited by constituents. Organizations that let happen-chance direct organizational values, norms, and culture generally are not as strong, secure, and as

successful as those organizations that actively and openly engage in activities that enhance and support these organizational characteristics (Fowler & Gilfillan).

There are other drawbacks, pitfalls, and shortcomings associated with ERP implementation projects. The point that needs to be made is that according to the literature, organizations need to be aware of those factors that can, and will, impact the success of an ERP implementation project (Al-Mashari, 2003; Soh, et al., 2003; Trott & Hoecht, 2004; Wognum, et al., 2004). As a result, organizations should take the steps and initiatives to ensure the success of an ERP implementation project.

Other Successful Implementation Attributes and Characteristics

There is no specific methodology or framework that will ensure a successful ERP implementation; however, there are a number of factors and criteria identified that should be a part of any implementation project (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Trott & Hoecht, 2004). No one installation and implementation methodology can guarantee a full, or partially, successful ERP implementation project. Therefore, multiple installation and implementation methodologies should be utilized in unison with one another to address the issues and concerns of an ERP implementation project.

According to Frantz, et al. (2002) and Yakovlev (2002), any ERP implementation project must be fully endorsed, advocated, and supported by the top executives of the organizational hierarchy, including the Chief Executive Officer; otherwise, full or partial success of the ERP implementation project are at risk and in jeopardy. When the executive level of the organization is not behind the ERP project, buy-in by the organizational participants is not likely to occur (Siau & Mesersmith, 2003). Siau and Mesersmith further reported that the dynamics of the organization can take over when

executive leadership is not behind an ERP implementation project, which can result in ERP implementation project participants being at odds with one another and resulting in major problems with the overall ERP implementation project.

Communication was identified to be a critical success factor for an ERP implementation project (Dong-Gil Ko, et al., 2005; Fowler & Gilfillan, 2003; Kock, 2002; Kvavik & Katz, 2002; Soh, et al., 2003). The implication is that knowledge transfer will occur from those who know the ERP system to those who are learning the ERP system. Assumptions about communications cannot be made, but rather active approaches that direct the guidelines and expectations of communication channels and processes are very important. According to Dong-Gil Ko, et al., communication competence is important to managing the conflicts that arise in an ERP implementation project. Dong-Gil Ko, et al. and Katzenbach and Smith (1993) further reported that team relationships are enhanced with increased communication strategies. With the importance placed on teams for an ERP implementation project, communications cannot be taken for granted.

A number of obstacles can arise in an ERP implementation project, many of which have already been identified. The key is to identify and address the misfits as early as possible in order to implement strategies to address the misfits (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Soh, et al., 2000; Trott & Hoecht, 2004). Luo and Strong further reported that to set the stage for a successful ERP implementation project, organizations should proactively address those misfit issues that can negatively impact the ERP implementation project and the overall success of the project. Again, happen-chance processes and procedures will result in problems throughout the organization during an implementation project as well as after an ERP implementation project is

completed, which assumes the implement project will be a success, but in reality will fall very short of being successful (Soh et al.).

Trott and Hoecht (2004) identified several factors that are essential for a successful ERP implementation project, which include the integration of the ERP system into the corporate strategy, involvement of business managers in the ERP selection process, involvement of users in the acceptable and adequate training program to support the implementation process, and a federated process. Trott and Hoecht further reported that each organization should evaluate these factors as they apply to their specific environment. Although many options exist in how organizations can address these factors within the organization, emphasis is placed on ensuring the factors are considered throughout the ERP implementation plan as each factor applies to that organization.

Thus, implementing an ERP system within any organization is a very complex project. Many of the problems associated with the implementation process appear to be human and organizational in nature (Wognum et al., 2004). Organizations must engage in activities that force the organization to investigate, evaluate, and involve elements of organizational change throughout the entire ERP implementation project. Leadership of change management is a key to successful ERP implementations.

<div align="center">Lessons Learned from the Literature</div>

Existing Staff

A search of the literature identified a number of lessons that should be learned from other educational institutions that have conducted ERP implementations. One common theme is the need to take care of new and existing staff through compensation and benefits (Kvavik & Katz, 2002, Swartz, 2000; Wognum et al., 2004). As reported by

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Kock (2003) and Kvavik and Katz, one tool necessary to take care of the existing staff is to back-fill positions so that existing staff can be dedicated to the ERP implementation. It is one thing to expect employees to buy into the ERP implementation, but it is another issue to expect employees to continue to do all existing work and still find the time to implement an ERP solution. Taking care of employees is critical. According to Kock, Kvavik and Katz, and Songini (2003), ERP implementations are complex and the biggest problems with such projects result from internal strife with employees. Wognum et al. reported that research since approximately 1994 revealed that technical problems account for 10% of the overall problems in an ERP implementation project while the remaining 90% of problems are associated in some capacity with human and organizational issues.

Training

One specific area on which to concentrate regarding employees is the amount and type of training provided by the organization (Kock; Kvavik & Katz; Songini, 2003; Swartz, 2001). Adequate money, time, and effort should be spent on training. According to Kock and Swartz, it is too easy to underestimate the true need and cost of training prior to the start of an ERP implementation. Kvavik and Katz reported that training is the most under-estimated cost and need for any ERP implementation. It is essential for knowledge transfer to occur between the vendor implementation training team and the institutional staff through training. Finally, because successful ERP implementation projects require change in and to organizational participants, it is imperative that the ERP implementation project be treated as a *people* project (Siau & Mesersmith, 2003).

Executive and Administrative Level Support

Another lesson identified as critical to address prior to the start of any ERP implementation is to have support from the top level administration (Kvavik & Katz, 2002; Swartz, 2000). When problems do arise, all members of the institution must know the top level administrators are supporting the project and will take whatever steps necessary to ensure success. Whether it is the top administration or an appointed steering committee with appropriate levels of power and authority, when issues or concerns are brought to light, appropriate decisions must be made, supported, and implemented from the top down (Frantz et al., 2002; Fui-Hoon Nah et al., 2003). Frantz further reported that it is essential that the staff dealing with the day-to-day functional processes have an opportunity to provide input and recommendations to the decision makers. Thus, top level leadership is essential for successful ERP implementations.

Scalability

Regarding higher education ERP implementations, the literature revealed the lesson learned of making sure an organization tests for the scalability of a proposed ERP solution before the implementation project starts (Kvavik & Katz, 2002). Institutions need to have a solid understanding of the direction of the ERP implementation prior to starting the implementation as opposed to once the implementation is underway. Kvavik and Katz further reported that in their research, scalability is one of the primary causes for ERP project difficulties. With the strong emphasis on web enabled services, another lesson learned is to make sure workstations and servers are configured to execute the web interfaces and core applications (Kvavik & Katz; Swartz, 2000). It is not a good thing to prepare for the deployment of an ERP solution only to find that workstations on the desk

of users will not execute the applications. In addition, a common fallacy is to be too lean

with server hardware upon deployment of ERP implementations (Arif, et al., 2004;

Swartz). Successful ERP implementations must have appropriate levels of hardware at

the server and workstation levels.

Adequate Project Plan

The use of fully developed and adequate project plans for the ERP

implementation is a lesson learned from the literature (Fowler & Gilfillan, 2003; Kvavik

& Katz, 2002; Soh et al., 2003). Kvavik and Katz stated that no plan or a bad plan will

spell doom for an ERP implementation. Planning is closely tied to leadership, which was

identified earlier as a key concept for ERP implementation success. Project plans must be

comprehensive and be supported with strong project teams (Frantz et al., 2002; Fui-Hoon

Nah et al., 2003; Katzenbach & Smith, 1993; Kvavik & Katz, Swartz, 2000; Siau &

Mesersmith, 2003; Ying & HeuyWen, 2005). In addition, it is important for organizations

to choose the right consultants for the ERP implementation project with the expectation

that the skill, experience, and knowledge of consultants will be transferred to

organizational participants (Haines, 2003).

Vendor Contract

A further lesson learned by higher education institutions who have conducted

ERP implementations is the actual contract between the institution and the selected

vendor (Fowler & Gilfillan, 2003; Kvavik & Katz, 2002). Everything associated with the

ERP implementation project must be in writing and clearly understood by all parties

involved. Contracts should address issues such as the cost of the base product, add-ons,

consultants, services, support contracts, training, fines, additional fees, etc. (Arif et al.,

2004). One contract option to consider is the use of a fix-price contract for the

aforementioned items. Generally speaking, contract responsibilities should be left to

individuals skilled in contract negotiations and to the legal staff to ensure a quality

contract (Fowler & Gilfillan).

Organizational Transformational Changes

Emphasis and attention must be placed on the impact and change of an ERP

implementation project as it applies to the organizational norms, values, and culture (Al-

Mashari, 2003; Fowler & Gilfillan, 2003; Fui-Hoon Nah et al., 2003; Luo & Strong, 2004;

Wognum et al., 2004). Transformational changes are now considered to be an expectation

of any ERP implementation project. Organizations will do well to take these

transformational changes into account and proactively manage the impact and

consequences of these transformational changes on the organizational norms, values, and

culture (Luo & Strong, Wognum et al.). Fowler and Gilfillan further reported that the

more the organizational participants can be involved in the change process, the higher the

level of success in the overall ERP implementation project. Perhaps the biggest factor to

be addressed by an organization moving into an ERP implementation project is the

change management at the leadership levels.

Other lessons can be learned from the experiences of institutions that have

completed an ERP implementation project. According to Frantz et al. (2002), higher

education institutions fundamentally do not have the financial and personnel resources to

cushion themselves from a failed ERP implementation project. Institutions would be wise

to conduct the appropriate research up front to make sure of the decisions associated with

all parts of an ERP implementation project. According to Arif et al. (2004), great caution

should be exercised in the decisions an organization makes regarding the change in business and functional processes that in turn necessitate changes in the ERP system itself. Although immediate needs may be met, changes and modifications to the ERP system are likely to be cumbersome and expensive to support in the future. Ultimately, customizations to the core of the ERP system will result in negative consequences sooner or later (Luo & Strong, 2004; Soh et al., 2003). Ying and HeuyWen (2005) reported that conflicts of interest between functional departments are common in ERP implementation projects. Defining, debating, and arguing over the owner of data, or the defined owner of the data, can result in significant scheduling delays, failure to keep the ERP project in budget, and low morale among project team members. According to Luo and Strong, decisions pertaining to technical and functional processes and modifications are frequently executed without appropriate consideration and input from line staff. The resulting consequences on the overall change management can have negative results. The bottom line is that any organization contemplating an ERP product installation and implementation project must spend adequate time and energy up front conducting appropriate research and knowing what the organization wants to accomplish through the project plan.

<div align="center">Summary</div>

There are many pieces to the ERP implementation puzzle. Identifying all the pieces of a puzzle is paramount when putting the puzzle together. In addition, there are several methodologies that can be followed when putting the puzzle together. There are no guaranteed right ways to conduct an ERP implementation; however, all of the pieces of the ERP implementation project must be identified and addressed when constructing

and executing the ERP implementation plan. Based upon the review of the literature, managing the changes that will occur in an organization is essential for the success of any ERP implementation project. Therefore, any higher education institution considering an ERP implementation must consider the costs, the benefits, the experiences of other institutions, potential pitfalls, impact on employees, and overall impact on the institution before engaging in an ERP implementation project.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Many aspects and attributes are associated with enterprise resource planning (ERP) implementation projects. Although the review of literature did not indicate any key factor(s) that absolutely guarantee the success of an ERP implementation project, the review of literature provided relevant information on those factors that have been proven to impact the success of ERP implementation projects. What factors are successful in an ERP implementation in one institution may or may not be successful factors for an ERP implementation project in another institution. Future ERP implementation projects will benefit from the additional evidence indicating specific factors that were critical to the successful implementation of an ERP implementation project. The more that can be understood about those specific factors, the higher the expectation of a successful ERP implementation project. This research project was created with the intent to compare the findings of several higher education institutions that engaged in an ERP implementation project against the review of literature and to focus on specific key factors that are thought to be more important in leading to successful ERP implementations.

Problem and Purposes Overview

ERP implementation projects in higher education have grown significantly over the last 10 to 15 years. According to Wognum et al. (2004), research since 1994 revealed that technical problems account for only 10% of the overall problems in an ERP implementation project while the remaining 90% of problems are associated in some capacity with human, organizational, and leadership issues. ERP systems continue to be

one of the fastest growing segments of the information technology market. Annual sales

of ERP systems increased by over 150% each year during the calendar years of 2000

through 2005 inclusive, and during that same time frame, over $31 billion was spent on

the implementation of ERP systems (Dong-Gil Ko, Kirsch, & King, 2005). In addition,

the current expenditure of budgeted and non-budgeted funds on ERP system

implementations is considered the single largest information technology investment made

by higher education institutions (Kvavik & Katz, 2002). Finally, higher education

institutions, more than ever, demand and rely on more detailed levels of information that

is used in making decisions that impact the many constituents of the higher education

environment (Fui-Hoon Nah, 2003). Therefore, it is imperative appropriate information

be obtained by institutions that can be used to help ensure the success of an ERP

implementation project.

Although many reasons exist for the growth in ERP systems, the core emphasis

on ERP implementation projects is primarily on processes of re-engineering, business

process analysis, best practice analysis, and utilization of transaction processing systems

(Dong-Gil Ko et al., 2005; Fui-Hoon Nah et al., 2003; Holsapple & Sena, 2003; Nicolaou,

2004; Trott & Hoecht, 2004; Yakovlev, 2002). In other words, the goal is to be more

effective and efficient in processing data elements and then utilizing those relational data

elements available to make decisions that are in the best interest of the organization or

institution. A tremendous financial commitment is involved in any ERP implementation

project. Although many costs of an ERP implementation project may be known up front,

there are many unanticipated and unbudgeted costs often associated with ERP

implementation projects (Arif et al., 2004; Gattiker & Goodhue, 2005; Fowler & Gilfillan,

2003; Soh et al., 2003). Again, appropriate efforts, consideration, and planning must be incorporated in the ERP implementation project as it relates to the advances in technology. The logical conclusion is that an ERP system will provide the basis and foundation for any organization to meet data requirements for current and future decision making purposes. However, getting from the starting point to the desired end results can be accomplished in any given number of ways. Unfortunately, in all too many cases, the end point is never reached. This research project was developed so that the information can be shared with the leadership of other organizations contemplating an ERP implementation purchase and installation project. In addition, the role and impact of change management on the organizational structure and the organizational culture, values, and norms through the ERP implementation process and in the first 18 to 36 months following completion of the formal scheduled close of the ERP implementation project was explored. In any organizational environment, which includes higher education, no other single item or event can change the organizational structure and organizational culture, norms, and values as dramatically as an ERP implementation project, which has both direct and indirect impact on the direction of the organization at many different levels (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Trott & Hoecht, 2004).

Thus, the intent of this case study research project was to contribute to the body of knowledge pertaining to ERP implementations that can benefit other higher education institutions in their quest to evaluate, purchase, install, configure, and implement an ERP system package. This research project included a group of five Midwest 4-year public and private higher education institutions that completed their core ERP implementation project between January, 2006, and October, 2007. Information obtained from the ERP

implementation participants is based on the elapse of the aforementioned time as opposed to information gathered during or immediately after the implementation of the ERP system core modules. The intent is that the passage of time permits respondent input to be based on a more comprehensive evaluation of the overall implementation project. The general purpose of this research project was to share its results and outcomes with other institutional leaders who are evaluating an ERP implementation purchase and project or preparing to engage in an ERP implementation project.

<div align="center">Research Methodology</div>

Many factors provide the foundation for a successful ERP implementation project. A number of methodologies could be utilized to conduct this research project to better understand those factors that impact and influence an ERP implementation project; however, a multiple case study approach with qualitative and quantitative analysis was conducted. Learning and understanding the relationships and connections between those factors is important, especially from the focus of leadership and change management. In addition, learning and understanding how and why specific variables or factors impact each other as well as on the overall implementation process provides an opportunity to more fully understand what makes an ERP implementation project successful. Thus, for this research project, a methodology was utilized that consisted of both qualitative and quantitative components. According to Bogdan and Biklen (1997), there is value in combining outcomes from each methodology in order to collaborate and triangulate research findings. The qualitative and quantitative methodologies were designed to complement and validate each other.

A qualitative case study can be defined as the investigation and examination of a specific event (Bogdan & Biklen, 1997; Merriam, 1998). Merriam further reported that the best methodology to study an intrinsically bounded phenomenon is to utilize a qualitative case study. For this multiple case study research project, the ERP implementation project is the bounded phenomenon being studied. The intent of the researcher is to obtain appropriate information from those individuals most closely associated with the actual implementation tasks and consequences of leadership and change management decisions.

In conjunction with the qualitative portion of this research project, a quantitative component was utilized. According to Fowler (2004), "Quantitative research designs involve the collection and statistical analysis of numerical data" (p.310). The intent of the quantitative methodology for this research project was to provide some type of measure on those variables and factors pertaining to leadership and change management that impact implementation of an ERP system. In and of itself, qualitative data collected likely will not provide full insight into those factors and variables impacting an ERP implementation project. However, in collaboration with quantitative data collected, a better understanding may be obtained of the specific factors on the success of an ERP implementation project.

<center>Research Questions</center>

The research questions addressed by this research project all pertained to acquiring knowledge and comparing how the higher education institutions individually and collectively as a whole implemented the vendor purchased ERP system as measured against the many reported findings of ERP implementations obtained in the review of

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literature. Many of these factors are in essence an extension of institutional leadership and change management. The following research questions guided the study:

1. What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?

2. What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?

3. What were the results of investing the financial and human resources of the institutions into the ERP implementation project?

4. What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?

5. What, if any, steps were taken to prepare stakeholders for the changes in work functionality as a result of the ERP implementation project?

Population and Sample

Five 4-year public and private higher education institutions from the Midwest agreed to participate in this research project. The list of institutions was provided by the account representative of the ERP vendor whose application was selected and purchased by the researcher's home institution. These five institutions completed a full ERP system implementation between January, 2006, and October, 2007. The researcher obtained contact information for the primary ERP system contact person at each of the higher education institutions from the ERP vendor account representative. The researcher initially contacted those primary contact individuals via e-mail. The e-mail outlined the nature, purpose, and intent of the research project. The initial e-mail was followed up

with telephone calls to each higher education institution's representative to ensure the purpose, intent, and structure of the research project was understood. In addition, any questions or issues were addressed during these follow up conversations. Future communications were made via e-mail and telephone to work through the details of each higher education institution agreeing to participate in the research study.

One of the institutions of this research project was a four-year, state-supported institution that provides a variety of degree programs through the college of liberal arts and professional studies. Degree programs offered by the university include an associate's degree, bachelor's degree, master's degree, certificates of study, and a post-bachelor's certificate. The university is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. The university employs approximately 525 full time employees that include nearly 190 faculty and 335 professional and support staff. The headcount enrollment of the university is approximately 5,550 with over 98% of the students enrolled in undergraduate programs. The annual budget of the university is approximately $57 million. The university started their ERP implementation project in October, 2003, and completed implementation of the core modules in January, 2006. Prior to the ERP implementation project, administrative systems included a combination of home-grown application, purchased systems for specific offices and functions, and peripheral systems.

Another institution was a comprehensive university that offers 150 programs of study leading to an associate's degree, professional certificate, bachelor's degree, master's degree, education specialist degree, or cooperative doctorate. These areas of study include 10 pre-professional programs, 27 areas of teacher certification, and 37

graduate programs. The university is fully accredited by the Higher Learning

Commission of the North Central Association of Colleges and Schools. The university

employs approximately 1,325 full time employees, which consists of 375 faculty and 950

professional and support staff. Student headcount for the university is approximately

12,000. The annual budget of the university is approximately $120 million. The

university's ERP implementation project started in December, 2003, with implementation

of the last core module in June, 2006. Previous to the ERP implementation project,

administrative systems were hosted predominantly on an older mainframe system with a

combination of in-house developed applications and purchased applications for specific

needs. Interfaces were not established between the many systems that needed to share

data.

A third university for this research project started their ERP implementation in

May, 2004, and completed the last core module implementation in October, 2007. With a

student population of over 14,000 students, this institution offers over 113 different

degree programs that range from an associate's degree through a doctoral degree. The

university employs over 1,700 full-time employees with slightly more than 550 full-time

faculty and approximately 1,150 professional and support staff. The annual budget of the

university is over $132 million. The university is accredited by the Higher Learning

Commission of the North Central Association of Colleges and Schools. Prior to the ERP

implementation project, this university utilized custom in-house developed administrative

systems running on mainframe based technology for the different functional areas.

Although legacy systems were stable, the need existed to move to more current

technology and reduce dependence on the aging development group for critical maintenance knowledge.

The fourth institution was a private 4-year institution with more than 12,700 students. This institution offers over 85 undergraduate degree programs and 50 graduate degree programs. Approximately 62% of the student population is enrolled in undergraduate degree programs while the remaining students are engaged in graduate programs. Approximately 6,000 professional and staff members are employed at the university. In addition, another 2,200 faculty are employed by this private institution. The ERP implementation project for this institution commenced in January, 2003, and the last core module went into production in June, 2006. Prior to the ERP implementation project, administrative systems predominately consisted of purchased applications for each of the functional areas running on mainframe type legacy hardware. Operational expenses for the university in the previous fiscal year were approximately $550 million. The university is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools.

The final institution was a regional 4-year comprehensive liberal arts public university. With a student headcount of approximately 10,500 students, over 150 degree programs are offered by the university in associate's, bachelor's, and master's degree programs. The annual budget of the university is approximately $97 million. The university employs over 400 full-time faculty and approximately 900 full-time professional and support staff. The university is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. Prior to the ERP implementation project, this university maintained a series of in-house developed

applications in conjunction with supporting purchased applications dedicated to specific

functional areas and environments. The ERP implementation project was started in June,

2004. The final core module of the ERP system went live in March, 2006.

<div align="center">Data Collection, Instrumentation, and Analysis</div>

Data collected for this research project were obtained primarily from a survey

instrument. Background information for each higher education institution was obtained

from that institution's web site and from the designated institutional point of contact. The

survey instrument consisted of two components. The first component of the survey was a

series of questions using a Likert-type 5-point scale, and the second component of the

survey was a series of open-ended questions (see Appendix A). Both data collection

methods were designed to obtain information from the sample population specific to the

research questions. A quantitative analysis was conducted on the Likert-based questions

while a qualitative analysis was conducted on the open-ended questions. The qualitative

component of the research project was also designed for participants to offer a more

insightful view to the impact and consequences of change management at the operational

level upon the ERP implementation project and each individual, their department, and the

university as a whole.

The survey instrument was distributed using a web interface. An e-mail was sent

to the identified population sample that included Project Management Team (PMT)

members, functional and team leads, and the functional and technical implementation

team members. The e-mail included the URL address for the survey location and

authentication credentials. Survey participants were provided authenticated credentials to

ensure that only those individuals were able to access and complete the survey. In

addition, the collection process permitted an individual to enter survey data only once.

Data input via the web survey tool were collected, kept confidential, and not associated in

any way with the authenticated credentials. Data collected was identified at the summary

level for each institution. A period of one week elapsed after the initial e-mail was

distributed to the population sample with the request to complete the survey. After the

elapse of the one week, a second e-mail was distributed to the population sample

thanking those individuals that had already completed the survey and requesting those

individuals who had not yet completed the survey to please do so. The URL address was

again provided to the recipients of the e-mail so that when the link was clicked on, the

survey link would open up in a web browser. Another one week time frame was allowed

to pass before shutting down the web survey and collecting the data from the database

created from the web surveys. An e-mail was sent to a total of 165 different individuals

from the five participating institutions inviting them to participate in the research study

by completing the web survey. Overall, a total of 74 individuals completed the survey,

which translated into a survey return rate of 44.9% from the population sample.

Requirements of the web page for the survey instrument were defined by the

researcher (see Appendix B). The web page survey requirements were given to one of the

Web Masters of the researcher's home institution. The initial design of the web page and

interface to collect survey data was completed by a Web Master; however, the application

used by the web master was turned over to the researcher to ensure the survey was

accurate and complete. As part of building the survey on the web, an informed consent

statement was defined, which was the first information displayed when the survey web

link was accessed (see Appendix C). After reading the informed consent information,

individuals of the population sample had the option of continuing the survey or closing the web browser. Emphasis was placed on developing the web site in such a way that there was no ability to associate responses with who entered what data into the web-based survey. Therefore, access to the data and integrity of the data collection process was ensured and maintained.

The survey questions were designed to provide insight to specific research questions. Data for Research Question 1 were provided via survey questions 1, 2, and 14. Data for Research Question 2 were provided by means of survey questions 3, 4, and 15. Data for Research Question 3 were obtained from survey questions 5, 6, and 16. Data for the fourth research question were provided through survey questions 7, 8, and 17. Data for Research Question 5 were obtained through survey questions 9, 10, 11, and 18.

Data gathered from the survey instruments was evaluated from both a qualitative and quantitative viewpoint. Statistical analysis was conducted on survey questions 1 through 12. According to Merriam (1998), the very nature of educational research "thus makes it imperative that researchers and others have confidence in the conduct of the investigation and in the results of any particular study" (p. 199). Research questions and survey questions were created and based on the intent of the findings of this case study to match the reality of what it takes to successfully implement an ERP system under the direction and control of organizational leadership. In addition, the survey instrument was field tested on a group of individuals involved in the ERP implementation project in some capacity, although not specifically a part of any of the project teams. Ultimately, this case study research project tried to ascertain what characteristics, qualities, measures, and

steps, from a leadership standpoint were undertaken to achieve success in the overall goal of successfully implementing an ERP system from ground zero.

Summary

Implementation of ERP systems is not a new venture; however, existing research data identified certain factors that may lead to the success or failure of an ERP implementation project. Therefore, this multiple case study research project was designed to add to the existing body of information, as well as to identify the impact of change management by leadership on specific key factors thought to impact the successful implementation of ERP applications and systems. The general belief is that the more the institution as a whole, along with the campus leadership and project leadership, knows about factors that are instrumental to the success of an ERP implementation project, the better the chances for that institution to have a very successful implementation project.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

The purpose of this multiple case study research project was to obtain information on the impact of specific factors on the overall success of enterprise resource planning (ERP) implementation projects in the higher education environment. Although the review of literature provides information on factors that may have an impact on the success of an ERP implementation project, this research project focused more on specific key factors observed through the lens of change management that may have more of a positive impact on the overall success of any ERP implementation project. The specific factors investigated through this research project included (a) the identification and communication of goals, reasons, and expectations for engaging in an ERP implementation; (b) stakeholder understanding of values and benefits of entering into and completing an ERP implementation project; (c) the financial and human resource costs to complete an ERP implementation; (d) identification and consideration of factors and influences that can negatively impact an ERP implementation; and (e) actions and preparations taken to prepare the workforce for the changes in how work is accomplished after the ERP implementation when compared to how work was completed prior to the ERP implementation project.

Five public and private four-year universities were invited to participate in this research project. Each of these universities completed an ERP implementation project between January, 2006, and October, 2007. More specifically, the targeted population included those individuals who actively participated in the actual implementation of the

ERP system as a Project Management Team (PMT) member, Project Manager, functional team leader, technical team leader, module functional team member, or technical team member.

An electronic survey was designed to answer the research questions. The survey instrument was divided into two components. The first component of the electronic survey included 12 questions based on a 5-point Likert-type scale. These questions were targeted at the specific factors thought to have significant impact on the success of an ERP implementation project. The results of this part of the survey were analyzed using standard statistical quantitative analysis tools of count, mean, mode, standard deviation, and confidence. The second component of the survey was comprised of seven open-ended statements. The open-ended questions were designed to allow respondents to more freely express their opinions of the ERP implementation project at their respective university.

Findings from the survey will be presented in the remainder of this chapter. First, the data analysis will be presented. The descriptive characteristics of the respondents will then be presented. The last section of the chapter will be a summary of the data analysis.

<div align="center">Data Analysis</div>

Multiple survey questions were targeted for each research question. Quantitative data collected from the first component of the survey were analyzed using statistical tools of count, mean, mode, standard deviation, and confidence. The second component of the electronic survey consisted of open-ended statements. Qualitative data collected from the open-ended statements were first coded into categories, and a qualitative analysis conducted on the categories. Triangulation of the quantitative data and qualitative data

was conducted in order to validate and solidify research findings. Quantitative findings can provide a certain defined insight into the research questions of this study, and to a limited extent, the same is true of qualitative findings. However, the qualitative findings also offered a wider range of respondent input regarding their experience with the ERP implementation project. The intent was that the analysis of both sets of data offered a more complete picture of the ERP implementation project and how the defined key factors for this research project relate to the overall success of the ERP implementation project. The triangulation of quantitative data and qualitative data was conducted on each research question by comparing the outcomes of the quantitative data and the qualitative data against each other, and through an analysis of online resources for each university.

The success of the ERP implementation project at each institution was not assumed. Because the goal of this research project was to evaluate the impact of specific key factors on the overall success of an ERP implementation project, it was necessary to verify the successful completion of the ERP at each university. Therefore, several survey questions were designed to allow respondents to answer the question of whether or not the ERP implementation project at the respondent's respective university was considered successful.

<center>Description of Respondents</center>

Five higher education institutions were invited to participate in this research project. All five of the higher education institutions completed their ERP implementation projects between January, 2006, and October, 2007. Background of each higher education institution was presented in Chapter Three.

The target population included those individuals with active roles in an ERP implementation project. The roles of the target population included Project Management Team (PMT) members, project managers, functional team leaders, technical team leaders, module functional team members, or technical team members. Communications with each campus were conducted through a designated contact person. The names of the contact people were supplied by the account representative of the ERP vendor that sold the ERP system to the institution of the researcher. In all but one instance, the initial contact person at each university remained as the point of contact throughout the project. In all cases, the institutional contact person was part of the Information/Technology Service department. Campus contact information for the population sample from each university was initially provided either by the primary contact person for each campus or from documents posted on the public web page for each institution. The final list of respondents was validated by each campus contact person before the first e-mail was sent to the campus participants.

Table 1 provides information on the number of surveys distributed to the population sample of each institution and the number of surveys that were completed from each institution. An overall survey return rate of 44.9% was achieved from the defined population sample. It should be noted that two institutions had a much lower return percentage rate of 16.3% and 30.8% respectively as compared to return rates of 55.2%, 66.7%, and 58.1% from the other three institutions.

Table 1

Survey Return Rates by Institution

	Surveys		
Institution	Distributed	Completed	Return Rate
#1	29	16	55.2%
#2	36	24	66.7%
#3	31	19	58.1%
#4	43	7	16.3%
#5	26	8	30.8%
Totals	165	74	44.9%

Table 2 provides information on the role of the respondent by each of the higher education institutions. Consistently across each of the institutions, fewer surveys were returned by the roles of technical members of the ERP implementation teams as compared to the project management role and functional member roles. Two of the five ERP implementation roles were technical in nature. Of the surveys completed, 20.3% of the respondents (n=15) were in a technical role, 20.3% of the respondents (n=15) were in a project managements role, and 59.5% of the respondents (n=44) were in a functional role on the implementations teams.

Table 2

Institutional Responses by Role

Institution	Project Management	Functional Leader	Technical Leader	Functional Member	Technical Member	Totals
#1	7	1	2	2	4	16
#2	3	10	3	8	0	24
#3	3	6	3	6	1	19
#4	0	1	1	4	1	7
#5	2	5	0	1	0	8
Totals	15	23	9	21	6	74

Research Questions

Many factors can be involved in the success or failure of ERP implementation projects. Five research questions were designed to investigate ERP implementations in higher education with a focus on specific factors that were thought to be most critical to the overall success of ERP implementation projects. Leadership and change management processes were emphasized. The research questions that formed the foundation of this research project were as follows:

1. What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?

2. What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?

3.   What were the results of investing the financial and human resources of the

         institutions into the ERP implementation project?

4.   What, if any, steps were taken by the organizational leadership to prepare

         for and protect against potential drawbacks, pitfalls, and shortcomings of the

         ERP implementation project?

5.   What, if any, steps were taken to prepare stakeholders for the changes in

         work functionality as a result of the ERP implementation project?

Presentation of Data

A total of 165 surveys were distributed to members of ERP implementation teams

across five public and private four-year Midwest higher education institutions where an

ERP implementation project was completed between January, 2006, and October, 2007.

A total of 74 respondents completed a survey for a survey return rate of 44.9%. Appendix

D summarizes the raw data collected from the respondents on survey questions 1 through

12. Appendix D also provides the statistical information of mean, standard deviation,

mode, and confidence for each of these survey questions. In reference to the seven open-

ended questions on the survey, responses to survey questions 14 through 20 were much

lower than the responses received for survey questions 1 through 12. Approximately 50%

fewer respondents provided feedback to the open-ended statements as compared to the

Likert-type questions. A total of 517 individual comments were received. Table 3

provides a summary of the responses and results of survey questions 14 through 20.

Appendix E contains all individual comments submitted by the respondents to the open-

ended questions. To maintain privacy of the institutions, the reference to institutional

names entered by the respondents was removed and replaced with the word "institution."

Appendix F contains the coding categories from survey questions 14 through 20. In the

following paragraphs, data gathered from the survey instrument will be presented as it

relates to each of the research questions.

Table 3

Summarized Results of Open-Ended Survey Questions 14 through 20

Question	Respondents	% of all Surveys	Comments	Coded Categories
14	40	54.1%	79	10
15	44	59.5%	82	11
16	45	60.8%	89	11
17	36	48.7%	53	11
18	44	59.5%	59	12
19	42	56.8%	71	11
20	44	59.5%	84	11

Research Question 1

Survey questions 1, 2, and 14 were designed to address the first research question,

"What goals, reasons, and expectations of the ERP implementation projects were defined

and communicated to the campus communities?" Survey questions 1 and 2 used a 5-point

Likert-based scale while question 14 was an opened-ended statement seeking respondent

opinions. Table 4 and Table 5 contain the responses and percentage information for

survey questions 1 and 2 while, Table 6 contains information on the coded data for

survey question 14.

Survey question 1 asked, "On a scale of 1 to 5, with 1 being "Not defined" and 5 being "Clearly Defined," how would you rate the institution in defining the vision, expectations, and goals for the ERP implementation project to the campus community?" Of the 73 replies received on survey question 1, the average response on the Likert item was 3.67 with a mode of "3". The standard deviation was 1.055 with a confidence value of 0.240. The "4" and "5" value was selected by 54.0% of the respondents (n=40) on this survey question, while the "1" and "2" value was selected by 13.6% of the respondents (n=10). The remaining 31.1% of the respondents (n=23) selected the "3" value in relation to whether or not the vision, expectations, and goals of the ERP implantation project were clearly defined by the institution. One respondent did not complete this survey question. Every Likert-type question had at least one respondent that chose not to respond to the survey question.

Table 4

Survey Question 1

	Likert Scale Values				
	1	2	3	4	5
Count	1	9	23	20	20
Percentage	1.4%	12.2%	31.1%	27.0%	27.0%

Survey question 2 asked, "On a scale of 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective," how would you rate the effectiveness of overall

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communication from project leadership on the ERP implementation project?" For this

survey question, the average response of the 73 respondents was 3.27 with a mode of 3.

The standard deviation was 1.134 with a confidence value of 0.258. Respondents (n=30)

selected the "4" or "5" value 40.6% of the time, while 27.1% of the respondents (n=20)

selected the "1" or "2" value. Regarding this survey question of communication

effectiveness by project and campus leadership, 31.1% of the respondents (n=23) selected

the "3" value. One respondent did not answer this survey question.

Table 5

Survey Question 2

	Likert Scale Values				
	1	2	3	4	5
Count	3	17	23	17	13
Percentage	4.1%	23.0%	31.1%	23.0%	17.6%

Survey question 14 was an open-ended statement that read, "Describe what

visions, expectations, goals, and reasons were communicated to the campus community

for engaging in the ERP implementation project." Forty respondents submitted 79

different comments. Of the total 79 comments, 69 comments (87.3%) were included in

the major categories of automation of business processes, better and faster access to data,

better service to students and employees, comprehensive system integration, improved

accuracy and central database, new application would be better, and new technology. The

remaining 10 comments (12.7%) indicated no communication occurred or the feedback

was negative.

Table 6

Survey Question 14

Category	Count
Automation of business processes	7
Better/faster access to data	2
Better service to students	7
Comprehensive system integration	21
Improve accuracy/central database	16
Limited communication to campus	7
New application would be better	4
None	3
On time/on budget	3
New technology	9

Research Question 2

The second research question asked, "What did stakeholders perceive to be the

values and benefits of going through an ERP implementation project?" Survey questions

3, 4, and 15 were targeted to answer this research question. Survey questions 3 and 4

utilized a 5-point Likert-type scale while question 15 was an open-ended statement. Table

7 and Table 8 contain results for survey questions 3 and 4. Table 9 contains the information received on survey question 15.

Survey question 3 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value," how would you rate the value of the BPA/re-engineering processes?" The mean value from the 70 respondents was 2.80 with a mode of 3. The standard deviation was 1.044 with a confidence value of 0.238. The "4" or "5" value was selected by 23.0% of the respondents (n=17) while 33.8% of the respondents (n=25) selected the "1" or "2" value. The remaining 37.8% of the respondents (n=28) selected the "3" value. Four respondents (5.4%) did not respond to this survey question.

Table 7

Survey Question 3

	Likert Scale Values				
	1	2	3	4	5
Count	9	16	28	14	3
Percentage	12.2%	21.6%	37.8%	18.9%	4.1%

Survey question 4 asked, "On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective," how would you rate the effectiveness of implementing BPA/re-engineering outcomes throughout the ERP implementation project?" A total of 70 respondents submitted feedback with a mean response of 2.49 and a mode of 3. The standard deviation was 1.126 with a confidence of 0.257. Furthermore, 16.3% of the

respondents (n=12) selected the "4" or "5" value, and 46.0% of the respondents (n=34) selected the "1" or "2" value. The remaining 32.4% of the respondents (n=24) selected the "3" value. Four respondents (5.4%) did not submit a response to this survey question.

Table 8

Survey Question 4

	Likert Scale Values				
	1	2	3	4	5
Count	17	17	24	9	3
Percentage	23.0%	23.0%	32.4%	12.2%	4.1%

Survey question 15 was an open-ended statement that stated, "Describe the benefits and values of engaging in the ERP implementation project." A total of 82 different comments were received from 44 respondents. The results revealed 92.7% of the comments (n=76) described positive benefits and values of conducting an ERP implementation project. Benefits and values achieved from the ERP implementation project included: better service to students, central repository of data, compatible systems across functional lines, data-based decisions, defining and shaping processes, enhanced communications, enhanced reporting, real time access to data, sense of accomplishment, teamwork to complete the project, and updated technologies. The remaining 7.3% of the comments (n=6) indicated no benefits or value was received from the ERP implementation project.

Table 9

Survey Question 15

Category	Count
Benefits still evolving	3
Better service to students	5
Central repository of data	9
Compatible system crosses functional lines	9
Defining and shaping processes	21
Enhanced communications	6
Individual sense of accomplishment	4
New functional use of new system	10
No benefits	3
Teamwork to complete project	5
Updated technology	7

Research Question 3

Survey questions 5, 6, and 16 were designed to answer the research question, "What were the results of investing the financial and human resources of the institutions into the ERP implementation project?" Survey questions 5 and 6 utilized Likert-type questions with a 5-point scale, while survey question 16 was an open-ended statement. Table 10 and Table 11 summarize the data from survey questions 5 and 6. Table 12 presents the data collected from survey question 16.

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Survey question 5 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value," how you would you rate the investment of the institution's financial resources against the results and outcomes of the ERP implementation project?" Of the 73 surveys returned, the mean value was 3.78 with a mode of 3. The standard deviation was 0.975 with a confidence level of 0.222. The "4" or "5" value was selected by 55.4% of the respondents (n=41) and another 8.1% of the respondents (n=6) selected the "2" value. The "1" value was not selected by any respondent. The remaining 35.1% of the respondents (n=26) selected the "3" value. One respondent did not respond to the survey question.

Table 10

Survey Question 5

	Likert Scale Values				
	1	2	3	4	5
Count	0	6	26	19	22
Percentage	0.0%	8.1%	35.1%	25.7%	29.7%

Question 6 on the survey was similar to question 5 except that the focus of question 6 was on the investment of human resources rather than financial resources. Survey question 6 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value," how you would you rate the investment of the institution's human resources on the results and outcomes of the ERP implementation project?" Of the 72

surveys received, the mean was 3.64 and the mode was 4. The standard deviation was 1.154 with a confidence of 0.263. The "4" and "5" value was selected by 55.4% of the respondents (n=41). Another 14.9% of the respondents (n=11) responded with the "1" or "2" value. The "3" value was selected by 27.0% of the respondents (n=20) for this survey question. Two respondents did not submit a response to the survey question.

Table 11

Survey Question 6

	Likert Scale Values				
	1	2	3	4	5
Count	4	7	20	21	20
Percentage	5.4%	9.5%	27.0%	28.4%	27.0%

The last survey question designed to answer Research Question #3 was an open-ended statement, which stated, "Describe whether or not, and why, the results of the ERP implementation project were worth the commitment of the institution's financial and human resources." A total of 89 comments were received from 45 respondents for survey question 16. Of the 89 comments, 84.3% of the comments (n=75) indicated there was value and worth in the investment of financial and human resources into the ERP implementation project. Six comments indicated there was value or worth in the investment of financial and human resources, but no explanation was provided. Positive comments included gained value through a good system for improved functionality and

efficiencies, increased communications, increased productivity, integrated system, replaced obsolete and old systems, and improved services to students and staff. A total of 15.7% of the comments (n=14) indicated there was little or no worth in the investment of both financial and human resources of the ERP implementation project. Of these 14 comments, over one-third stated no focus, consideration, or attention was given to the efforts of staff engaged in the ERP implementation project.

Table 12

Survey Question 16

Category	Count
Improved functionality/efficiencies	20
Increased communication	5
Increased productivity	7
Integrated system	12
No focus/recognition of staff	5
Not worth costs – no explanation	2
Not worth costs – other	7
Replaced obsolete/old systems	9
Services to students and staff	9
Worth costs – no explanation	8
Worth cost – other	5

Research Question 4

Survey questions 7, 8, and 17 were designed to answer the fourth research question. Research question 4 asked, "What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?" Survey questions 7 and 8 utilized a Likert-type 5-point scale. Survey question 17 was an open-ended statement. Table 13 and Table 14 contain the data for survey questions 7 and 8, and Table 15 contains the data for survey question 17.

Survey question 7 asked, "On a scale from 1 to 5, with 1 being "No Change" and 5 being "Extreme Change," how would you rate the degree of change when comparing how business was conducted before the ERP implementation project and after the ERP implementation project?" The mean value of the 74 surveys submitted was 3.90 with a mode of 4. The standard deviation was 0.802 with a confidence of 0.183. The data revealed that 73.0% of the respondents (n=54) selected the "4" or '5' value. Another

Table 13

Survey Question 7

	Likert Scale Values				
	1	2	3	4	5
Count	0	4	15	38	16
Percentage	0.0%	5.4%	20.3%	51.4%	21.6%

5.4% of the respondents (n=4) selected the "1" or "2" value. The remaining 20.3% of the respondents (n=15) selected the "3" value for this survey question. One respondent did not complete this survey question.

The focus of survey question 8 was on the potential negative consequences of the ERP implementation project. Survey question 8 asked, "On a scale from 1 to 5, with 1 being "Not Effective, and 5 being "Highly Effective," how would you rate the steps and measures taken to prepare for and protect against the potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?" Overall, 73 surveys were received with a mean response of 2.99 and a mode of 3. The standard deviation of survey question 8 was 1.161 with a confidence of 0.264. Of the respondents who answered the question, 29.8% (n=22) selected the "4" or "5" value, while 32.4% of the respondents (n=24) selected the "1" or "2" value. The remaining 36.5% of the respondents (n=27) selected the "3" value. One respondent did not reply to the survey question.

Table 14

Survey Question 8

	Likert Scale Values				
	1	2	3	4	5
Count	8	16	27	13	9
Percentage	10.8%	21.6%	36.5%	17.6%	12.2%

Survey question 17 stated, "Describe any step or measure taken to protect you and the campus community from any potential drawback, pitfall, and shortcoming of engaging in the ERP implementation project." Input was received from 48.7% of the total respondents (n=36) with a total of 53 comments. Seventy-four percent of the comments (n=37) indicated effective steps were taken to protect against potential pitfalls, shortcomings, and drawbacks of an ERP implementation, and the remaining 26.0% of the comments (n=16) stated no effective steps were taken. Categories of the effective steps

Table 15

Survey Question 17

Category	Count
Allocation of staff	3
Creation of dedicated implementation teams	2
Funding for consultants	3
Increased workloads not addressed	5
Keeping focus on goals	4
No steps taken	8
Regularly scheduled meetings/communication	9
Some issues not addressed	3
Testing during all phases	3
Training	6
Yes – other	7

taken to address the negative consequences of an ERP implementation project included

allocation of staff, constant monitoring of the project, creation of appropriate

implementation teams, funding allocated for consultants, keeping focus on goals,

regularly scheduled meetings and communications, testing during all stages, and training.

Of the comments pertaining to non-effective steps taken to guard against the negative

consequences of ERP implementation projects, the categories included increased

workloads not addressed, no steps taken, and some issues not addressed.

Research Question 5

The final research question was, "What, if any, steps were taken to prepare

stakeholders for the changes in work functionality as a result of the ERP implementation

project?" Survey questions 9, 18, and 19 were designed to address this research question.

Survey question 9 utilized a 5-point Likert-type question format. Survey questions 18 and

19 were open-ended statements. Table 16 presents the data associated with survey

question 9, and Tables 17 and 18 contain the information for survey questions 18 and 19.

Survey question 9 asked, "On a scale from 1 to 5, with 1 being "Not Effective"

and 5 being "Highly Effective," how would you rate the institution's effectiveness of

preparing the campus community for the change on the organizational structure and

culture resulting from the ERP implementation project?" The mean of the 72 responses to

this survey question was 2.97 with a mode of 3. The standard deviation was 1.048 with a

confidence of 0.239. Of data returned, 25.7% of the respondents (n=19) selected a "4" or

"5" value, while 31.1% of the respondents (n=23) selected the "1" or "2" value for this

survey question. The remaining 40.5% of the respondents (n=30) selected the "3" value

in their opinion of the effectiveness of their institution in addressing issues of

organizational change and changes to the culture of the organization. Two respondents did not complete this survey question.

Table 16

Survey Question 9

	Likert Scale Values				
	1	2	3	4	5
Count	5	18	30	12	7
Percentage	6.8%	24.3%	40.5%	16.2%	9.5%

The open-ended statement for survey question 18 stated, "Describe any operational change or impact upon your position responsibilities that occurred as a result of the ERP implementation project, and how you were prepared for any of the changes as a result of the ERP implementation project." Input from 39 respondents yielded 59 different comments pertaining to how the institutions handled change in the workplace and to the workload. Furthermore, 57.6% of the comments (n=34) provided input that the university took steps to prepare for change brought about by the ERP implementation project, while 42.4% of the respondents (n=25) indicated the university took no steps to prepare for change. The data indicated the effective steps taken by the institution to prepare the campus for change included access to real-time data, training, active monitoring of systems, assignment of data ownership, changes of positions and duties, regular meetings and communications, single entry of data, and staff encouraged to be

engaged. Respondent comments that indicated no steps were taken to prepare for operational change or cultural change as a result of the ERP implementation project included increased workloads not addressed, no consideration for staff and extra hours, not enough done, not enough time for training, and preparations not provided.

Table 17

Survey Question 18

Category	Count
Access to real time / accurate data	4
Access to training	5
Assigning data ownership	2
Change of position / duties	8
Changes – other	6
Increased workloads not addressed	4
No consideration of staff & extra hours	4
None	8
Not enough done	5
Preparations not provided	4
Regular meetings / communications	6
Staff encouraged being engaged	3

Survey Question 19 asked respondents to reply to the statement, "Describe any steps and actions taken to ensure the success of the ERP implementation project." Of the

74 surveys submitted, 42 respondents (56.8%) completed this survey question. A total of

71 comments were received from the 42 respondents. Of the comments received, 97.2%

(n=69) outlined positive steps and actions taken to ensure the success of the ERP

implementation project, which included the categories of administrative support,

appropriate implementation time lines, appropriate levels of funding and staff, building

project document and planning, invested hard work, regular meetings and communication,

teamwork and joint efforts, testing, training, and use of dedicated consultants. The

Table 18

Survey Question 19

Category	Count
Administrative support	2
Appropriate implementation time lines	3
Appropriate levels of funding / staffing	4
Building project document / planning	8
Invested hard work	9
None	2
Regular meetings / communication	13
Teamwork / joint efforts	11
Testing	4
Training	10
Use of dedicated consultants	5

remaining 2.8% of the comments (n=2) simply indicated no steps were taken to ensure

success of the ERP implementation project.

Successful ERP Implementation

What may be considered a successful ERP implementation to one person may

mean something else to another person. Therefore, survey questions 10, 11, 12, and 20

were designed to obtain specific information on the respondents' viewpoints of the

overall success of implementing the ERP application of choice across their campus.

Survey questions 10, 11, and 12 utilized a Likert-type question format with a 5-point

value range. Survey question 20 was an open-ended statement designed to allow

respondents to provide their input on the success or failure of the ERP implementation

project at their campus. Table 19, Table, 20, and Table 21 present the data for survey

questions 10, 11, and 12. Table 22 provides the data from survey question 20.

Survey question 10 asked, "On a scale from 1 to 5, with 1 being "Not Successful"

and 5 being "Highly Successful," how would you rate the overall success of the ERP

implementation project?" The mean from the respondents on this question was 3.93 with

a mode of 3. The standard deviation was 0.887 with a confidence of 0.202. A total of 62.1%

of the respondents (n=46) selected the "4" or "5" value. Another 2.7% of the respondents

(n=2) selected the "2" value. No respondent selected the "1" value. The remaining 33.8%

of the respondents (n=25) selected the "3" value on the Likert scale when considering the

overall success of the ERP implementation project. One respondent did not provide a

reply to the survey question.

Table 19

Survey Question 10

	Likert Scale Values				
	1	2	3	4	5
Count	0	2	25	22	24
Percentage	0.0%	2.7%	33.8%	29.7%	32.4%

Survey question 11 asked, "On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort," how would you rate your effort to ensure the success of the ERP implementation project?" This survey question was targeted at the respondent's efforts in the overall success of the ERP implementation project. From the surveys received, the mean for this survey question was 4.56 with a mode of 5. A total of 89.2% of the respondents (n=66) selected the "4" or "5" value. Only 2.7% of the respondents (n=2) selected the "2" value, and no respondent selected the "1" value. The remaining 2.7% of the respondents (n=2) selected the "3" value. A total of four respondents did not make any selection on this survey question.

Table 20

Survey Question 11

	Likert Scale Values				
	1	2	3	4	5
Count	0	2	2	21	45
Percentage	0.0%	2.7%	2.7%	28.4%	60.8%

While survey question 11 was geared to the participant's effort to ensure the success of the ERP implementation project, survey question 12 was aimed at the overall institution's effort to ensure a successful ERP implementation project. Survey question 12 asked, "On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort", how would you rate the overall institution's effort to ensure the success of the ERP implementation project?" The mean of this survey question was 3.90 with a mode of 4. The standard deviation was 0.853 with a confidence of 0.194. A total of 63.5% of the respondents (n=47) selected the "4" or "5" value. Once again, only 2.7% of the respondents (n=2) selected the "2" value, and no respondent selected the "1" value. Respondents selected the "3" value 32.4% of the time (n=24) when considering the institution's effort for overall success of the ERP implementation project. One respondent did not respond to this survey question.

Table 21

Survey Question 12

	Likert Scale Values				
	1	2	3	4	5
Count	0	2	24	26	21
Percentage	0.0%	2.7%	32.4%	35.1%	28.4%

Question 20 of the survey was an open-ended statement that said, "Describe your thoughts and opinions on the ERP implementation project and the overall success or failure of the ERP implementation project." A total of 84 comments were received from the 44 respondents. The data revealed 75.0% of the comments (n=63) received were positive about the success of the ERP implementation project, while 25.0% of the comments (n=21) reported negative issues and concerns with the ERP implementation project. No comments were received from any respondent who referenced the ERP implementation project was a failure. Categories pertaining to the positive aspect of the ERP implementation project included assignment of resources, commitment of staff, good administrative support, implementation was work in progress, increased productivity, individual sacrifices, sufficient knowledge required, and testing and training key elements. Categories of negative comments included disappointed in administrative support, implementation not complete and work in progress, inappropriate decision makers, limitations of application exists, and not enough resources.

Table 22

Survey Question 20

Category	Count
Commitment of staff	11
Disappointed in administrative support	4
Implementation not complete/work in progress	6
Inappropriate decision makers	2
Individual sacrifices	2
Limitations of application exist	3
Not enough resources	2
Hard / difficult Implementation	3
Success	38
Sufficient knowledge required	2
Testing and training keys	2
Other	9

Summary

There is no guarantee that any ERP implementation project will be successful. Therefore, this research project was constructed to obtain information on those specific key factors that may have a more defined and significant impact on the success of ERP implementation projects. Furthermore, the survey questions were designed to target responses that answered the research questions. Of the 165 individuals asked to

participate in this study, 74 respondents completed some portion of the survey, which

resulted in a return rate of 44.9%. In Chapter Five, the findings will be analyzed in light

of the research questions, conclusions will be presented, and implications of the research

project on ERP implementations in higher education will be discussed.

CHAPTER FIVE

FINDINGS, CONCLUSIONS, AND IMPLICATIONS

In Chapter One, the investigation into Enterprise Resource Planning (ERP) implementations in higher education was introduced. The purpose of this research project was outlined and the research questions defined. Chapter Two provided an in-depth review of literature as it applies to ERP implementations in all types of industrial, commercial, and educational environments. The research design and methodology was defined and presented in Chapter Three, which included the selection of the higher education institutions utilized in this research project. In Chapter Four an analysis of the data was conducted and presented. In Chapter Five, a summary of the research project will be provided, the findings discussed, conclusions presented, implications offered, and suggestions for future research projects will be given.

Research Project Summary

Rationale for Study

Engaging in an ERP implementation project is no small task. ERP implementation projects are expensive, complex, time consuming, consume significant levels of human and financial resources, and have a changing impact on nearly every facet of the organization (Arif, et al., 2004; Luo, & Strong, 2004; Sawyer & Southwick, 2002). The reliance and dependence on ERP systems has grown substantially since the early to mid-1990s, and today the purchase and implementation of ERP systems continues to be one of the fastest growing segments of the information technology sector (Luo & Strong). Many reasons exist for engaging in an ERP implementation project, including access to and

availability of real time data, centralized database, system integration across functional lines, improved efficiencies and productivity, web-based services, enhanced reporting, review of and implementation of best practices, automation of business process, and increased functionality (Al-Mashari, 2003; Arif, et al.; Esteves & Pastor, 2004; Gattiker & Goodhue, 2005; Holsapple & Sena, 2003; Kock, 2002; Kvavik & Katz, 2002; Mahil, 2004; Songini, 2003; Swartz, 2000). Organizations deploy ERP systems to make important and critical decisions using vital and timely knowledge from a central repository of accurate data that cuts through the organization's functional departments and environments (Arif, et al.; Holsapple & Sena).

The demands and requirements for purchasing, configuring, installing, and implementing an ERP system in a production environment cannot be taken lightly or for granted. Little room for error exists in order to achieve a successful, efficient, and effective ERP implementation given the investment of financial and human resources. In addition, any knowledge and information pertaining to an ERP implementation process that can be obtained from the experiences of other higher education institutions may be of great value and benefit to institutions that have not yet gone through an ERP implementation process. Therefore, the purpose of this research project was to provide additional information on ERP implementation projects so that those higher education institutions contemplating or engaging in their own ERP implementation project could learn from the ERP implementation experiences of other organizations. The general thought was that the more an institution knows about ERP implementations, the better prepared that institution will be to implement their own ERP system. Furthermore, the better prepared a higher education institution can be to conduct an ERP implementation

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project, the greater the chances of completing the ERP implementation project successfully.

Statement of Problem

The purchase of ERP systems is big business for those vendors offering their specific system solutions to higher education institutions. Tremendous marketing efforts and pressure are exhibited by vendors on potential clients to purchase the vendor's applications, products, services, and maintenance contracts (Arif, et al, 2004; Proctor & Williams, 2004). All ERP vendors want higher education institutions to succeed with the implementation of their ERP system, because the livelihood of the vendor is ultimately dependent upon the successful implementation of the ERP solution at each institution (Sawyer & Southwick, 2002; Trott & Hoecht, 2004). Higher education institutions require access to relevant and timely data that can be utilized to make the difficult decisions that will have consequences for the daily operations, structure, and culture of the organization (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Yakovlev, 2002). With the advances in technology, the expectation is that an ERP system will provide the required data for making decisions. As much as vendors want to sell their applications to higher education customers, institutional pressures already exist to implement an ERP system that will meet the current and future demands of the institution and its constituents.

Any institution engaging in an ERP implementation project must have clearly defined goals and expectations (Fui-Hoon Nah, et al., 2003; Kvavik & Katz, 2002). Institutions cannot haphazardly engage in an ERP implementation project, but instead should have a clearly defined road map and project plan. In addition, implementation of an ERP system is one of the single largest investments in terms of dollars and human

resources any institutions of higher education might ever embark upon (Al-Mashari, 2003, Dong-Gil Ko, et al, 2005; Holsapple & Sena, 2003). Because of this high cost level, an institution generally will have one chance to engage in an ERP implementation project, which increases the pressures and stakes for a successful implementation. Since a predefined methodology to guarantee the success of an ERP implementation project does not exist, it is imperative that institutions take the appropriate steps and measures to build the foundation for a successful ERP implementation project (Fui-Hoon Nah, et al.; Kvavik & Katz).

Research Questions

The research questions that form the foundation for this research project pertain to acquiring knowledge of how the higher education institutions implemented ERP system solutions purchased from an ERP vendor. The findings of this research project will be measured and compared to the reported findings of ERP implementation projects obtained from the review of literature. More specifically, key factors that appear to have more of a relationship and impact on the overall success of an ERP implementation project were investigated. The key factors used in constructing the research questions were the result of information obtained in the review of literature, which consisted of (1) the definition and communication of goals, reasons, and expectations; (2) stakeholders' perceptions of values and benefits; (3) investment of financial and human resources; (4) steps taken to prepare and protect against potential drawbacks, pitfalls, and shortcomings; and (5) measures taken to prepare stakeholders for changes in work functionality. Overall, the desire of this researcher was to contribute to the body of knowledge pertaining to ERP implementations to benefit other higher education institutions in their quest to

evaluate, purchase, install, configure, and implement an ERP system package successfully.

The research questions that guided this study were as follows:

1. What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?

2. What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?

3. What were the results of investing the financial and human resources of the institutions into the ERP implementation project?

4. What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?

5. What, if any, steps were taken to prepare stakeholders for the changes in work functionality as a result of the ERP implementation project?

Methodology

This research project was a multiple case study, which included five public and private four-year higher education institutions in the Midwest. Each of the institutions completed their implementation project between January, 2006, and October, 2007. The data gathering tool for this research project was a 20 question survey. Each survey question was designed to answer one of five research questions. Twelve questions of the survey utilized a 5-point Likert-type scale. One survey question was crafted to obtain the role of the each respondent in their respective implementation project. Seven survey questions were open-ended statements. A copy of the survey is provided in Appendix A.

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The targeted population sample for this research project was those individuals involved in the actual implementation of the ERP system at each of their institutions. Each participant served in a role as Project Management Team member, Project Manager, functional team leader, technical team leader, module functional team member, or technical team member.

<div align="center">Findings</div>

From the five higher education institutions that participated in this research project, 165 individuals were invited to complete an online survey. Out of this group, 74 completed the online survey for a survey return rate of 44.9%. Validation of the success of the ERP implementation projects will be discussed first. Then the findings for each of the research questions in turn will be discussed one at a time.

Successful ERP Implementation

The expectation of this research project is that the ERP implementation projects at the participating higher education institutions were successful. Survey questions 10, 11, 12, and 20 were designed to validate from the respondents' perspective the overall success of implementing the ERP application across their campus. Survey questions 10, 11, and 12 utilized a Likert-type 5-point scale. Survey question 20 was an open-ended statement seeking respondent input on the overall success of the ERP implementation project.

Survey question 10 asked, "On a scale from 1 to 5, with 1 being "Not Successful" and 5 being "Highly Successful", how would you rate the overall success of the ERP implementation project?" Of the 70 individuals who responded to this survey question, the mean was 3.93. A low standard deviation of 0.887 indicated the strength of the mean

<div align="center">115</div>

value, which strongly points to a "Highly Successful" ERP implementation project. Of the total responses received, 62.2% of the respondents (n=46) selected the "4" or "5" value. In addition, another 33.8% of the respondents (n=25) selected the "3" value indicating a level of success to the project. Another 2.7% of the respondents (n=2) selected the "2" value indicating the ERP implementation project has some level of success. No respondent selected the "1" value, which was represented on the Likert scale as "Not Successful." Clearly, from the viewpoint of the respondents, ERP implementation projects were considered very successful.

Survey question 11 targeted the respondents' personal efforts toward the ERP implementation project. Survey question 11 asked, "On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort", how would you rate your effort to ensure the success of the ERP implementation project?" It is interesting to note that out of the 74 respondents who completed a survey, four individuals did not answer survey question 11. Otherwise, 89.2% of the respondents (n=66) selected the "4" or "5" value, which included 60.8% of the respondents (n=45) selecting the "5" value, which represented "Extreme Effort" on the Likert scale. In addition, another 2.7% (n=2) selected the "3" value, which indicated a level of value to the effort provided by the respondents. Only two respondents selected the "2" value, indicating little personal effort was exerted on the ERP implementation project. No respondent selected the "1" value of "No Effort" being exerted. Therefore, nearly 92% of the respondents indicated some level of positive effort was exerted to ensure the success of the ERP implementation project. The mean was computed to be 4.56 with a very low standard deviation of 0.694. Clearly the data showed

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that, overall, respondents perceived their personal input towards the ERP implementation project to be with "extreme effort".

Survey question 12 was similar to survey question 11 except the focus was on the overall university effort as opposed to the personal effort. Survey question 12 asked, "On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort", how would you rate the overall institution's effort to ensure the success of the ERP implementation project?" Based on the data of the 73 replies submitted, the mean was 3.90 with a standard deviation of 0.853. A total of 63.5% of the respondents (n=47) selected the "4" or "5" value, while 32.4% of the respondents (n=24) selected the "3" value". An additional 2.7% of the respondents (n=2) selected the "2" value. Again, no respondent selected the "1" value of "No Effort" being exerted by the university to ensure the success of the ERP implementation project. With over 98% of the respondents indicating effort was expended, the data strongly indicated the university as a whole did what was necessary to implement the ERP system. It should be noted; however, that not as strong of an effort was reported at the university level as at the individual level. It is also interesting to note that the data collected for question 12 was nearly identical to that data collected for survey question 10, which again indicates a high level of overall success of the ERP implementation projects.

Survey question 20 was an open-ended statement that asked respondents to respond to the statement, "Describe your thoughts and opinions on the ERP implementation project and the overall success or failure of the ERP implementation project." Of the 74 surveys collected, only 59.5% of the respondents (n=44) submitted input. A total of 84 separate comments were submitted with 75.0% of the comments

(n=63) indicating the ERP implementation project was a success, or respondents provided input of the positive outcomes of the ERP implementation project. The remaining 21 comments expressed criticism of the ERP implementation project. However, it should be noted that no comments mentioned any aspect of a failed ERP implementation project. Data categories supporting a successful ERP implementation project included commitment of staff, good administrative support, implementation was a work in progress, increased productivity, individual sacrifices, sufficient knowledge required, and testing and training for key elements. Based on the data, all of the ERP implementation projects of this study were considered a success by the respondents.

Defining and Communicating Goals, Reasons, and Expectations

Survey questions 1, 2, and 14 were designed to provide answers to the first research question, "What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?" On the surface, this research question is quite simple; yet, the foundation of why an ERP implementation is being conducted should be firmly established with all institutional constituents. The key component of this research question pertained to defining and communicating appropriate goals, reasons, and expectations for engaging in an ERP implementation project to the campus community, including the implementation teams. The intent was to determine if this component had a more critical impact upon the chances of overall success on the implementation project. Survey questions 1 and 2 utilized a 5-point Likert-type scale. The first survey question focused on clearly defining the visions, goals, and expectations of the ERP implementation project while the second survey question focused on the communication factors. Survey question 14 was an open-ended prompt

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that allowed respondents to provide their specific input on the definition and communication of ERP implementation project visions, goals, and expectations.

Survey question 1 asked, "On a scale of 1 to 5, with 1 being "Not defined" and 5 being "Clearly Defined", how would you rate the institution in defining the vision, expectations, and goals for the ERP implementation project to the campus community?" The average response of survey question 1 was 3.62, which placed the mean response on the "Clearly Defined" side of the Likert-type scale, indicating an importance in defining the visions, goals, and expectations of the ERP implementation project as it relates to the success of the implementation project. In addition, 54.0% of the respondents submitted responses of either the "4" value (n=20) or "5" value (n=20). More than 31% of the respondents (n=23) selected the "3" value, which was more than any of the other values. In addition, another 12.2% of the respondents (n=9) indicated there was a level of defining and communicating the visions, goals, and expectations of the ERP implementation project. Only one person indicated the visions, goals, and expectations of the implementation project were "Not Defined". The data indicated that 85.1% of the respondents indicated the vision, expectations, and goals were defined and communicated to the campus community in a relatively clear capacity. The data strongly suggested the overall perception of the visions, goals, and expectations of the ERP implementation project were important to the success of the ERP implementation project, which is consistent with the information found in the review of literature. According to Fui-Hoon Nah, et al. (2003), regardless of the goals, it is essential that institutional leaders define and clearly communicate those goals across all organizational boundaries to ensure a successful ERP implementation project.

Survey question 2 asked, "On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the effectiveness of overall communication from project leadership on the ERP implementation project?" Responses to survey question 2 were similar to the data collected on survey question 1, except that the average response was slightly lower, at 3.27, while showing the same mode value of "3". Only 40.6% of the respondents (n=30) selected the "4" value or "5" value, which indicated a higher level of effectiveness associated with communications coming from the ERP implementation project leadership. In addition, another 31.1% of the respondents (n=23) indicated a level of effectiveness by selecting the "3" value. Finally, 23.0% of the respondents (n=17) selected the "2" value, which indicated a smaller level of effectiveness regarding communications. Even though 4.1% of the respondents (n=3) indicated communications of the ERP implementation project was "Not Effective", the data suggested the effectiveness of overall communication from the ERP implementation project leadership and administrative leadership was pretty high given over 71% of the respondents reported the effort was on the "Highly Effective" side of the Likert scale and an additional 23.0% of the respondents reported at least some minimal effort was exerted.

Survey question 14 was an open-ended statement that said, "Describe what visions, expectations, goals, and reasons were communicated to the campus community for engaging in the ERP implementation project." Of all the surveys returned (n=74), only 54.1% of the respondents (n=40) provided input. A total of 82 comments were received. The data revealed 87.3% of the comments (n=69) provided some type of vision, expectation, goal, or reason for engaging in the ERP implementation project. The data further indicated the greatest emphasis was on better services to students,

comprehensive/integrated system, improved accuracy/central database, and the use of newer technology. Only 12.7% of the comments (n=10) implied no communications or limited communications were conducted by the ERP project leadership or administrative leadership. From the input received, the data suggested a strong and positive effort was made to communicate visions, expectations, goals, and reasons to engage in an ERP implementation project; however, the data also provided the opportunity to raise the concern that, as mentioned previously, only 54.1% of the respondents provided input to the open-ended question. Given that nearly half of the respondents whom completed a survey did not answer this open-ended statement, the question that goes unanswered is, "why did not all respondents provide input to the open-ended statement?"

In answer to Research Question 1, the goals, reasons, and expectations that were defined for engaging in the ERP implementation project included automation of business processes, better and faster access to data, better service to students, comprehensive system integration, improved accuracy and central database, and the use of new technology. The list of goals, reasons and expectations for engaging in an ERP implementation project is comparable with the review of literature. The goals, reasons, and expectations were communicated in an effective capacity to the campus community according to the data. The premise of Research Question 1 was that the communication of defined goals, reasons, and expectations of the ERP implementation to the campus community was one of those few key factors that specifically relate to the overall success of an ERP implementation project. Given the relationship between the high level of overall success of the ERP implementation projects as reported by the respondents and the reported strong definition and communication level of goals, reasons, and

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expectations for engaging in the an ERP implementation project, the data suggests that this factor did have a more critical connection to the overall success of an ERP implementation project.

Values and Benefits of ERP Implementation Project

Survey questions 3, 4, and 15 were designed to provide insight to the second research question, which was, "What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?" The intent was to determine whether or not the communication of the values and benefits of the ERP implementation project to the implementation teams and campus community impacted the overall success of the ERP implementation project. Survey questions 3 and 4 utilized a Likert-type 5-point scale while survey question 15 was an open-ended statement. These survey questions were designed to obtain insight from the respondent's viewpoint on the impact of communicating the values and benefits of engaging in and conducting an ERP implementation project on its overall success. According to the review of literature, a number of the major benefits resulting from ERP system implementations include: (a) replacing legacy systems (Arif, et al., 2004; Esteves & Pastor, 2004; Kock, 2002; Kvavik & Katz, 2002; Mahil, 2004; Songini, 2003; Swartz, 2000; Yakovlev, 2002); (b) obtaining the benefits of re-engineering, evaluations of best practices, and business process analysis (Al-Mashari, 2003; Arif, et al.; Esteves & Pastor; Frantz, et al., 2002; Gattiker & Goodhue, 2005; Holsapple, & Sena, 2003; Kock; Kvavik & Katz; Mahil; Soh, et al.; Songini; Swartz); and (c) tracking data in a centralized database that is much easier to maintain and is available to all appropriate users for critical decision making efforts (Arif, et al.; Fowler & Gilfillan, 2003; Siau & Mesersmith, 2003; Soh, et al.; Yakovlev). In

addition, according to Arif, et al., Fowler and Gilfillan, and Trott and Hoecht (2004), some of the additional benefits, which in many ways are subsets of the goals, benefits, and advantages already listed, include the following:

(1) Improving coordination and cooperation between the various functional departments across the organization.

(2) Adapting organizational abilities accordingly to organizational functional requirements.

(3) Improving decision support and decision making using higher quality data.

(4) Improving communication channels and flow of information and data across the organizational boundaries.

(5) Utilizing software that has already been tested and proven to be functional in the market place as opposed to developing an internal system in-house.

(6) Receiving and installing updates and patches provided by the ERP vendor.

(7) Increasing report accuracy that leads to more informed decision making processes.

Survey question 3 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how would you rate the value of the BPA/re-engineering processes?" This survey question was designed to extract information on the impact of conducting the business process analysis (BPA) and re-engineering processes as they relate to the values and benefits of the ERP implementation project with associated change and the overall success of implementation. The mean value for this survey question from 70 respondents was 2.80. Four respondents (6.1%) did not reply to this survey question. The mode was the "3" value, which indicated there was value received from the BPA and re-engineering

processes. Only 23.0% of the respondents (n=17) selected a "4" or "5" value, which was on the "Great Value" side of the Likert scale. Another 37.8% of the respondents (n=28) selected the "3" value, which indicated the respondents perceived value to the BPA or re-engineering processes. Although 12.2% of the respondents (n=9) indicated there was "No Value" in conducting the BPA or re-engineering processes, 21.6% of the respondents (n=16) indicated there was some value from conducting the BPA or re-engineering processes. The data suggested respondents' perceived value was received by conducting the BPA or re-engineering processes, which indicates that conducting the BPA or the re-engineering processes may have had some impact on the success of an ERP implementation project or of change management.

Survey question 4 was an extension of survey question 3 from the standpoint of trying to obtain the effectiveness of implementing the outcomes of BPA/re-engineering processes. Survey question 4 asked, "On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the effectiveness of implementing BPA/re-engineering outcomes throughout the ERP implementation project?" The mean for this survey question was 2.49. These findings were similar to the findings of survey question 3. The 2.49 mean value for survey question 4 indicated some level of effectiveness was obtained when considering the effectiveness of implementing BPA or re-engineering outcomes throughout the ERP implementation project. The mode for this survey question was the "3" value, which also indicated there was value for implementing outcomes of the BPA and re-engineering outcomes. Of all the responses, 16.2% of the respondents (n=12) selected a "4" or "5" value, and an additional 32.4% of the respondents (n=24) selected the "3" value. Therefore, a total of 44.8% of the

respondents (n=36) indicated an "effective" to "Highly Effective" response in regards to implementing the outcomes of the BPA or re-engineering outcomes. Another 23.0% of the respondents (n=17) selected the "2" value, which indicated there was some level of effectiveness for implementing BPA or re-engineering processes. A total of 23.0% of the respondents (n=17) selected the "1" value indicating that implementing outcomes of BPA or re-engineering processer was "Not Effective". The data indicated the respondents' overall perception toward the effectiveness of implementing BPA and re-engineering process outcomes and benefits as somewhat effective.

Survey question 15 stated, "Describe the benefits and values of engaging in the ERP implementation project." A total of 82 comments were received from 44 of the total 74 respondents. The data revealed that 92.7% of the comments (n=76) indicated positive benefits and values were obtained from conducting the BPA and re-engineering processes and implementing the outcomes of those BPA and re-engineering processes. The data further indicated the categories of benefits and values for conducting and implementing outcomes of BPA processes included better service to students, central repository of data, compatible system across functional lines, defining and shaping processes, enhanced communications, sense of accomplishment, new functional use of system, teamwork to complete the project, and updated technology. According to Al-Mashari (2003) and Frantz, et al. (2002), the very nature of conducting the BPA and re-engineering processes is the integration of the various re-engineered business processes across the institution's different functional and operational departments, which was reported by 92.7% (n=76) of the comments. Fui-Hoon Nah, et al. (2003) reported that organizations need to be willing to alter and modify existing business processes to adapt to the ERP package and how it

can best benefit the organization. The data from survey question 15 indicate values and benefits were achieved from conducting BPA/re-engineering processes and implementing the outcomes.

Research Question 2 asked, "What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?" The underlying premise of this research question was that there is a key connection between conducting and implementing the outcomes of the BPA and re-engineering process and the impact upon the overall success of the ERP implementation project. The critical component of any business process re-engineering effort is change management (Fui-Hoon Nah, et al., 2003; Siau & Mesersmith, 2003). Furthermore, the intent of the re-engineering and business process analysis effort is to provide the capability to integrate functions, processes, and procedures within the selected ERP solution in the most effective and efficient way feasible (Folwer & Gilfillan, 2003). Knowing, documenting, and conducting processes that are most efficient and effective for the university conducting an ERP implementation project seems to be logical, but yet are often overlooked or not taken into serious consideration.

Data from the survey questions indicated that benefits and values were obtained from conducting the BPA and re-engineering processes and implementing the outcomes. Based on the data, the benefits and values received from the ERP implementation project included better service to students, central repository of data, compatible system across functional lines, defining and shaping processes, enhanced communications, sense of accomplishment, new functional use of system, teamwork to complete project, and updated technology. The findings were consistent with the review of literature. The data

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obtained from survey questions 3 and 4 indicated that respondents' perceived a lesser level of value and benefit was received in conducting the BPA and re-engineering processes and implementing the outcomes. Overall, the data indicates conducting BPA and re-engineering processes is an important factor of an ERP implementation project; however, the data does not support the premise that a key connection exists between conducting and implementing the outcomes of BPA and re-engineering processes and the level of overall success of the ERP implementation project.

Investments in Financial and Human Resources

Survey questions 5, 6, and 16 were designed to answer the research question, "What were the results of investing the financial resources and human resources of the institutions into the ERP implementation project." Using a 5-point Likert-type scale, survey question 5 was targeted at financial resources and survey question 6 was targeted at human resources. Survey question 16 was an open-ended statement seeking specific respondent input on the value and benefits for the investment of financial resources and human resources on the ERP implementation project. Based on the review of literature, the purchase, installation, and implementation of an ERP system is expensive in terms of both financial and human resources costs. As reported by Dong-Gil Ko, et al. (2005), over $31 billion were spent on ERP systems in 2005. Sawyer and Southwick (2002) further reported that when an organization implements an ERP system solution, on the average of between $3 and $5 will be spent on other components of the ERP implementation project for every $1 spent on purchasing the application. Other factors that drive up the cost of an ERP implementation project include the time and dollars needed to train existing staff on the new ERP package (Siau & Mesersmith, 2003) and the

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amount and level of customizations made to the system (Soh, et al., 2003). In addition, the absence of an implementation budget to cover all aspects of an ERP implementation project puts severe constraints on the institution's ability and effort to complete a successful implementation project (Frantz, et al., 2002). The foundation of this research question is that the more an institution can know, prepare for, and address the issues of the financial resources and the human resources costs, the higher the likelihood of a successful ERP implementation project.

Survey question 5 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how you would you rate the investment of the institution's financial resources against the results and outcomes of the ERP implementation project?" The mean for this question of the 73 respondents who completed this survey question was 3.78 with a mode of the "3" value. Initially the data supported the claim that there was value in the investment of financial resources of the ERP implementation project. Further analysis indicated 55.4% of the respondents (41) selected a "4" or "5" value, which was on the "Great Value" side of the Likert scale. An additional 35.1% of the respondents (n=26) selected the "3" value indicating value in the investment of financial and human resources. Another 8.1% of the respondents (n=6), selected the "2" value, which indicated there was some value in the investment of financial and human resources. No respondent selected the "1" value, which represented "No Value". Therefore, statistical information of over 90.0% of the respondents perceived there was at least some value and importance to the investment of financial resources as it relates to a successful ERP implementation project.

The focus of survey question 6 was on the investment of human resources as opposed to the financial resources as outlined in survey question 5. Survey question 6 asked, "On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how would you rate the investment of the institution's human resources on the results and outcomes of the ERP implementation project?" The mean response by the 72 respondents was 3.64, which was on the "Greater Value" side of the Likert scale regarding the investment of human resources on the results and outcomes of the ERP implementation project. Although the mean value for this research question was on the "Great Value" side of the scale, the mean value was not as high and strong as the mean value reported on survey question 5 in relation to the investment of financial resources. However, the mode value was 4, strongly indicating a high level of value and importance of investing in human resources for the success of an ERP implementation project. A total of 55.4% of the respondents (n=41) selected a "4" or "5" value, which was on "Great Value" side of the Likert scale. Another 27.0% of the respondents (n=20) selected the "3" value indicating there was value in the investment of human resources. In addition, 9.5% of the respondents (n=7) selected the "2" value, which indicated some value in the investment of human resources. Of all the respondents, 5.4% (n=4) selected the "1" value, which indicated "No Value" was received from the investment of human resources of the ERP implementation project. As was the case with the investment of financial resources, the data strongly indicated respondents perceived the investment in human resources was of significant value in regards to the overall success of an ERP implementation project.

Survey question 16 was an open-ended statement designed to answer the research question pertaining to the value and worth of the institution's investment of both financial

resources and human resources on the ERP implementation project. The survey question stated, "Describe whether or not, and why, the results of the ERP implementation project were worth the commitment of the institution's financial and human resources." The data revealed 59.5% of the respondents (n=45) submitted 89 comments. Of these 89 comments, 84.3% of the comments (n=75) indicated a positive value and benefit to the investment of financial resources and human resources as they relate to the success of the ERP implementation project. Further data analysis indicated the value and worth of the institution's investment of both financial resources and human resource on the ERP implementation project included the categories of improved functionality/efficiencies, increased communications, increased productivity, integrated system, replaced old/obsolete system, and services to students and staff. When analyzing the remaining 15.7% of the comments (n=14), the data indicated the biggest negative issue was the lack of support and recognition of staff. This specific negative category may well shed light on why the data on the investment of human resources was not more closely related to the investment of financial resources. There appears to have been a level of discontentment from a number of the respondents in how staff was treated throughout the duration of the ERP implementation project. However, the data for this survey question indicated that respondents perceived a great value and worth toward the commitment of the institution's financial and human resources on the ERP implementation project.

Research Question 3 asked, "What were the results of investing the financial and human resources of the institutions into the ERP implementation project." The premise of this question was that a key relationship exists between the investment of financial resources and human resources by an institution on an ERP implementation project and

the overall success of that ERP implementation project. Organizations have spent billions of dollars implementing ERP systems, and the expenditure of budgeted and non-budgeted funds on ERP systems is regarded as the single largest investment made by organizations in the arena of technology (Al-Mashari, 2003; Dong-Gil Ko, Kirsch, & King, 2005; Holsapple & Sena, 2003). Furthermore, according to Kvavik and Katz (2002), implementation of an ERP system is one of the single largest investments in dollars and human resources that institutions of higher education might ever make.

Data from the survey questions strongly indicated that there was value and benefit to the institution for investing in the financial resources and human resources as they relate to the success of the ERP implementation project. The data indicated the respondents perceived the value and worth of the institution's investment of both financial resources and human resources on the ERP implementation project included improved functionality and efficiencies, increased communications, increased productivity, integrated system, replaced old and obsolete system, and services to students and staff. The data further indicated respondents perceived more value appeared to be associated with the investment of financial resources than the investment of human resources as related to the overall success of the ERP implementation projects, but not by a large margin. Overall, the data strongly suggested that the investment of financial and human resources is a key factor in determining the success of an ERP implementation project.

Protection Against Drawbacks, Pitfalls, and Shortcomings

Research question 4 asked, "What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and

shortcomings of the ERP implementation project?" The focus of this research question was on change and how that change was handled within the framework of the ERP implementation project. Survey questions 7, 8, and 17 were designed to answer this fourth research question by using a 5-point Likert-type scale for survey questions 7 and 8 and an open-ended statement for survey question 17. Even though ERP systems often become operational as a result of the implementation project, many of these implementation projects are completed at the expense of any given number of issues and concerns that have undesired consequences and impact upon the organization (Fui-Hoon Nah, 2003; Nicolaou, 2004; Siau & Mesersmith, 2003). Many organizations reported that the expected and anticipated benefits and advantages of purchasing and implementing an ERP system are elusive and may never fully be realized (Al-Mashari, 2003; Fowler & Gilfillan, 2003; Soh, et al., 2003; Trott & Hoecht, 2004; Wognum, et al., 2004). In addition, Siau and Mesersmith reported that the more employees are involved in the issues of change management, the higher the success rate of ERP implementation projects. The review of literature covers a number of specific concerns regarding the unknown potential roadblocks and challenges of implementing and ERP system, but the key is to be aware of those drawbacks, pitfalls, and shortcomings that can prevent a successful implementation of an ERP system.

Survey question 7 asked, "On a scale from 1 to 5, with 1 being "No Change" and 5 being "Extreme Change", how would you rate the degree of change when comparing how business was conducted before the ERP implementation project and after the ERP implementation project?" The mean from the73 surveys completed for this question was 3.90 with a mode value of the "4" value. These data alone clearly indicated change in

how business was conducted was a result of the ERP implementation project. The data

also revealed that 73.0% of the respondents (n=54) selected a "4" or "5" value, which

was on the "Extreme Change" side of the Likert scale when considering change to the

day-to-day business practices. An additional 20.3% of the respondents (n=15) selected

the "3" value of the scale, which indicated there was change associated with the way

business was conducted before and after the ERP implementation project. Another 5.4%

of the respondents (n=4) selected the "2" value, indicating some change was involved in

the daily work operation. No respondent selected the "1" value, which stated "No Change"

was incorporated in the way business was done after the ERP implementation project as

compared to before the project. The respondents clearly revealed that change was a

definite by-product of the ERP implementation project and the new processes defined by

the implementation project with over 93.0% of the respondents that perceived there was

"some" change to "Extreme Change" to work operations after the ERP implementation

project was completed when compared to before the ERP implementation project.

The focus of survey question 8 was on how change from an ERP implementation

project was handled, especially in light of the potential negative consequences of the ERP

implementation project. Survey question 8 asked, "On a scale from 1 to 5, with 1 being

"Not Effective", and 5 being "Highly Effective", how would you rate the steps and

measures taken to prepare for and protect against the potential drawbacks, pitfalls, and

shortcomings of the ERP implementation project?" The average response of the 73

respondents that completed this survey question was 2.97, with the mode being the"3"

value. When considering how respondents thought change issues were handled regarding

the measures and steps taken to guard against potential drawbacks, pitfalls, and

shortcomings, 29.8% of the respondents (n=22) selected the "4" or "5" value, which was

on the "Highly Effective" side of the Likert scale. Another 36.5% of the respondents

(n=27) selected the "3" value indicating the steps and measures to prepare against change

were handle in an effective capacity. In addition, 21.6% of the respondents selected the

"2" value, which indicated some level of effectiveness was associated with preparing for

change. Finally, 10.8% of the respondents (n=8) selected the "1" value indicating the

steps and measures taken to prepare against the drawbacks, pitfalls, and shortcomings of

an ERP implementation project were "Not Effective". The data indicated the steps and

measures taken to prepare for and protect against the potential drawbacks, pitfalls, and

shortcomings of the ERP implementation project was effective with 66.3% of the

respondents (n=49) selecting a "3", "4", or "5" value on the Likert scale. When

combining the data from survey questions 7 and 8, the data indicated an impact to the

working place resulted from the ERP implementation project, and the preparations for

those changes were perceived by the respondents as being more than effective.

Survey question 17 stated, "Describe any step or measure taken to protect you and

the campus community from any potential drawback, pitfall, and shortcoming of

engaging in the ERP implementation project." A total of 48.7% of the respondents (n=36)

generated 53 different comments. Positive comments (n=37 at 69.8%) out-numbered

negative comments (n=16 at 30.2%). The largest number of positive comments was in the

categories of regularly scheduled meetings and communications and training and testing

activities. The negative comments were divided into the categories of no steps taken and

increased workloads not addressed. The data from survey question 17 indicated that the

respondents perceived some steps and measures were taken to protect the campus

community from the potential drawbacks, pitfalls, and shortcomings of engaging in the ERP implementation project, but not enough was done to prepare for the all the changes encountered within the framework of the project.

Research Question 4 asked, "What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?" This research question was based on information from the review of literature that indicated change is going to occur with any ERP implementation project; thus, the intent was to learn what efforts were conducted to prepare for that change. The underlying belief was that a key connection exists between preparing for and addressing the wide assortment of change brought about by an ERP implementation project and the overall success level of the ERP implementation project. Organizational requirements and functionality of the ERP system are not always compatible (Al-Mashari, 2003; Fowler & Gilfillan, 2003; Gattiker & Goodhue, 2005; Soh, et al., 2003). There will be misfits between organizational processes and the ERP system being implemented (Luo & Strong, 2004). How each organization responds to the changes of ERP projects will impact the overall effectiveness and efficiency of the implementation project and the functionality of the ERP system (Arif, 2004; Fowler & Gilfillan; Gattiker & Goodhue).

In answer to Research Question 4, the data indicated that respondents perceived that steps and measures were taken by the university to prepare for change brought about by the ERP implementation project that included access to real time and accurate data, access to training, assigning data ownership, change of position and duties, regular meetings and communications, and staff encouraged to be engaged. The data further

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revealed that, as a whole, the steps and measures taken to address the many changes brought about by the ERP implementation projects were effective. The data indicated a level of perceived dissatisfaction from a small group of respondents regarding steps and measures to protect against potential drawbacks, pitfalls, and shortcomings of the ERP Implementation project, which included increased workloads not addressed, no consideration of staff and extra hours worked, not enough done, and preparations not provided. The data supported findings from the review of literature regarding the importance of preparations for change brought about by the potential drawbacks, pitfalls, and shortcomings of an ERP implementation project is an important factor. Overall, the data supported the claim that a key relationship exists between preparing for the wide assortment of change from potential drawbacks, pitfalls, and shortcomings brought about by an ERP implementation project and the overall success level of the ERP implementation project.

Preparations for Changes in Work Functionality

The last research question asked, "What, if any, steps were taken to prepare stakeholders for the changes in work functionality as a result of the ERP implementation project?" Survey question 9 used a 5-point Likert-type question and survey questions 18 and 19 were open-ended statements all designed to answer this fifth research question. Focus of this research question was primarily on the impact of change to the institution resulting from an ERP implementation project. Because an ERP implementation generally is the essence of a large-scale organizational change that involves many, if not all, of the organizational participants, the organization must recognize and address change management issues. Siau and Mesersmith (2003) reported that the more

employees are involved in the issues of change management, the higher the success rate of ERP implementation projects. The whole concept of change management is perhaps the most important single factor that needs to be fully addressed by any organization embarking on the journey to implement an ERP system (Fui-Hoon Nah, et al., 2003; Siau and Mesersmith; Soh, et al., 2003). Morgan (1997) reported that organizational change implies cultural change, which is above and beyond changes in technology, rules, systems, procedures, and polices. Institutions cannot take these factors for granted. According to Frantz, et al., Kock, Trott, and Hoecht (2004), and Wognum, et al. (2004), one of the biggest mistakes of ERP implementation projects is the failure to realize the impact of change on employees and processes. The premise of the research question is that a key relationship exists between effectively managing the changes attributed to an ERP implementation project and the level of success associated with that ERP implementation project.

Survey question 9 asked, "On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the institution's effectiveness of preparing the campus community for the change on the organizational structure and culture resulting from the ERP implementation project?" Of the 72 surveys completed, 25.7% of the respondents (n=19) selected a "4" or "5" value, which was on the "Highly Effective" side of the Likert scale. Another 40.5% of the respondents (n=30) selected the "3" value, which indicated the institution was effective in preparing the campus community for change resulting from the ERP implementation project. In addition, another 24.3% of the respondents (n=18) indicated some level of effectiveness was provided by the institution with the selection of the "2" value. Only 6.8% of the

respondents (n=5) selected the "1" value, which indicated the institution was "Not Effective" in preparing for change to the organizational structure and culture. Thus, 90.5% of the respondents indicated a level of effectiveness in preparing the campus community for changes to the organizational structure and culture, and 66.2% of the respondents rated the institution between effective and "Highly Effective" in preparing the campus for organizational structural and cultural changes. It is interesting to note that when comparing the results of the this survey question with the survey question specifically inquiring about preparations made to prepare for the potential negative consequences of an ERP implementation project, the results were closely aligned. But when comparing this survey question with the survey question asking about the change in work after the ERP implementation project, there are minor differences in how the questions pertaining to change were answered. According to the data, the respondents perceived there was a level of effectiveness from the institution in preparing for changes in the organizational structure and the organizational culture.

The open-ended statement for survey question 18 stated, "Describe any operational change or impact upon your position responsibilities that occurred as a result of the ERP implementation project, and how you were prepared for any of the changes as a result of the ERP implementation project." Only 44 of the 74 surveys (59.5%) contained input to this survey question. A total of 59 comments were categorized. The data revealed 57.6% of the comments (n=34) mentioned positive operational changes of the ERP implementation project while the remaining 42.4% of the comments (n=25) outlined negative results. Positive steps taken to prepare for changes in the work place following the ERP implementation project included the categories of regular

meetings/communications, training, change of position/duties, and encouragement of

staff to be engaged. The opposing viewpoints identified were the categories of not

enough done to prepare the campus community, no consideration for staff conducting the

implementation, and increased workloads not addressed. Although a variety of responses

were received from the survey question, an apparent thread is revealed that indicates

good outcomes came from the ERP implementation project but at the expense of not

taking care of campus constituents in appropriate ways.

Survey Question 19 asked respondents to simply reply to the statement, "Describe

any steps and actions taken to ensure the success of the ERP implementation project."

Although not explicitly stated, the aspect of change is implied in the statement. A total of

71 comments were received from 42 respondents. Of the 71 comments received, all but

two of the comments (n=69 at 97.2%) provided input of the different steps and actions

taken to ensure the success of the ERP implementation project. Although a wide range of

categories was created from the comments, the more dominant categories were building

project document/planning, invested hard work, regular meetings and communication,

team work and joint efforts, and training. The two remaining comments simply indicated

no steps or actions were taken to ensure the success of the implementation project.

Clearly there was a strong perception from the respondents that each of the universities

took steps, measures, and actions to ensure the success of the ERP implementation

project.

Research Question 5 asked, "What, if any, steps were taken to prepare

stakeholders for the changes in work functionality as a result of the ERP implementation

project?" Siau and Mesersmith (2003) reported that the more employees are involved in

the issues of change management, the higher the success rate of ERP implementation projects. When organizations do not engage in these change management activities, the resulting ERP implementation generally misses out on the opportunities to make the organization more effective and efficient in how business and functional processes are handled (Fowler & Gilfillan, 2003). Furthermore, many institutions do not realize the impact of an ERP implementation project on the culture, norms, values, traditions, practices, and communications of an institution (Fowler & Gilfillan; Fui-Hoon Nah, et al., 2003; Luo & Strong, 2004; Soh, et al., 2003; Morgan, 1997; Songini, 2003; Swartz, 2000; Yakovlev, 2002). The implementation of an ERP system will cause change, and institutions must be ready to address the many different changes that will occur to the people who make up the institutional culture and functional processes. Frantz, et al. (2002), Kock (2002), Sawyer and Southwick (2002), and Wognum, et al. (2004) reported that ERP implementation projects ask people to change how they do their jobs, which is very difficult for many people to accept and adapt to in their positions. The premise of the research question was that a key connection exists between preparing for change appropriately and the overall success of an ERP implementation project.

In answer to Research Question 5, the data supported the review of literature from the standpoint that change occurred within the institutions and with the way work was accomplished. Data further indicated that respondents perceived some effective steps were taken to prepare stakeholders for the changes in work functionality, which included administrative support, appropriate implementation time lines, appropriate levels of funding and staffing, building project document and planning, invested hard work, regular meetings and communications, teamwork and joint efforts, testing, training, and

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use of dedicated consultants. Although some respondents perceived that the effectiveness of preparing the campus for the changes forthcoming from the ERP implementation project was, at best, average, the majority of the respondents perceived the success of the ERP implementation project was very high. Overall, the data indicated the respondents perceived higher levels of values and effectiveness were achieved in preparing the organization for change resulting from the ERP implementation project. When considering all the data, not only were steps taken to prepare the campus for change brought about by the ERP implementation project, but there also appeared to exist an important relationship between preparing the campus community for change and the overall level of success associated with the ERP implementation project.

Conclusions

Based on the analysis of the statistical information from survey question 10, 11, 12, and 20, the statement can be made that the ERP implementation projects of the five higher education institutions included in this research project were very successful. In addition, information available on the public web pages for each of the institutions indicated the ERP systems were online, functional, and operational, further indicating each respective ERP implementation project was a success. Respondent input regarding overall status of their ERP implementation project consistently and strongly indicated the implementation projects were successful.

The very nature of installing an ERP system suggests change (Fowler & Gilfillan, 2003; Fui-Hoon Nah, et al., 2003; Luo & Strong, 2004; Soh, et al., 2003; Morgan, 1997; Songini, 2003; Swartz, 2000; Yakovlev, 2002). One of the biggest mistakes of ERP implementation projects is the failure to realize the impact of change on employees and

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processes (Frantz, et al., 2002; Kock, Trott, & Hoecht, 2004; Wognum, et al., 2004). According to Esteves and Pastor (2004) stakeholders within the institution must be identified and made a part of the overall implementation project. The theme of change management is a critical component of any ERP implementation project.

Change management underscores the foundation of each research question. Individually, the outcomes of each research question were presented above in the Findings section. In the following paragraphs, the data will be discussed within the context of change associated with the ERP implementation projects.

Research Question 1

The first research question for this research project was, "What goals, reasons, and expectations of the ERP implementation projects were defined and communicated to the campus communities?" The data confirmed the goals, reasons, and expectations of the ERP implementation projects that were defined and communicated to the campus communities included automation of business processes, better and faster access to data, better service to students, comprehensive system integration, improved accuracy and central database, on time and on budget, and new technology. The data further suggested that the campus and project leadership was more than effective in defining and communicating the goals, reasons, and expectations for engaging in the ERP implementation projects to the campus community. The data supported the premise of a significant link exists between the definition and communications of the goals, reasons, and expectations for conducting an ERP implantation project and the overall success obtained from completing the implementation project. In other words, the level, depth, and breadth of definition and communication on the goals, reasons, and expectations for

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engaging in an ERP implementation project did drive the level of success achieved with the project. The data also suggested a link appears to exist between the work efforts expended by the individuals of the implementation project and the overall success of the ERP implementation project. From the change management perspective, leadership must take the appropriate steps to communicate to the campus community about the potential changes that result from any type of ERP implementation project.

Research Question 2

The second research question of this research project was, "What did stakeholders perceive to be the values and benefits of going through an ERP implementation project?" To obtain the most benefits and advantages from an ERP implementation project, institutions need to engage in BPA and re-engineering efforts in order to provide the capability to integrate functions, processes, and procedures within the framework of the selected ERP solution that will provide the most efficient and effective ways feasible (Fowler & Gilfillan, 2003). It is known that BPA and re-engineering efforts are time consuming and require all entities affected by the ERP solution to be involved in the process; however, it is wise to utilize BPA and re-engineering processes within the institution to align institutional policies, procedures, and processes to include best practices where appropriate (Kvavik & Katz, 2002). The premise of this research question was that the values and benefits of the ERP implementation project would be well known after conducting the BPA and re-engineering efforts.

The data clearly showed respondents perceived values and benefits were obtained from conducting the ERP implementation project. Values and benefits obtained from the implementation project included better service to students, central repository of data,

compatible system across functional lines, defining and shaping processes, enhanced

communications, a sense of accomplishment, new functional use of the system, teamwork

to complete the project, and updated technology. The data also indicated that the BPA

and re-engineering efforts was an important ingredient to the overall success of the ERP

implementation project. Although the data indicated a level of communication occurred

to the campus community on benefits and values of conducting an ERP implementation

project, the data do not support the premise that a key connection exists between the

values and benefits received from the ERP implementation project and and the

overarching level of success for the implementation project. Thus, even though an ERP

implementation project tends to affect nearly every aspect of campus, the perceptions

from the respondents of the implementation teams indicated that addressing and

preparing for the impact of change at the global campus level was not as important as

dealing with the issues of change at the project implementation team level. Again, the

data indicated that managing change is the key when taking on such a massive project as

an ERP implementation. Campus and project leadership would do well to turn to change

management theories when working through the many different changes brought about

by the ERP implementation project and its processes.

Research Question 3

The third research question asked, "What were the results of investing the

financial and human resources of the institutions into the ERP implementation project?"

The foundation of this research question was that a key connection existed between the

financial and human resource costs and the overall success of the ERP implementation

project. The data indicated the respondents' perception was that a number of initial and

ongoing costs were associated with an ERP implementation project, which included initial cost of the application, consulting services, backfilling, overtime, turnover, support and maintenance, training, and hardware. However, the data showed a small segment of the respondents perceived additional measures should have been taken to accommodate the ERP implementation team members to ensure a successful implementation of the ERP implementation project, but no specifics were provided. The quantitative data and the qualitative data both strongly supported the foundation that a key connection existed between the success of an ERP implementation project and the investment of financial and human resources in the project. An ERP implementation project consumes large amounts of time from those individuals that make up the implementation teams, and institutions must adequately prepare for and address effectively the financial and human resources costs to ensure a successful project.

Research Question 4

The fourth research question was, "What, if any, steps were taken by the organizational leadership to prepare for and protect against potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?" This research question was based on the fundamental belief that change can and does occur as a result of an ERP implementation project. The premise was that a significant connection existed between an implementation project and how institutional leadership prepares the campus constituents for the known and unknown drawbacks, pitfalls, shortcomings, and other changes encountered during the ERP implementation project, and the overall success of the ERP implementation project.

The data collected from the respondents indicated significant changes were incorporated in the functional operations of day-to-day work activities when comparing work responsibilities prior to and after the ERP implementation project. Steps and measures taken to prepare for the change as reported by the respondents included access to real time and accurate data, access to training, assigning data ownership, change of position and duties, regular meetings and communications, and staff encouraged to be engaged. The data further supported the premise of a key connection existing between addressing change and the overall success of an ERP implementation project by indicating communication transpired between all campus constituents to adequately prepare for the many different drawbacks, pitfalls, and shortcomings of the ERP implementation project and the natural changes that accompany such a project. The qualitative data also supported the connection between preparing for change and ERP implementation success. The data indicated a small group of respondents perceived that not enough was done to prepare against the negative components encountered during the ERP implementation project; however, the data strongly indicated it was important to prepare and plan for the issues and concerns associated with the different drawbacks, pitfalls, and shortcomings of an ERP implementation project. When considering all the data, the data supports the fundamental belief that a connection exists between the success of an ERP implementation project and the ability to address the changes associated with the drawbacks, pitfalls, and shortcomings of an ERP implementation project. Change management theories would advocate administrative and project leadership being more proactive and aggressive to include the campus constituents in

their actions to more fully prepare the campus for the many changes that result from this type of campus impacting project.

Research Question 5

The fifth, and last, research question asked, "What, if any, steps were taken to prepare stakeholders for the changes in work functionality as a result of the ERP implementation project?" The focus of this research question was on the stakeholder changes that transpire with the functional operations resulting from the ERP implementation project. The underlying principle is that a key relationship existed between the steps taken to prepare for the many different types of changes brought about by the ERP implementation project and the overall success of the project. One constant factor of ERP implementation projects is that change will occur within the organization at many different levels. The whole concept of change, and managing that change, is perhaps the most important single factor that needs to be fully addressed by any organization embarking on the journey to implement an ERP system (Fui-Hoon Nah, et al., 2003; Siau and Mesersmith, 2003; Soh, et al., 2003). Thus, the more campus constituents can know about and be prepared for anticipated change, the higher the chances and degree of success of the ERP implementation project.

According to the data, it appears the ERP implementation project leadership took steps to prepare campus stakeholders for changes brought about by the ERP implementation project. Steps taken to prepare campus stakeholders for change included administrative support, appropriate implementation time lines, appropriate levels of funding and staffing, building project document and planning, invested hard work, regular meetings and communications, teamwork and joint efforts, testing, training, and

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use of dedicated consultants. The data showed that some respondents perceived a few areas of weakness in preparing the campus environment for the operational changes resulting from the ERP implementation project. In addition, the data also suggested that some respondents perceived not enough was done to prepare for change at desired levels. When considering the reported success of the ERP implementation projects from the respondents perspective and the overall data for the research question, properly managing the changes brought about the ERP implementation had a positive impact upon the success of the ERP implementation project. Therefore, the data supported the existence of a key connection between the implementation of change management methodologies for an ERP implementation project and the overall success of the implementation project.

Discussion

Individual Effort

A consistent theme obtained from the data drew attention to the efforts of the individual participants of the ERP implementation teams. The data indicated those individuals involved in the ERP specific module implementation teams generally believed they went above and beyond the call of duty to ensure the implementation of their assigned ERP module was successful. Understanding the motivations and attitudes of why the individual participants exhibited the behavior that "failure was not an option" would be something of value to investigate. It is interesting to note that the respondents all reported their effort to ensure the success of the ERP implementation project was higher than the perceived effort of the university as a whole. In addition, the data indicated campus and project leadership did not address taking care of staff issues and concerns. If the individual efforts were perceived to be as strong as the data suggested,

and each of those individuals were members of an implementation team, then the conclusion should be drawn that the overall university effort would be that much stronger than what was reported by the respondents; however, the data do not support this logic.

When seeking respondent input and feedback about individual and university effort, it was interesting to learn from the respondents' perception that they overwhelmingly indicated the individual effort was greater than the overall institutional team effort. Literature presented in Chapter Two suggested implementation by teams as opposed to individuals was more effective (Siau & Mesersmith, 2003). The use of project teams does not just happen, but rather effort must be put forth to prepare the organizational culture, norms, and values for deployment of project teams during an ERP implementation project. Topics that must be addressed when developing and defining project teams are functional and departmental representation, team composition, group size, group dynamics, training on how to work as a team, group cohesiveness, individual characteristics, empowerment, leadership, problem solving strategies, group norms, social strategies, individual diversity, and organizational support (Frantz, et al., 2002; Fui-Hoon Nah, et al., 2003; Katzenbach & Smith, 1993; Siau & Mesersmith; Ying & HeuyWen). In essence, teams must be empowered and equipped with the tools and environment to complete an ERP implementation project in part (single ERP module) and in whole (complete ERP system).

Participant Roles

The population sample was defined to be those participants of the ERP implementation project with a role as a Project Manager, Project Management Team member, functional implementation team leader, technical implementation team leader,

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functional implementation team member, or technical implementation team member. The industry best practice and vendor suggested number of people that would be engaged in these roles vary, but generally there might be approximately 45 to 60 individuals involved in all the different ERP implementation teams. The assignment and role of human resources individuals for a typical ERP implementation project might be as follows: One or two people assigned as project manager(s); three to five members on the project management team; one functional team leader per core module; one technical team leader per core module; three to eight functional team members per core module; and one to five technical team members per core module. The number of core modules can vary from vendor to vendor, but generally in higher education five core modules are associated with the base ERP implementation project.

In this study, 165 individuals were invited to participate in the study. Table 1 in Chapter Four showed the distribution of roles as reported by the respondents. There are a couple points of concern regarding this role distribution. First, two institutions had no respondents from the technical implementation teams. Second, one institution had no respondents in the project manager and project management roles. Third, one institution reported a higher number of functional team leads than might be expected. Fourth, one institution had no respondents in the technical leader role. If the findings for this case study research project were from only one higher education institution, the roles of the respondents might present a problem to how the data were reported. Because of the number of institutions incorporated in the research project and the use of aggregated data, it is likely that respondents' input across the multiple institutions greatly reduced the

concern of the roles of respondents that participated in the study. Answers to the

questions from the distribution of participant role would be pure conjecture at this point.

Returned Surveys

As mentioned in Chapter 4, the survey return rate was 44.9% (n=74 out of 165

distributed surveys). When looking at the return rate of each higher education institution

independently, one institution had a much lower survey return rate than the other

institutions. Ideally, it would be good to know why that one institution's survey return

rate was lower than the others.

Of the 165 respondents invited to participate in this research project, 44.9% of the

respondents (n=74) submitted a survey. Of the 74 surveys completed and submitted,

between 48.7% and 60.8% of those respondents (n=36 and n=44) provided input to the

seven open-ended statements. The data received were valuable, but the qualitative data

may have been richer with more of the respondents responding and providing feedback to

all of the open-ended statements on the survey.

Communications

One common thread woven through the research project was communications.

The data indicated that communications transpired between the project leadership and the

implementation teams and campus community. Despite the success of the ERP

implementation projects as reflected in the respondent's perception from the data,

evidence from the data also suggested not enough communications transpired from the

project leadership. Since the evidence of limited communications was small, does this

environment support the classic adage that some people think there can never be enough

communication? Or could this input be the case of some respondents indicating they were

not given enough of an opportunity to provide their input into the ERP implementation

project planning process? The data from this research project is not able to address these

questions.

<center>Implications</center>

Better Communications to Campus Constituents

Communications were identified in the review of literature as an important

component to any ERP implementation project. Communications are by default assumed

to be addressed through the defined structure of the ERP implementation project as a

whole and by each component of the ERP project implementation plan. It is one thing to

say communication methodologies and processes will be defined and conducted for the

ERP implementation project, but it is quite another thing to ensure the methodologies and

processes are fully implemented, utilized, and supported. Although communications were

not a central theme for the basis of this research project, communication was a

component built into the research questions.

The respondents perceived communication to be critical to the success of any

ERP implementation project. Data on communications indicated both a positive

perspective as well as a negative connotation. The qualitative data revealed positive

respondent comments on ERP implementation project communications from several of

the survey questions that included increased communications, enhanced communications,

scheduled communications, and regular communications. The same quantitative data

also showed respondent comments on one survey question that indicated limited

communications were provided to the campus community; however, no mention was

made of limited communications to the implementation teams. Communications are an

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element that becomes personalized from the standpoint of subjectivity, especially in how communications are conducted. In addition, what is communicated and received by each person will be perceived differently from person to person. Institutions must place an emphasis on communications when engaging in an ERP implementation project, and institutions cannot underestimate the value of communications at all levels of the campus community.

Change on the Organization

Change is recognized as being synonymous with ERP implementation projects. The data supported the notion that the likelihood of success for ERP implementation projects increase with the more individuals can know about change, how they will be impacted by change, and how they can be prepared for change. Change was an integral component of several research questions, but not specifically investigated as it pertains to the organizational structure and culture. Analysis of the quantitative and qualitative data indicated that the respondents perceived the underpinnings of change do not necessarily have the greater impact on only the implementation team members, but rather on all the campus constituents, including students, faculty, staff, and administration. Every component of the campus environment is impacted by change brought about by the ERP implementation project, and therefore, institutions must plan for and be prepared to address the many changes brought forth from the ERP implementation project.

Implementation Team Members Effort

From the perception of the respondents, the data suggested the individual effort was greater than the overall effort of the university as it relates to the success of the ERP implementation project. Given the high level of success for the ERP implementation

projects as reported by the respondents, the outstanding question is why the respondent

effort appeared to be so much greater than the university effort as reported by the

respondents. Perhaps this perception from respondents that the individual effort was

greater than the university effort was the result of the active participation by respondents

in implementing the technologies of an ERP system. At the same time, institutions need

to be cognizant of the individual efforts and their specific roles in the ERP

implementation project.

<center>Future Research</center>

Several specific aspects of ERP implementations were identified that warrant

additional attention and research. Although each of the specific aspects was identified

and discussed in the review of literature in Chapter Two, targeted research may reveal

how each aspect more specifically impacts the ERP implementation project. These

specific aspects include better communications to campus constituents, addressing the

impact of change on the organizational structure and culture, and motivations of

implementation team members.

Communications to Campus Constituents

Communication is a much studied term. In many contexts, communications and

technology oppose each other; however, as technology continues to work its way into

every nook and cranny of the higher education environment, it is imperative that proper

and adequate levels of communication about technology be incorporated within the

framework of the organization. The data from this research project indicated more could

have been done to address issues of communication throughout the ERP implementation

project. Since the perception of the respondents was that the ERP implementation

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projects were all very successful, what more was desired in the communication arena?

The researcher believes there is valuable information yet to be uncovered regarding

communications within the framework of ERP implementation projects.

Impact of Change on Organization and Culture

Change is synonymous with ERP implementation projects. The whole field of

change management studies is wide open as it relates to ERP implementation projects.

However, from the data analysis conducted, there is reason to believe not enough

attention and detail was targeted toward the impact of change on the organizational

structure of the institution and the organizational culture. The data also suggested these

specific areas may have been ignored, or perhaps it would be better stated, taken for

granted. The researcher believes value and merit exists in defining and creating studies on

the relationship of ERP implementation project success and the many aspects of change

as they apply to the organizational structure of the institution and the culture of the

organization.

Individual Motivation

From the viewpoint of the researcher, it was very interesting to see how the data

indicated that the respondents in whole generally perceived more individual effort was

put forth than effort from the university as a whole. Did individual respondents truly

believe if it had not been for their effort alone, the ERP implementation project would not

have succeeded? Or is the apparent disparity between individual effort and university

effort the result of the perceived lack of appreciation exhibited by the institutional

leadership and ERP project leadership? In any case, the researcher believes valuable

information can be obtained from research that target individual efforts and the

motivation of the individual. It is believed this topic would have merit to those higher education institutions embarking upon an ERP implement project.

Summary

Organizations have spent billions of dollars implementing ERP systems, and the expenditure of budgeted and non-budgeted funds on ERP systems is regarded as the single largest investment made by organizations in the arena of technology (Al-Mashari, 2003; Dong-Gil Ko, Kirsch, & King, 2005; Holsapple & Sena, 2003). Furthermore, implementation of an ERP system is one of the single largest investments in dollars and human resources that institutions of higher education might ever make (Kvavik & Katz, 2002). The optimal goal and desire of any ERP implementation project is to successfully complete the defined visions, goals, and expectations of the ERP implementation project.

All higher education institutions require access to relevant and timely data that can be utilized to make the difficult decisions that will have consequences for the daily institutional operations, structure, and culture (Fowler & Gilfillan, 2003; Luo & Strong, 2004; Yakovlev, 2002). With the advances in technology, the logical conclusion and expectation is that an ERP system will provide the basis and foundation for any organization to meet data requirements for decision making purposes. Important lessons can be learned from educational institutions where ERP solutions have already been implemented. There is very little room for error when entering into a contractual agreement to successfully deploy an ERP system.

According to the review of literature in Chapter Two, many factors impact the deployment of an ERP system. The investment of financial and human resources in higher education institutions is very high for ERP implementation projects (Dong-Gil Ko,

et al., 2005; Fui-Hoon Nah, 2003; Haines, 2003). In addition, the rollout of ERP implementations is very complex (Songini, 2003). In the higher education environment, virtually no other single item or event can change the organizational structure and organizational culture, norms, and values as dramatically as an ERP implementation (Siau & Mesersmith, 2003). Therefore, conducting a case study research project using quantitative and qualitative data analysis on several higher education institutions that recently completed an ERP implementation project has the opportunity to share experiences, lessons learned, and other valuable information to those institutions yet to embark upon an ERP implementation project. In addition, concentration on specific factors that may have more of a bearing on the overall success of the ERP implementation project would be of value to institutions undertaking an ERP implementation project.

Research questions were based on the information gathered from the review of literature conducted in Chapter Two. Five research questions were designed to investigate the relationship of specific factors on the success of ERP implementation projects in higher education. The research project was conducted using input from five public and private 4-year higher education institutions in the Midwest. Each institution completed its respective ERP implementation project from January, 2006, through October, 2007. Specific factors were identified as having a greater impact and relationship on the overall success of the ERP implementation project, process, and methodology. A survey was utilized as the data gathering tool. The survey consisted of a series of Likert-type questions using a 5-point scale and a series of open-ended questions. A survey return rate of 44.9% was obtained with a quantitative and qualitative analysis conducted on data.

The five research questions all targeted the relationship and impact of keys factors on the overall success of the ERP implementation project. Each of the institutions participating in this research project reported their ERP implementation as a success. It was important to verify the success of the ERP implementation projects at each institutions because the research questions are engrained with the assumption that the ERP implementation projects were successful. Therefore, several survey questions were targeted to verify and confirm success of the ERP implementation project.

For Research Question 1, the data indicated that goals, visions, and expectations of the ERP implementation project were effectively communicated to the implementation teams and the campus community. According to the respondents' perception, the goals, reasons, and expectations that were defined to the campus community for engaging in the ERP implementation project included automation of business processes, better and faster access to data, better service to students, comprehensive system integration, improved accuracy and central database, and the use of new technology. The data also supported the purported key connection between the level and extent of the definition and communication of goals, visions, expectations, and other components of the ERP implementation project to the campus community and the overall success of the ERP implementation.

Regarding Research Question 2, the premise of this research question dealt with a key connection between the change that resulted from conducting BPA or re-engineering efforts and implementing the outcomes as compared to the overall success of the ERP implementation project. The data indicated from the respondent's perception that the values and benefits of engaging in an ERP implementation project were defined and

communicated to the campus community in addition to the implementation teams that included better service to students, central repository of data, compatible system across functional lines, defining and shaping processes, enhanced communications, sense of accomplishment, new functional use of system, teamwork to complete project, and updated technology. The data suggested there was value in conducting the BPA and re-engineering processes, which was consistent with the review of literature suggesting these that activities should not be taken lightly. However, the data do not indicate a key connection exists between addressing issues of change and overall success of the ERP implementation project

The existence of a key connection between the investment of financial resources and human resources in an ERP implementation project and the success of that ERP implementation project was the underlying foundation for Research Question 3. The data clearly indicated that respondents perceived great value existed in the commitment of financial resources and human resources on the ERP implementation projects that included improved functionality and efficiencies, increased communications, increased productivity, integrated system, replaced old and obsolete system, and services to students and staff. Interestingly, the data suggested that respondents perceived more attention should have been placed on the human resources component. As mentioned previously, the perception of the respondents was that the ERP implementation projects were successful. The data suggested that the commitment of financial resources and human resources on the ERP implementation project is important and plays a significant role in the overall success of the project.

Regarding Research Question 4, the data revealed that respondents in general perceived the institution engaged in steps and practices to prepare the campus community for the changes brought about by the many different potential drawbacks, pitfalls, and shortcomings of any ERP implementation project. Much of the survey data supported the information obtained from the review of literature that indicated addressing the drawbacks, pitfalls, and shortcomings of an ERP implementation project is an important component of an ERP implementation project. The perception from the respondents indicated steps and measures taken by the leadership to protect against the drawbacks, pitfalls, and shortcomings of an ERP implementation project included access to real time and accurate data, access to training, assigning data ownership, change of position and duties, regular meetings and communications, and staff encouraged to be engaged. Even though the data suggested that a small group of respondents perceived the university did not do enough, the data indicated that overall the respondents perceived the university and project leadership took the necessary steps and measures to prepare for change associated with the drawbacks, pitfalls, and shortcomings of any ERP implementation project. The data also supported the existence of a connection between the steps and measures taken to prepare against the drawbacks, pitfalls, and shortcomings of an ERP implementation project and the overall success of the ERP implementation project.

When considering Research Question 5, the data strongly indicated the respondents perceived the university engaged in activities to prepare the campus community for changes in the functionality of the workplace brought about by the ERP implementation project. These activities included administrative support, appropriate implementation time lines, appropriate levels of funding and staffing, building project

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document and planning, invested hard work, regular meetings and communications, teamwork and joint efforts, testing, training, and use of dedicated consultants. Although some respondents indicated more effort could have been conducted in preparing the campus community, the data convincingly indicated that the respondents perceived the ERP implementation projects to be very successful. The foundation of this research question was built on the ability of the university to make the necessary accommodations and arrangements to prepare the many areas of the campus community for the functional changes in the work environment as associated with the success of the ERP implementation project, which the data indicated was accomplished.

Although there is no factor or group of factors that guarantee the success of an ERP implementation project, key factors do exist that have a bearing on its success. The intent of this project was that the findings add to the body of information pertaining to ERP implication projects such that other higher education institutions embarking on the ERP implementation project can learn from others who have already completed the process.

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Survey

Please respond to the first part of this survey by selecting the number that most closely reflects your thoughts and experiences of the ERP implementation project at your institution.

1. On a scale from 1 to 5, with 1 being "Not Defined" and 5 being "Clearly Defined", how would you rate the institution in defining the vision, expectations, and goals for the ERP implementation project to the campus community?

    Not Defined   Clearly Defined
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

2. On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the effectiveness of overall communication from project leadership on the ERP implementation project?

    Not Effective   Highly Effective
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

3. On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how would you rate the value of the BPA / re-engineering processes?

    No Value   Great Value
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

4. On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the effectiveness of implementing BPA/re-engineering outcomes throughout the ERP implementation project?

    Not Effective   Highly Effective
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

5. On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how you would you rate the investment of the institution's financial resources against the results and outcomes of the ERP implementation project?

    No Value   Great Value
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

6. On a scale from 1 to 5, with 1 being "No Value" and 5 being "Great Value", how you would you rate the investment of the institution's human resources on the results and outcomes of the ERP implementation project?

    No Value   Great Value
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

7. On a scale from 1 to 5, with 1 being "No Change" and 5 being "Extreme Change", how would you rate the degree of change when comparing how business was conducted before the ERP implementation project and after the ERP implementation project?

    No Change   Extreme Change
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

8. On a scale from 1 to 5, with 1 being "Not Effective, and 5 being "Highly Effective", how would you rate the steps and measures taken to prepare for and protect against the potential drawbacks, pitfalls, and shortcomings of the ERP implementation project?

    Not Effective   Highly Effective
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

9. On a scale from 1 to 5, with 1 being "Not Effective" and 5 being "Highly Effective", how would you rate the institution's effectiveness of preparing the campus community for the change on the organizational structure and culture resulting from the ERP implementation project?

    Not Effective   Highly Effective
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

10. On a scale from 1 to 5, with 1 being "Not Successful" and 5 being "Highly Successful", how would you rate the overall success of the ERP implementation project?

    Not Successful   Highly Successful
      1 ◯   2 ◯   3 ◯   4 ◯   5 ◯

11. On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort", how would you rate your effort to ensure the success of the ERP implementation project?

No Effort   Extreme Effort
   1 ○   2 ○   3 ○   4 ○   5 ○

12. On a scale from 1 to 5, with 1 being "No Effort" and 5 being "Extreme Effort", how would you rate the overall institution's effort to ensure the success of the ERP implementation project?

No Effort   Extreme Effort
   1 ○   2 ○   3 ○   4 ○   5 ○

13. What was your role in the ERP implementation project?

   ○   Member of Project Management Team

   ○   Project Manager

   ○   Functional Team Lead

   ○   Technical Team Lead

   ○   Functional member of specific module implementation team

   ○   Technical member of specific module implementation team

In this part of the survey, please respond to each of the open-ended statements statement based on your role and participation in the ERP implementation project.

14. Describe what visions, expectations, goals, and reasons were communicated to the campus community for engaging in the ERP implementation project.

15. Describe the benefits and values of engaging in the ERP implementation project.

16. Describe whether or not, and why, the results of the ERP implementation project were worth the commitment of the institution's financial and human resources.

17. Describe any step or measure taken to protect you and the campus community from any potential drawback, pitfall, and shortcoming of engaging in the ERP implementation project.

18. Describe any operational change or impact upon your position responsibilities that occurred as a result of the ERP implementation project, and how you were prepared for any of the changes as a result of the ERP implementation project.

19. Describe any steps and actions taken to ensure the success of the ERP implementation project.

20. Describe your thoughts and opinions on the ERP implementation project and the overall success or failure of the ERP implementation project.

Appendix B

Survey Criteria

The defined criteria and requirements for collecting survey information via a web interface is as follows:

1. The web page must easy to navigate.
2. Font and character size of the survey should be easy to read.
3. Data collected from the survey should be stored in a database file such that the information can be exported in a flat file format and given to the researcher after the survey is shut down.
4. Only defined and specified individuals from the population sample should be able to access and enter survey data.
5. Authenticated credentials should be utilized to ensure security.
6. Each participant should be able to complete only one survey.
7. After the first two weeks of the entering data, a list of those participants that have not yet completed a survey needs to be given to the researcher.
8. Putting the web page into production mode must be coordinated with the researcher as e-mail notifications are sent to the research sample population participants.

Appendix C

SURVEY CONSENT FORM

Identification of Researchers: This research is being done by Jim Graham, a graduate student with the Educational Leadership and Policy Analysis department at the University of Missouri – Columbia.

Purpose of the Study: The purpose of this research project is to determine the impact of leadership and change management in the implementation of an ERP system in a university environment.

Request for Participation: I am inviting you to participate in this research project. It is your decision on whether you would like to participate. If you decide not to participate, you will not be penalized in any way. You can also decide to stop at any time without penalty. If you do not wish to answer any of the questions, you may simply skip them. You may withdraw your data at any time of the study. Once you turn in your responses, no one, including myself, will know which survey is yours.

Exclusions: You must have been directly involved with one of the project teams for the ERP implementation project at the university.

Description of Research Method: This research project involves completing a short survey. The survey will ask you about your roll in the ERP implementation project and your thoughts on the impact of leadership and change management factors on the ERP implementation project. Completing the survey will take about 20 minutes to finish. If you would like to know the results of this research project, please contact me. If you have questions about the project, you may contact my advisor, Dr. Sandy Hutchinson via e-mail at hutchinson@ucmo.edu or telephone at (660) 543-4720.

Privacy: All of the information collected via the survey for this research project will be anonymous. Your name or any information that could be used to identify you will not be collected. You will take the survey via a web interface in any location of your choosing.

Explanation of Risks: The risks to this study are similar to the risks of everyday life.

Explanation of Benefits: The benefits of this research project will be to share information relative to the impact of leadership and change management factors on an ERP implementation project with other higher education institutions. As an integral part of the ERP implementation project, your input will have great value of the on the end product of the research project.

Questions about Your Rights: If you have any questions about your rights as a research participant, please contact the University of Missouri-Columbia Institutional Research Board at (573) 882-9585.

Your completion of the survey indicates your informed consent.

Appendix D

Quantitative Survey Questions Data

Responses and Percentages for Likert-Based Survey Questions 1 Through 12

	Likert Scale Values						Percentages					
	1	2	3	4	5	Null	1	2	3	4	5	Null
#1	1	9	23	20	20	1	1.4	12.2	31.1	27.0	27.0	1.4
#2	3	17	23	17	13	1	4.1	23.0	31.1	23.0	17.6	1.4
#3	9	16	28	14	3	4	12.2	21.6	37.8	18.9	4.1	5.4
#4	17	17	24	9	3	4	23.0	23.0	32.4	12.2	4.1	5.4
#5	0	6	26	19	22	1	0.0	8.1	35.1	25.7	29.7	1.4
#6	4	7	20	21	20	2	5.4	9.5	27.0	28.4	27.0	2.7
#7	0	4	15	38	16	1	0.0	5.4	20.3	51.4	21.6	1.4
#8	8	16	27	13	9	1	10.8	21.6	36.5	17.6	12.2	1.4
#9	5	18	30	12	7	2	6.8	24.3	40.5	16.2	9.5	2.7
#10	0	2	25	22	24	1	0.0	2.7	33.8	29.7	32.4	5.4
#11	0	2	2	21	45	4	0.0	2.7	2.7	28.4	60.8	5.4
#12	0	2	24	26	21	1	0.0	2.7	32.4	35.1	28.4	1.4

Statistical Data for Likert-Based Survey Questions 1 Through12

Question	Mean	Std Dev	Mode	Confidence	Count
#1	3.67	1.055	3	0.240	73
#2	3.27	1.13	3	0.258	73
#3	2.80	1.044	3	0.238	71
#4	2.49	1.126	3	0.257	71
#5	3.78	0.975	3	0.222	73
#6	3.64	1.154	4	0.263	72
#7	3.90	0.802	4	0.183	73
#8	2.99	1.161	3	0.264	73
#9	2.97	1.048	3	0.239	72
#10	3.93	0.887	3	0.202	73
#11	4.56	0.694	5	0.148	70
#12	3.90	0.853	4	0.194	73

Appendix E

Responses to Survey Open-Ended Questions

Question	Comments
14	Aging mainframe system and better service to students.
14	All areas would provide needs and wishes. Plans would be worked out with input from across campus. This did not happen.
14	automation of business processes--intergration - reduce redundancy-- improve accuracy of information --
14	Communication with the campus community was very limited from the project leadership in preparing the campus. All communication was left up to the functional team.
14	Consolidation of data into a central database. Taking advantage of new technology. Participation allowed input into the set up of the system.
14	Elimination of dated business processes, modernization of core technology, reduced dependence on local knowledge and expertise for support of core I.T. systems.
14	General goals were communicated. However, no expectations were communicated to ME and how MY job would be affected during the implementation (such as working 80 hours workweeks for several months).
14	Getting information faster and easier.
14	goal was to have a single data base for all administrative functions to eliminate duplications and multiple platform incompabilities
14	I believe the campus community, outside of the offices involved, was not exposed to the visions, expectations, goals and reasons.. unless they happened upon a website with a bunch of rhetoric and outdated information.
14	I think the institution failed in the early stages of the implementation. Quality communication did not occur until a little later in the game. Being part of the first module (Admissions) to implement, we lost out on some things. The expectations that were communicated to me were that we were implementing Banner out of the box--no mods.
14	Implementation of a comprehensive system with built-in flexibility between modules. Eliminate duplicate entry and allow communication between the modules.
14	Improved experience for students through increased online capabilities and more efficient business processes to support them.
14	It was a directive of the president that we work together - all divisions/departments - to ensure the success of the project. The need was great. Our legacy systems were not integrated, much time was spent correcting mistakes from data errors in many systems. Very little automation was available. Students could not pay online. Our technical staff could not keep up with the regulatory requirements.
14	It was clear to me why we were making this change. The expectation was

	that we would get this system up and running on time and within budget.
14	It was explained the implementation would be a very time consuming priority project resulting in a fully-integrated system.
14	It was never stated this way, but I believe that management wanted to replace the entire technology stack with a commodity off the shelf product. It appeared that they didn't really care which one we bought.
14	It would allow all university systems to talk with each other. All would be on same system.
14	More streamlined processes
14	Open meetings were used to prepare the campus. Expectations, reasons for change and goals were discussed.
14	Our main goal in the implemenation of ERP was to have one central database for the entire campus.
14	Technological advances, better reporting, centralized development, interoperability, single database, project timelines
14	The campus would be better equiped to support the students, faculty, and staff by combining the multiple systems across campus so everyone was utilizing the same data in the same way.
14	The CIO and CFO explained the need for a fully integrated campus wide ERP system for increased service and efficiencies plus to modernize the Universitys technology and software.
14	The desire was for improved business practices, central storage of a person's ID and profile, a portal allowing single sign-on access to many services.
14	The expecations for the campus was for all areas to have there modules inplemented and abide by the time line provided by the project director. This was the campus is able to share data by all being on the same software.
14	The primary reason for the change was the need for a fully integrated software system. In addition, we were having to purchase a new mainframe system.
14	The university wanted an integrated package and our old system did not prove what we were looking for.
14	There was not. There was the goal of having a unified system, but expectations were not made clear from the upper adimnstration which is resulting in problems we are having now.
14	To increase the University's value with updated services to compete with today's market in regard to technology.
14	Trigger events required system changes, the needs and value of integrated data and functionality lead to the selection of a suite approach vs a best of breed product selection process. Campuswide leadership visions lead to moving forward.
14	unified and cohesive processing
14	Vision - to have campus wide integrated system.--Expectations - no modifications to canned software--Goals - deadlines for each modules implementation were set--Reasons - To become more integrated and to get off antiquated system.--NOTE: Our legacy system was NOT antiquated and it was more integrated in some aspects then what we are on now. Most

	things that we were not doing with legacy had more to do with policy then technology. --
14	Visions - a fully integrated system that would provide better access/benefits for students. Expectations were basically that we were to "just do it" for the betterment of the University. Goals were clear as to when things had to be completed, when we would go live, etc. Reasons were fairly clear - the University created a newsletter that went out to all, explaining what was going on in the ERP project, and why it was needed. We'd outgrown our home-grown system, and various groups across campus were running independent systems and shadow databases that were not cohesive or able to communicate in anyway.
14	We were told that the new product would be better than what was in place.
14	Goal/expectation was to implement on time and within budget.
14	Integrated system for all departments to be able to utilize the same data.
14	Expectations and goals were that we stay on target with our go-live dates. Administration made it perfectly clear why the campus was moving to an integrated system and that everyone was to work together on the project. It was communicated to us to work within our current policies and procedures as much as we could but to also look at each policy and procecure as we went along and be able to stand behind the why's of each procedure. If we were doing something because "it was always done that way" we were to ask ourselves "is it still the best way and why" before trying to implement the process. I think these ideas, goals, and expectations played a key part in the success of the overall implementation for our University.
14	Implement a unified system where all parts communicate with each.
14	Mainframe purchased software would be extinct; need for integrated database to improve reporting accuracy.
15	A common shared database is one of the greatest benefits. Enhanced reporting capabilities is another. Enhanced timekeeping and payroll processing was another benefit.
15	A huge learning process that can be good though frustrating
15	Achieved visions, and goals. The institution emerged in a changed business state. Improved services to our students.
15	All departments can see there departments transactions daily.
15	Being personally involved in the implementation of two modules gave me an immediate look at the difficulties, challenges and shortcomings of the system as they were discovered.
15	Benefits and values are still emerging as kinks (we implement work around for known system defects) and conflicting module set-ups are improved. ---- Basic benefits - can now make data based decisions.
15	Bringing the university's administrative functions into one standard platform with one common database allows one authorative source of information. We brought our technology up to industry standard and will be forced to not fall behind.
15	Brought many offices to gether to work on project
15	By being a member of the project team, I was very prepared to conduct

	University business when the system went live.
15	Communication across the aisle to differing views and needs.
15	Everyone came to "play" and "work" in the same "sandbox". No more of "my system is better than yours".
15	forced examination of business processes to become more defined and less subjective
15	Forced the re-evaluation of legacy processes
15	From my vantagepoint there are none. Some may point to the student's ability to access information via the web now but this also could have been accomplished with our old system.
15	Having one integrated system is helpful.
15	I have been able to continue to suggest, and inplement improvements within the new system.--
15	I think, if anything, we communicate much better as a university because of this shared and, at times, painful implementation.
15	Improve business applications. Move business processes to the business units of the institution.
15	In many cases, it was an opportunity to dismantle a long-standing, inefficient process and start over. The financial analysis process on campus has become much more accurate and user-friendly.
15	It allowed the participants to work closely with other offices to see how the University data flowed and affected other areas on campus. It provided insight into the capabilities of the system but also showed you that the system was not a "plug it in and it works" type software. A lot of set-up is involved to permit the system to work well for "institution". The software is very flexible. It also allowed me to see how the software is kept current and the importance of a "vanilla" version.
15	It gave each department the opportunity to look at its processes and ensure that they were efficient and effective
15	It was a usually enjoyable challenge on a personal and professional level. The institution needed to make the system integrated to the benefit of students. They were the focus, which made this work.
15	Learned more about the overall business processes of the University.
15	Modernized data management, system functionality, data analysis, regulatory compliance and reporting. Consistent standards for official data sources. Replacement of out dated hardware, systems and processes.
15	more up to date system to do day-to-day process
15	probably the biggest benefit for me was coming back and being able to train my staff on the use of the new system, and being able to explain why things had to be done specific ways. I find it easier to understand why I'm doing something that seems random and useless if I understand the effect that will hae on other areas. It allowed our group to start thinking outside our office's processes and gain a better understanding of how all processes across campus work.
15	Probably the biggest 'unknown' benefit from this project was that we now have a core group of people who understand all of the modules and how

	they interact together. This type of cross-department knowledge did not exist before the banner implementation.
15	Provided an opportunity for business process redesign and enhanced communication and participation across functional areas and offers the possibility of leveraging Web-enabled user interface and an integrated database to create an effective customer experience.
15	Shortened some processed and brought the university onto one system
15	Streamlined many functional processes on campus, provided better access to students for the entire recruitment, financial aid, registration and fee payment process. Stronger reporting ability.
15	The benefit of implementing was having a system which was interactive between departments, which at the same time, if not managed correctly, can end up being a disadvantage.
15	The benefit to upper management was taking control of the financial and record keeping process?s away from the functional units. The benefit for the university was that one functional unit could not stop the progress of another unit because of related data processes. The benefit to the technology unit was long term job security because any ERP product will not deliver the function that custom software does.
15	The greatest benefit and value is by being a primary participant you have the opportunity to shape new processes. While serving on the implementation team, I also had responsiblity for developing tables and new processes for functional users.
15	The project is a huge challenge so when you successfully meet it you have a great sense of accomplishment. You have the opportunity to work with others around campus that you might not otherwise. You have the opportunity to learn about yourself, others, and the campus.
15	This project allowed members of the functional departments to have a say in how their areas were designed/set-up.
15	We are in a far better system then we were in previously. We have been able to grow are area in regards to data, and create better business practices in which has cut down on time it takes to do some tasks.
15	We built everything we have and know how we designed it. It is now easier to make changes to it as needed, since we understand how it works.
15	We took about four steps backward.
15	We went from having two different systems to one system that would communicate with other departments.
15	Benefits/values were the upgrade of an aging system, finding new and better ways of doing business, reviewing processes and jobs within the unit to better utilize skills of staff
15	Consistency of data. One database of all constituency groups. Availability of data warehouse to extract specific information. Self-service capabilities.
15	Working together and communicating with each other is the only way you're going to have success in such a project. Our University has always done this well which played a large role in our success. Whenever you move to something new (whether it be a small office policy/procedure or a

	large univeristy-wide implementation of an integrated computer system), you're always going to look at each process very carefully and analyze each bit. This analyzing of each policy, procedure, paperwork, form, etc. was very beneficial during our implementation as we were forced to look at all of our departments carefully and streamline policies, procedures, etc.
15	Streamline our business. Move from outdated hardware to current technology.
15	integrated database
16	A great deal of inter-area interaction and business process improvemant was achieved. Students are much more engaged online. We are now in a position to leverage our enhanced Web-based relationships.
16	Although implemntation and the first year was incredibly difficult, the result has been worth the institution's commitment.
16	Banner ERP enhanced reporting of accurate, timely and consistent data. Prior to Banner the University systems were not "on-line real-time". In addition, without integration within the previous legacy systems, data was inconsistent and often inaccurate.
16	Probably the biggest 'unknown' benefit from this project was that we now have a core group of people who understand all of the modules and how they interact together. This type of cross-department knowledge did not exist before the banner implementation.
16	for the advancement area, believe worthwhile because current system was obsolete; however, not sure Banner has yet realized its potential promised
16	For the end user (students in this case) - it has many benefits that were not available or even possible in our old system. For those of us who do data entry daily, and run various processes... at times it doesn't seem worth it because there seems to be more work required to enter things in our system than was needed in the old system.
16	I am not a financial person so I don't know if we received GOOD Value for the money we spent, but we did receive some value. WE are better off now than when we started. The power brokers were removed and all requests for changes are now tempered with the reality that the core technology at the center cannot be changed.
16	I believe it brought the University up to date in the technology world. It forced departments to work together for the common good. It enlightened the user community as to what is involved in maintaining complete and accurate data on all levels. I believe it gave more "ownership" to the users.
16	I believe that it was worth the commitment. There were to many outdated and home grown systems to maintain. Have one system has created a better information flow, and allowed different areas to communicate and work together more effectively.
16	I believe the increase in productivity and the communication that now exists between the modules was well worth the financial commitment.
16	I still maintain that for a fraction of the money spent on hardware, software and all the new positions that were created, we could have made our legacy system as good or better.

16	I work with the Human Resources module. I find that it is a reduntant system. What you put on one form does not automatically update the same information on a different form.
16	Improved business processes. Self service for students was major success.
16	In some ways - for areas who's needs have been mostly met, the ERP implementation has been worth the cost. However, some areas have not had their needs met...basically because one or two areas monopolize the time of two IS staff. Insufficient number of staff for this area. It's a wonder staff haven't resigned or become ill because of the stress and overload.
16	It has allowed better tracking of students, more timely purchasing, and a more efficient payroll system.
16	It was absolutely worth the commitment. The implementation forced process changes, which resulted in enhanced service to students and employees.
16	It was definitely worth it as we were able to move from a mainframe system that was enhanced in somre areas to it's limit and now allows us to take advantage of new technologies to provide campus with strategic advantages.
16	It was not at the time worth the committment, perhaps in the long term...
16	It was worth it from an institutional perspective because our legacy systems were not integrated.
16	Move off of legacy hardware. Our software vendor desupported the version of software we were running prior to the implementation.
16	Moving toward a full-integrated system is still a very desirable goal. I am baffled as to why the Office of Admissions, the gateway to student data, is not utilizing a Banner product.
16	Outsourced development of the ERP, new technologies utilization, standardization of the applications, and best or breed add ons.
16	Prepared the campus for the next step in its growth to become a world class university. If you want to be big, you need to act big and that started with combining all the multiple systems into one pot.
16	The commitment was highly worthwhile. When comparing where we are today with administrative systems to where we would have been following an alternate direction, we are in a position of having better systems that deliver more efficient and effective services at a much lower on-going cost, giving the university the flexibility to do more with their systems and resources.
16	The ERP implementation project was well worth the commitment of the financial and human resources. The ERP selected had the best record on on-time, on-budget implementation and we were able to meet our go-live dates. While the human resources were stretched very thin, the knowledge of how the system is put together is invaluable.
16	The greatest result was improved efficiencies.
16	The implementation of ERP was worth the effort it took to implement this system because we are now able to use one database to house all the information that is vital to the university.

16	The institution needed to make better decisions in back-filling and supporting the needs of departments as they implemented the system. Good people were lost as a result of burn-out and not acknowledging the additional demands that the project was placing on people.
16	The new system has allowed us to improve the way we do business so I feel it was worth the time and effort.
16	The old system was no longer supported.--We are able to get more information faster and export to Excel. Old system used a lot of paper for reports and you could not get all of the information needed form just one report usually.
16	The results of the ERP implementation project were well worth the commitment of the institution's financial and human resources. In addition to accomplishing all of the expectations and goals listed in the responses to questions 14 & 15, the Banner ERP system will provide an automated solution for a 10 - 15 year time frame.
16	The system is better now in terms of fairness, service and value to students. The issues of access, both to information and to their financial aid dollars, have been addressed by the new system. I believe this project was critical and the resources were wisely spent.
16	Things are flowing pretty well. It does seem to save some time when actually calculating and balancing a payroll. There is so much to the system that you never really know it all. It has emmense posibilities if you know how to build your own reports from it thru sql and putting into reporting services.
16	We are now able to complete more business online, which our students expect and deserve. Business on campus is done faster, better with more accuracy. We are more productive.
16	we had to move to a more robust system so the financial cost was necessary. however the institution did not plan well for a ful implementation across all functional areas with all packages. Much was left to future roll out when ERP funding was gone and resources not available. On th HR side there was little recognition of the staff hours required to implement and how many people were engaged in their regular job and the implementation. There was little or no concern of upper administration or the Project leadership on handling burnout and the extra stress on the human resources.
16	We not have 1 system in place that covers all the many facets of the university.
16	While some may say the system doesn't work for them I beleive overall the system does work and the university has been able to move forward in changing processes. I beleive those that are not seeing the benefit of the system are the ones that don't like change.
16	Yes
16	Yes - the changes in process and all policies and procedures that support them likely could not been successful without the focus of the ERP project, and its role as a change agent supported by the President and his leadership team.

16	Yes, they were worth it. Our output can more easily be substantiated and justified.
16	Aging systems required that something be done. Bringing in the new system was the best possible solution to keep the University going and moving forward
16	Yes, I believe the effort and resources were worth the investment. The system is much better than the previous system with regard to the user.
16	Because of where the world is heading on the information highway, an implementation of an internet-based system was inevitable. The support given by the institution and it's leaders made the project bearable. While there are numerous items within the system that may not be to our liking, I think the overall system and the results of the implementation were definitely worthwhile.
16	Very worthwhile. End-users have better access to data in a self-service mode.
16	Worth commitment; gained functionality, integrated database; administrative offices now work more as a team.
17	A lot of effort was put into eliminating shadow alumni and donor databases and not sure if this succeeded throughout campus
17	A real key was to contract with Sungard to provide dedicated Sungard consultants from start to finish with the system implementation for each module. Some consultants were better than others but overall they did a good job.
17	Any measures we on the IT side and the plan was that we had to implement. Even though we ran dual systems for 3 months there was little planning on how to keep in sync or in providing edits and reports. The knowledge skills set of the IT people was a drawback and a steep curve for them to overcome.
17	Cannot think of anything at this time.
17	Communication was very good around campus. Training was excellent, resources were created, but it was all a learning curve. I would say for those of us involved in the module that went live first - we were working blind a lot of the time. I personally did not feel like we always received the best answers/support from the reps from the company - and sometimes received confusing or even contradictory information on how to set things up, depending upon what consultant happened to be in town training us on various things that week. Those of us who were part of the first module go-live definitely were the guinea pigs! But we helped the others that came later understand all of the possible things to look out for. I do think that perhaps the biggest problem we were faced with was not being given proper information or even 'warning' from the consultants on what effects what we built at the beginning would have on everything else from there on out. And as we found, once it's built and used in our system, it can never be truly undone!
17	Communication. We tried to communicate to all levels as frequently as possible.--In addition, we required team leads to participate in all module

	training. This kept us moving forward together - toward the common goal of implementing all modules.
17	Detailed pre-planning by campus to identify all current processes to assure new system can handle the changes needed.
17	Employees' time demands for implementation and continuing use were underestimated.
17	Every attempt was made to include all stakeholders. If a committee was discussing an item that might have potential impact on an area that wasn't represented, that area was brought into the discussion. You can't be afraid to backtrack and realign your course, if you initially head down the wrong path.
17	Funds were reserved for additional software, training etc. that came up, so getting the support was not an issue.
17	I don't recall any protective efforts. This was pretty much a "get on the bus or off the bus" proposition.
17	IT staff time was protected by the administration to insure the project had personnel resources to implement the ERP project.
17	Let me respond to this by saying I would highly encourage any institution that is considering such a project to build within their implementation budget monies to provide temporary staffing during the 12 months key staff are unavailable to perform their regular duties.
17	Lots of testing, and training before implementation.
17	Meeting milestone deadlines, training users, setting realistic goals
17	Nearly every process was well modeled in put test environment before implementation. This result was possible because of the very significant and broad participation by every affected back office area.
17	none
17	None that I am aware.
17	None that I can think of
17	NONE; there was no money for additional support and functions were not backfilled.
17	Pasted a page of project charter.
17	Project teams were set up and for the most part supervisors allowed project members the time away from their offices to participate.
17	The implementation process was designed to be highly inclusive of all elements of the campus as a method to help manage the risks associated with an ERP implementation.
17	The University was not concerned, in any way, about any pitfalls or drawbacks for the employees who were expected to implement the ERP project. They may have taken measures to protect the University in other ways.
17	There are many pitfalls and drawbacks in an ERP project. We tried to manage this with a constant stream of information from the implementation teams to those in effected areas. There were also many opportunities for those not working within the core implementation group to communicate their fears and issues.

17	There was training on preparing staff for the changes, but this didn't happen until well after our module was implemented. The leadership team kept close watch on progress and budget, and I think this protected everyone.
17	There were multiple tracks of training and communication about the project. The legacy system was left in place as long as possible to act as a backup.
17	There were no steps taken. It was additional work in which no compensation was given. We knew things would be better in the end and they are. There was not explination that the parts would not be implemented for years and that we would still be limping along in some areas.
17	Training was supplied in abundance. New software and hardware tools were made available. New positions were created and filled with very qualified people. These were all done to prevent implementation from failing.
17	"Institution" made a good decision to pay for the amount of consulting that it did. Working so closely with the consultants reassured me that we would be successful because the consultants had both knowledge and experience we could draw upon.
17	We did a lot of testing of the new system before going live. Kept the old system available for awhile after going live.
17	We had a lot of meetings to discuss options - but little follow through on supporting each department.----Ongoing changes in consulting staff tripled work loads as other modules had to continually modify their set-ups.
17	Weekly meetings with all modules to ensure that everyone's needs were met and that all problems were addressed.
17	Our I.T. staff was dedicated to helping all faculty and staff in the implementation. They prioritized job/report requests from government reqirements to "wish lists"; Administration stood behind staff members during the implementation and understood what a difficult task the implementation was on top of everyone's regular duties. Because of this, part-time and temporary hires were approved to help cover various areas during the project.
17	Detailed implementation planning.
18	As a part of this project my job change tremendously. Before our implementation I was a data entry specialist, but now I write ad-hoc reports and manage the HR data for the university.
18	Automated systems were replaced with more complicated and less functional processes in Banner. We were not prepared.
18	Being in IT, this was just another big project.
18	Being on the lead team allowed me to understand changes that were taking place, and better to accept the changes. I have been able to streamline my job, and have been able to acquire new skills and new responsibilities.
18	Data is much more timely, accurate and consistent for analysis purposes and presentation to Senior Management.
18	Data security has come to depend primarily upon features of the Oracle database as opposed to being based upon programming in our applications.
18	During the implementation I was doing two full time jobs. It became

	apparent that in order to utilize Banner to the level that we needed to we would need a position dedicated to that. We did create a position following implmentation. I know supervise that area and am responsible for our data.
18	Historically, my organization was the analysis and development group. In the Banner environment, our primary role is systems/services support. This is a huge cultural change.
18	I began as functional team leader but early in the process change job responsibilities taking me off the project entirely
18	I don't think you can prepare enough when going through such a major conversion. The only thing you can do is try to maintain a sense of accomplishment along the way, and ensure that staff are not getting burned out.
18	I have a new position because of the implementation and have become the lead contact for our system my school.
18	I was told there would be drastic changes, but was not fully aware of how it would impact my work load.
18	Instead of entering things in two different systems we were able to enter into only one. This increased our processing time.
18	Learning the system and learning how to get the information we need.
18	Managing IT staff that had been primarily application developers that were transformed to resource support for the ERP project was major. All staff were trained in new technologies and roles.
18	Midway through the three-year project, I was asked to be the Project Manager. I had a two-week window to trade information with the outgoing PM; otherwise I had no special training. I carried on with my previous job and added the project managment for the ERP. It was a highly stressful year-and-a-half.
18	more actively aware of how the system works for our area instead of relying on others to show or tell me. I'm able to more effectively do my job by understanding the system and pull the information.
18	More reporting and processes now completed in departments, away from IT.
18	Most of my work time was spent on the project while finding time to continue my normal day to day role. It involved many extra hours of work.
18	Mostly delegation of responsibilities to others not so involved in implementation.
18	My position and responsiblities are constantly changing and evolving day-to-day. I started in one area and have since been moved to another. As new products/updates are implemented, I have been given more tasks. No complaints though, makes the job "interesting".
18	My workload increased. Additional responsibilities required because of ERP implementation.
18	None - I was hired as part of the implementation team
18	Prior to the ERP implementation, I assisted co-workers when they had issues with "their" systems. As part of the ERP, I became the expert on each system in our area, as well as the interfaces between modules, and

	helped lay the strategic and tactical framework of the system. Preparation - I attended all the training, functional and technical, that I could fit in; spent time with the consultants, learning as much as I could.
18	Prior to the implementation of Banner, we were fortunate to have many automated processes that had been tweaked through the years to perform flawlessly. Many of those functions are not possible in our Banner module. There was no preparation for this. We discovered them as our consultant moved us through the implementation process. As a result, we are manually performing such tasks which is a set-back of about twelve years.
18	Running dual systems and not preparing as an institution to backfill prevented the office from receiving adequate training. Work demands prevented senior level employees from coming back and conducting thorough training. Specialized staff had to learn much of the system on their own and were not in a position to learn from the consultants.----Burn-out, increased workloads, and loss of staff reduced morale and negatively affected the operations of the office.
18	Same responsibilities.
18	Since I had previously participated in ERP implementations, it was easier to anticipate the committment of time for our staff. We budgeted additional overtime in advance of the project.
18	The biggest change was that users became more involved in the system. It was a more equal partnership between my office and IS.
18	The new database structure prevents most of the applications staff from having to do all testing and maintenance after hours. It is very good to have the system up basically 24/7. It allows users to process their own data and run their own reports.
18	The on-going impact upon my position has been the requirement to hold weekly meetings with the Implementation Team and the Module Owner Users Group to track upcoming patches and modifications to the ERP system. I prepared for the responsibility of monitoring the overall ERP system by attending training sessions as frequently as possible during the Banner deployment.
18	The only real change I saw for our department was learning the new system.
18	The operational change and impact to my position responsibilities is to large to communicate on this survey. The University may have communicated to the team leads how the implementation of an ERP would affect their lives. However, that information was never communicated to functional employees who were also critical to the implemention.
18	This is another area I feel we failed in. The time commitment was never really clarified on the front end. During RFP stage, consultants talked about 100% backfill and that scared a few of us but we knew it would not happen. It made me personally plan ahead with my boss regarding my time commitment. However, I know others on the team who weren't includled in the RFP meetings and thus had no clue what they were in for, nor did their bosses. They were not supported in the same way and worked day and night trying to do their regular job as well as implementation tasks. The

	leadership should have better communicated and prepared everyone for the time commitment.
18	We (end users became more technical than we ever expected.
18	We were expected to keep the old in house system going as well as to build all the values into the new system. Many long hours were spent inputing data into the calculate system. We put a great deal of thought into how we built items, sequenced them, prioritized them etc, and this has paid off.
18	We were prepared for change. We were not prepared for a significant increase in the amount of work we would have to do. Everything seems to take longer in our system than it did in our old system. That said, I do acknowledge that our old system, being homegrown, was tailored to meet our specific needs, and we were very spoiled by that. it's been a challenge to try to make the new system work for us when it's "out of the box" so to speak, with no personalization or customization. We've had to change our business practices to fit what it can handle, rather than the other way around.
18	While the implementation was in process a number of us looked at the functional needs of the system and divided the responsibilities for data and data integrity, security and put that in place.
18	Work load increased dramatically during implementation. We were warned in advance of this happening.
18	Every aspect of this office's business changed as a result of the implementation. With the change brought increased responsibility to make sure my staff and the rest of the University who used my module were prepared for the change. Months of initial and continued training have added to my duties. Constant monitoring of security (who gets which forms, access, etc.) is also a different aspect of the job. It was there before but now is more complex.
18	The implementation totally changed the jobs of those working in HR. We had to learn all the processes of the new system through extensive training. We relied on system documentation and consultant's knowledge in the setup and utilization of the system.
18	Implementation of our product caused my department to need 2 additional FTE's. The state and federal regulations that we must follow gave us no choice in the need of additional staff as well as the need for report writing to ensure various processes were followed according to regulations.
18	Added new responsibilities and interactions with more staff. Not prepared by university. Relied on education and learned how to manage project as project progressed. Had great support from ERP project manager and consultants.
19	1. Mandate from the president to make it successful. 2. Made virtually NO modifications. 3. Communicate. 4. Training - invest in a trainer(s) to ensure all staff is adequately trained.
19	A definite timeline was established and publicized. On-site training was provided. User seminars were provided.
19	A real key was to contract with Sungard to provide dedicated Sungard

	consultants from start to finish with the system implementation for each module. Some consultants were better than others but overall they did a good job.
19	Again, having funding available is critical to dealing with unexpected needs for support, or software.
19	Attempts were made via groups.
19	cannot comment since was gone prior to these steps and go-live implementation
19	Cannot think of anything at this time.
19	Continued training and updates to the system.
19	Contract with the vendor to assure that they had a vested interest in completing the project timely and correctly by having an outcomes based contract rather than a time based contract.
19	Contracted for a high level of onsite vendor support during the implementation.
19	Despite my grumbling about some aspects of it, I believe we had a very successful implementation here. Some of it was trial and error, but our implementation teams were very forward thinking. Since most of the people who built our homegrown system were still on staff, they were instrumental in investigating the new system and figuring out how exactly to best import data, build custom tables, build reports, etc. While it may never be a perfect system, I think they have made it as successful as it can possibly be.
19	Each main area had a core group of individuals that were involved with the project from day one. This allowed us to have a say in the design of our information. It also made us "buy into" the project more.
19	Extreme credit goes to the many lower level staff who absorbed the regular work load of those who concentrated on the implementation tasks.
19	From our organization: literally years of planning - development of data warehousing in the late 1980's, and a slow migration from mainframe-centeric reporting and analysis tools to relational DB environment and reporting solutions.
19	Good communication among Team Leads. Weekly meetings to keep on top of everything.
19	Good leadership teams were put together and the project team, for my module anyway, were kept informed and involved. Leadership and tech members attended functional implementation/training meetings and learned along with us. Everyone knew this had to work and we could make it work. I felt this as a positive, not a negative, and worked hard to contribute so my area/office would not be negatively impacted.
19	I feel that IS made an effort to ensure success. They hosted updates, tied to communicate to the campus community, planned celebrations
19	I worked 80-hour work weeks for 7 months without a day off (including weekends and holidays).
19	Juat hard work
19	Many long hours of entering and testing data. Built and checked interfaces

	with the State system to insure they had all data necessary. TEST TEST TEST
19	On-going communication strategies were critical to the project's success. We advertised and celebrated early "wins". Snacks were always available in the work rooms where the different project teams received training and held meetings.
19	Open positions were filled with outside people who's job performance was tied to the implementation
19	Project management team was responsible for the management of the project and did an excellent job keeping the project moving.
19	Regular meetings, proposals outlining departmental needs, on going communication
19	Senior management consistently made area participation a priority throughout the implementation process.
19	Spending the money to have the consultants on-site three times more than a traditional implementation.--Purchasing an ERP with a proven track record and plenty of peers to get assistance from.--Purchasing the support from the ERP company to get help when we need it.--Putting together strong module teams, with a functional and technical lead.
19	the IT dept had spent 3 years building a datawarehose and doing data cleansing so we were in a very good position to do all the data transformations that were required for the ERP.
19	The pre-planning process was very thorough. The contract with SunGard was carefully reviewed. Two FTE Trainers were hired, specifically to advance Banner usage. The Team Leads were some of the best people on campus.
19	There was a lot of communication and working together with each module to ensure the success of the project.
19	Throw resources to the right areas, realistic deadlines and meeting them, training users about the applications.
19	Training was supplied in abundance. New software and hardware tools were made available. New positions were created and filled with very qualified people. These were all done to prevent implementation from failing.
19	Utililzing the resources provided by Sungard by hiring the consultants.
19	We all worked, testing and re-testing; fixing things that didn't work. Our consultant, who wasn't very good was on site.
19	We had a year to implement the HR module.
19	We spent a lot of time loading our data into a test enviroment. We were able to test new processes and made sure they worked the way we expected. This process also allowed the training needed for employees to get used to a new systme. The last three months we double entered data, tested. This allowed us to compare our legacy process to the Banner process. We had very little surprises when we went live.
19	Weekly meetings were established for the Implementation Team and the User Module Owners, and bi-weekly meetings were held for the Project

	Managment Team. A weekly conference call was scheduled for the duration of the project with the SungardHE Project Manager. A significant amount of time was spent early in the project developing the Project Definition Document. This effort provided us with a clear understanding of goals, objectives, mission, feasibility assessments, project scope, project milestones, budget, assumptions/dependencies, constraints, risks, organizational structure, assignment of responsibilities, training, configuration mangagement, change management, and a written and signed committment from the upper level administrators (President, Provost, and Vice Presidents).
19	Work, work, work!
19	Up front involvement in decision-making. Constant communication with campus community about progress of project. For staff involved at base level of project, time away to attend training and provide training and development of updated procedures manuals.
19	Extensive training. Extensive testing.
19	Staying on track with our go-live and communication within and between departments and various modules. Also, testing, testing, testing!!
19	All stakeholders were included. Schedule was carefully planned and everyone expected to hold to it.
19	Weekly meetings of campus project manager and module leaders.
20	An ERP implementation is all about change, which is hard for many people to accept. Be sure to put 'change agents' on the team. People who embrace change and can be cheerleaders for your project. Without this, a project like this will surely fail.
20	Banner has taken a lot of time and resources but our data and reporting is a lot more accurate than with the old system.
20	from a person involved early in the process and now only as a user, seems as if system has delivered some improved functionality but not all the tools promised such as ease of reports and information retrieval.
20	I believe that the infusion of new people who had the implementation as their primary focus was key to the success
20	I believe the ERP project was a success, with the finalization to come in the next two years. We don't yet have all the pieces in place, but we are getting close. We bit off a huge amount of work - all new hardware, all new software, all new functional interfaces, new programming languages - and we didn't go for the bare bones implementation. We made mistakes that we are still paying for, such as our inability to see that three months of limited dual data entry would make life work so much better over the course of many years. Not all of our consultants understood the package we thought we purchased and were unwilling to give us the guidance we needed.-- When we started the ERP project, I felt comfortable with the support pledged by the highest levels of the university administration. By the time the last module went live, however, the administration was almost totally new and had no commitment to developing policy and procedures that worked with the ERP.

20	I feel our implementation was very successful due to intense testing and trainging.
20	I feel that this project was extremely successful. We had a great group of people working to ensure the success.
20	I have participated in 3 ERP implementations, two in the private sector and 1 in higher education. By far, the most reluctance to change came in higher ed.
20	I knew our organization would make the technical side of an ERP work. I was pleasently suprpised at the committment of the university to empower the core implementation team, let us do our work, and support us with organizational policy and process change when needed. I was also very pleased with the willingness of those throughout our campus to adapt to this drastic change.
20	I think the overall project is a success; however, I think it's taken numerous sacrifices by individuals campus wide to make it work.
20	I think "institution" is a great success story. There were missteps and issues as there are always bound to be but there were no fatal errors. This is due to the great people involved in the process--their dedication (even if they weren't 100% behind the product personally) and their expertise. There was always grumbling and cursing the name of Banner but at the end of the day we worked together to make things happen.
20	I thought the Banner implementation was highly successful due to the efforts of the technical and functional project leaders and certain team members. Each module was implemented within a year or less and was highly functional the day each module went live. To me, it was a smooth transition with the expected challenges you anticipate when using a new system. ----The Senior Administration at that time either retired or resigned in mass leaving middle-management to ensure the successful implemention of the project. ----Thus, the success was due solely to the dedication and expertise of the functional and technical team leaders and certain team members. Weekends and late evenings were required for many months to ensure the project team met their deadlines. ----I did think members of the campus who were not part of the project team did not wholeheartedly accept the new Banner system upon initial implementation. Nor did they comprehend the extraordinary efforts and time from family the team members contributed to the University for the successful implementation of the Banner system. ----I think this lack of campus-wide support was due to the highest levels of management not openly endorsing or embracing the Banner ERP system. Senior leadership and communication is crucial for the successfully implementing an ERP system. The University was fortunate to have dedicate Information Systems and functional employees to ensured the project was a success. ----I have been on similar ERP implementations at other employers whereby the project team members were recognized and rewarded for their efforts. The University project team members received criticism for minor things or situations where Banner did not exactly mimic the legacy systems.----The Banner implementation team members received

	little to no recognition for their efforts.
20	In my opinion, this project was very successful. All projects have ups and downs but I feel we were able to come up with solutions and proceed with the project. We did implement on time and within budget and I'm very proud of the work that we did. In addition, I had a terrific experience working with my colleagues. We developed a very close bond and I'm happy to say we were still friends and talking with each other when we were done. While this was a very positive experience in many ways I don't think we should overlook the incredible amount of hard work and sacrifice that many gave to this project. It was the hardest, most intense project I have ever done. I hope to have about 10 years before the next one.
20	In my view the implementation is not complete. Banner is implemented but not even all of that is. There are other projects that have not been implemented to the level that they need to be. One huge draw back to the implementation is that the upper administration was not educated or involved to the level that they needed to be. They did not and have not taken a stand on the importance of using the system, and there are still shadow databases that should have been long gone. IS was not and has not been given the resources that they need in order to implement all aspects of the project and the support is not there for all areas to do what they need to do. There is still clean up that needs to be completed and it is hard to get these issues addressed.
20	It was a good thing that upper management supported the project. Without that support, I think we could still be in the "implementation phase". If I had to do all over again, I would have pressed for a different order of the module "go-live" to be more consistent with implementation from other institutions.
20	It was a great deal of very hard work that resulted in less functionality than the HRS system in place. It succeeded only because of the dedication of the individuals who refused to let it fail.
20	Major success in many areas. Extremely expensive and falls short in some areas including reporting and workflow processes. ERP requires on-going major maintenance activities. More staff required to support in all areas of the institution especially in the IT staff.
20	My biggest issue with the ERP project is simple. Team LEADS were provided an additional stipend to compensate them for their extra hours. Those of us on the functional teams worked as many hours, if not more, but received no compensation, and NO reduction of our normal workload. Most of us were working at least 80 hours per week, and many felt somewhat used by the university. I consider that something of a failure on the part of the administration to not recognize that an implementation of this magnitude would be a full time job for most involved in the actual implementation. Of course, I also don't think that the people who sold us this system were honest about the time demands this would put on implementation teams. We heard that repeatedly from our consultants, even.

20	Not many schools in the country can state that their ERP was under budget and on time and business interruption was minimal.
20	One of the two best implementations undertaken by Missouri public institutions in the past 10-15 years. It was successful in that it was completed on time and on budget and improved administrative support services at "institution".
20	Our project was successful. I think the biggest issue is having sufficient knowledgable support from the ERP providor. Critical decisions are being made during the conversion to a new system and without knowledgeable ERP support, efficient process designs could be jeopardized.
20	Ours was a complete success, on time and under budget. The change was difficult for some, but see how campus functions now and the level of happiness that exists with the system I would say students and staff also believe this ERP implementation was a complete success.
20	overall it was a success but the univeristy did not commit enough manpower to get the product implemented without current staff working alot of overtime.
20	Overall with hindsight the project went fairly well. I believe we fell short of providing support for the offices that had to "take up the slack" for the project team members while they put their time in on the project. I don't believe reporting was addressed properly. We hit the ground running with the system without providing critical reporting at the same time which caused frustration for the users. Critical reports should have been defined and been in place as part of the "GO LIVE" targets. More communication would have helped about the interaction between modules. A final "have we covered all our bases" meeting might have helped before implementation of the student module.----A project of this type is overwhelming for everyone involved. Our campus users were not as involved in processing data as some other campuses might have been, therefore this system was quite a change for them. Many of the offices had never used software packages before and so maybe a user meeting up front might have helped acclamate them a little better.
20	Overall, it was a success. There were some pieces that were so dysfunctional, that we chose not to use them. There was never any question about the university being able to implement the installation. There were questions about the ability of the software to deliver what had been promised. In the end, we had a product that would had the core functions needed to run a university. We are now busy building function on top of that core.
20	Overall, the ERP implementation has been successful. It is an incomplete work in progress...again with some areas receiving greater benefit than others. This is a frustration for me as I'm still waiting on tasks to be completed or even looked at.
20	The ERP implementation was a required commitment. Our legacy ERP system was no longer supported by the hardware vendor effective December, 2006. The implementation was difficult and at times

	overwhelming but the overall success was worth every bit of the effort.
20	The ERP implementation went fairly well with my department. It has increased our productivity, although the reporting aspect was not as great as we had hoped.
20	The goal to implement our current modules has been met and they are operational so that can be considered a success. The morale and climate changes as a result of the implementation process did not contribute to a feeling of success.
20	The implementation was a huge success because of the efforts of many people, not the software. The software is working okay now because of the efforts of many people.
20	The implementation was a success -- but only because many employees were prostituted in the process.
20	The implementation was done on time and as such seen as a success. However looking back there were issues that we encountered that were part due to doing things our way instead of the way the vendor said it should be done.
20	The implementation was necessary and was successful. In hindsight, the University would have had to do it no matter what. Timing was the only question.
20	The implementation was very effective and established a level of inter-area interaction that continues to contribute to our success. The ERP software itself has some limitations that the vendor does recognize as such that we have compensated for through the development of custom forms and tables. Given this effort the overall result is definitely a success.
20	The overall implementation of Banner was successful for all areas. I think by having a year to implement that was plenty of time to test and build.
20	The process could be much more successful if BANNER would create functional teams that served as consultants for the life of the project. There are too many consultants that come in and make changes without regard to the impact on other units. A team approach would also allow for consistent feedback to the project managment team and more support to administration if additional staffing or reources are needed.
20	Way too much responsibility and pressure put on the high level functional users, without support for current job duties. Important decisions were made by people who are not functional users which complicates processes they are not intimately familiar with.
20	We met with less resistance on the campus, as a whole, than was anticipated. We finished on time and under budget. However, the key players worked overtime for almost three years--thousands of hours--and health was impacted in some cases. While we had administrative support, few team members felt that their efforts were fully appreciated by top management.
20	You have to feel the project was a success - the failure of the project is that there are many aspects of the ERP that we have not utilized.
20	As all modules came in on time and within budget, I think the project was a

	success. It served to bring together units of the campus that had previously not worked together to bring about a successful implementation. I believe some units are also now held in a higher regard based on their individual success in bringing up the system and providing training to the general campus.
20	I believe the implementation was a great success. We were given ample time for training and the freedom to contact our consultants when necessary. The timeline is extremely important in an implementation. You don't want to rush through the implementation setup and have to live with a setup that wasn't the best choice.
20	I think that the success we had with our implementation was due to the fact that we had no choice with our go-live date. The date was set for each module and we stuck to that. I don't think anyone is ever fully ready to go-live with a new system, however, it's best to jump in with both feet and see where it gets you. I also think that our University as a whole communicates very well between departments and this helped lead to the success of our implementation.
20	It was a massive undertaking that ended on-time with a very successful implementation.
20	Successfully implemented each module (student, admissions, advancement, finance, hr, & ar) as scheduled. Disappointed we had to purchase CORE to handle the majority of our AR tasks.

Appendix F

Open-Ended Survey Questions Categories

Question 14 – Describe what visions, expectations, goals, and reasons were communicated to the campus community for engaging in the ERP implementation project.

Automation of business processes	7
Better/faster access to data	2
Better service to students	7
Comprehensive system integration	21
Improve accuracy/central database	16
Limited communication to campus	7
New application would be better	4
None	3
On time/on budget	3
New technology	9

Question 15 – Describe the benefits and values of engaging in the ERP implementation project.

Benefits still evolving	3
Better service to students	5
Central repository of data	9
Compatible system crosses functional lines	9
Defining and shaping processes	21
Enhanced communications	6
Individual sense of accomplishment	4
New functional use of new system	10
No benefits	3
Teamwork to complete project	5
Updated technology	7

Question 16 – Describe whether or not, and why, the results of the ERP implementation project were worth the commitment of the institution's financial and human resources.

Improved functionality/efficiencies	20
Increased communication	5
Increased productivity	7
Integrated system	12
No focus/recognition of staff	5
Not worth costs – no explanation	2
Not worth costs – other	7
Replaced obsolete/old systems	9
Services to students and staff	9

Worth costs – no explanation   8
Worth cost – other   5

Question 17 – Describe any step or measure taken to protect you and the campus community from any potential drawback, pitfall, and shortcoming of engaging in the ERP implementation project.

Allocation of staff   3
Creation of dedicated implementation teams   2
Funding for consultants   3
Increased workloads not addressed   5
Keeping focus on goals   4
No steps taken   8
Regularly scheduled meetings/communication   9
Some issues not addressed   3
Testing during all phases   3
Training   6
Yes – other   7

Question 18 – Describe any operational change or impact upon your position responsibilities that occurred as a result of the ERP implementation project, and how you were prepared for any of the changes as a result of the ERP implementation project.

Access to real time/accurate data   4
Access to training   5
Assigning data ownership   2
Change of position/duties   8
Changes – other   6
Increased workloads not addressed   4
No consideration of staff and extra hours   4
None   8
Not enough done   5
Preparations not provided   4
Regular meetings/communications   6
Staff encouraged being engaged   3

Question 19 – Describe any steps and actions taken to ensure the success of the ERP implementation project.

Administrative support   2
Appropriate implementation time lines   3
Appropriate levels of funding/staffing   4
Building project document/planning   8
Invested hard work   9
None   2
Regular meetings/communication   13

Teamwork/joint efforts	11
Testing	4
Training	10
Use of dedicated consultants	5

Question 20 – Describe your thoughts and opinions on the ERP implementation project and the overall success or failure of the ERP implementation project.

Commitment of staff	11
Disappointed in administrative support	4
Implementation not complete/work in progress	6
Inappropriate decision makers	2
Individual sacrifices	2
Limitations of application exist	3
Not enough resources	2
Hard/difficult implementation	3
Success	38
Sufficient knowledge required	2
Testing and training keys	2
Other	9

    Assignment of resources
    Change agents not utilized
    Good administrative support
    Great implementation
    Increased productivity
    Reluctance to change
    Required commitment
    Staff abused

VITA

Jim Graham was born in Waukesha, Wisconsin. After living the pre-school years in Wisconsin, the family moved to McPherson, Kansas, where his parents and two brothers and their families continue to reside. Jim graduated from high school in 1976.

Jim received his Bachelor of Science degree in Business Administration from Newman University in 1980, and a Master of Science degree in Communications was conferred from Fort Hays State University in 1990. The first four years of being in the work force was spent programming in the life insurance industry. In 1986, the transition was made to the information/technology services arena of the higher education environment. The next 12 years were spent leading the Information Services department at a community college in Kansas followed by a three-year stint leading the Information Services department of a small state regional university in Arkansas. Jim currently is employed at the University of Central Missouri in the department of Information Services. Over the past 9 years, Jim has held various leadership roles in the Information Services department and currently holds the position of Director of Information Technology Services.

Jim was married in 1985, and this next year he and his wife, will celebrate 25 years of marriage. Jim's wife is employed as the Director of a non-profit organization serving the many different needs of women. Jim and his wife have three sons and a newly acquired Soft Coated Wheaton Terrier puppy. One son has a professional architectual degree from the University of Arkansas and is employed by an architectual firm in Santa Monica, California. A second son is in his junior year of pursuing an Electronics

Technology degree at the University of Central Missouri. The third son is a freshman at Warrensburg High School.

Jim's spiritual beliefs are at the core of who he is. Jim is a member in a local church with a body of believers where he has held several in positions of service and leadership and continues to serve.