The Evolution of Information Technology Executive Position in Higher Education: The Strategic and Adaptive Chief Information Officer in Higher Education

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Reuben S. Dlamini

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This dissertation titled

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Strategic and Adaptive Chief Information Officer in Higher Education

by

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has been approved for

the Instructional Technology Program

and The Gladys W. and David H. Patton College of Education and Human Services by

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ABSTRACT

DLAMINI, REUBEN S., Ph.D., November 2011, Curriculum and Instruction, Instructional Technology

The Evolution of Information Technology Executive Position in Higher Education: The Strategic and Adaptive Chief Information Officer in Higher Education

Director of Dissertation: David R. Moore

The study examined the evolving role of information technology executives in higher education with the objective of detailing the skills and experiences necessary to be a CIO in higher education, the expectations of the leaders in higher education of these individuals, and how leaders in higher education view the role of the CIO. The position responsibilities have been steadily increasing over the past two decades due to redefinition of the business of higher education. The CIO position is no longer highly focused on technical issues but has influence on the institution’s business strategies, which clearly shows that the position has experienced organizational ascension.

The position’s requirements as advertised on various publications, the CIO needs to be technologically savvy, business savvy, technology advocate, be strategically focused as well as understand governance (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010). Due to its complexity, the position does not succumb to the notion of one-size-fits-all organizations. In the researcher’s effort to understand the CIO’s place in higher education the Burke-Litwin organizational model was adopted. The model provided the theoretical framework to guide the study in the following parameters: understanding higher education dynamics, higher education strategic leadership, carefully
planned technology investment driven by data, policies and procedures, and aligning the
decision-making process with the vision and mission of the institution (Burke, 2002).

This triangulated qualitative study used CIOs and higher education executives
from the Association of American Universities (AAU) institutions, specifically in the
USA. The following qualitative techniques were used to determine the skills, experience,
and roles: document analysis, online survey, and interviews. The results indicated the
need for CIOs to have multidimensional personalities with the ability to strategically
adapt according to the institution’s needs. The CIOs are to be: technically savvy, business
savvy, well rounded individuals, good listeners, understand higher education, as well as
good organization builders. In short the results indicated that CIOs have diverse work
experience and educational background. The CIOs follow the traditional or nontraditional
path to the position (Birnbaum & Umbach, 2001). The traditional category includes all
executives who came through the ranks in higher education, while the nontraditional
category includes those executives whose “careers have alternated between higher
education and external positions and those who had no previous higher education
experience” (Birnbaum & Umbach, 2001, p. 206). There was a correlation between the
CIOs and the higher education executives on the skills, experience, roles, views, and
expectations of the position.

Approved: _____________________________________________________________

David R. Moore
Associate Professor of Educational Studies
DEDICATION

To the memory of my mother and mentor Rev. Carol Busisiwe Ramanamane, my grandmother Thokozile E. Dlamini, great grandmother Deacon Esther Tsabedze, and my sister Winile Dlamini for their love, support, and selflessness...Your support and prayers made it possible for me to think big and continue to learn in the midst of it all.
ACKNOWLEDGMENTS

Many thanks to God Almighty, for giving me the strength, the power and the courage to undertake and conclude this study. It has been a long journey through the storm, valleys, and mountains, but God surely carried me through.

To my advisor Dr. David R. Moore thank you for being a mentor and a role model with great deal of patience and wisdom guiding me throughout the process. You showed an unwavering confidence in my success, inspired me to continue on this journey, and helped me to bring the topic idea to life. To Dr. Adah Ward-Randolph thank you for believing in me and my research topic. Your guidance and constructive feedback kept me focus, and the introduction to qualitative research made this journey more interesting. To Dr. Valerie Martin-Conley you have been an insightful mentor throughout the process and the dissertation would not have been what it is without your kaleidoscopic view on this topic. You showed great deal of patience and wisdom in helping me to think creatively about higher education. To Dr. Albert Akyeampong, thank you for your insight on emerging educational technologies and mentorship throughout the process. The experience would not have been the same without you.

I am extremely indebted to the then Graduate Chair of the School of Electrical Engineering and Computer Science, Dr. Roger D. Radcliff for making it possible for me to continue my education here at Ohio University. I am also honored to have served as the International Student Union President under the tutelage of Dr. Krista McCallum-Beatty and the ISFS Staff. I am indebted to ISU and Dr. McCallum-Beatty for giving me a chance to develop my leadership skills and work ethic. It was a great honor to have
friends I cherish so much and supported me in various ways throughout the process: Andrews Ofori-Birikorang, Gcina Mavimbela, Siphokazi Magadla, Vusi Magagula, Bose Maposa, Merrian Brooks, Tyrone Carr, Olumide Edegbai, Marilyn Rucker, Carol Beware, George Gathigi, Jacqueline Gayle, Maingi Solomon, Nelisiwe Simelane, Frank Wangendo, Kombe Kapatamoyo, Tawanda Chikombero, Wanjiru Mbure, Basetana Maposa, Rosemary Mburu, Ernest Waititu, Ye En, and everybody else who supported me throughout the process. To my undergraduate advisors and mentors Dr. Edward Asikele and Professor Herbert Stewart words cannot express my appreciation to you. Thank you for your mentorship and coaching throughout my academic journey.

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commitment, and dedication to me and my siblings I would not have made it out of primary school. You gave it all…Thank you Mama! Thank you Mvulane!

To all my sisters, brothers, nieces, and nephews thank you for cheering me on and for providing emotional support. You all have been there throughout the process. To the Men of Omega Psi Phi Fraternity, Inc. words cannot express how much your uplift through scholarship helped me to get through this journey. With you guys I persevered. I am thankful to all the professors from the College of Education and College of Engineering who nurtured and empowered me with knowledge to be the best student and researcher I can be. Finally to God be the Glory!!!

The song “In The Midst Of It All” by the gospel great Yolanda Adams kept me going:

I've come through many hard trials, Through temptations on every hand, Though Satan's tried to stop me, And to place my feet on sinking sand, Through the pain and all of my sorrows, Through tears and all of my fears The Lord was there to keep me, For He's kept me in the midst of it all…Not because I've been so faithful, Not Because I've always obeyed, It's not because I trust him to be with me all of the way, But it's because He loves me so dearly, He was there to answer my call, There always to protect me, For He's kept me in the midst of it all.
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<td>Center for Higher Education Chief Information Officers Studies</td>
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<td>CIO</td>
<td>Chief Information Officer</td>
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<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<td>IDG</td>
<td>International Data Group</td>
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CHAPTER I  INTRODUCTION

1.1  Introduction

Technology in higher education remains key to the way instructions are delivered, research is done, and the day-to-day business operations of the university are run. In the last quarter century, there has been an unprecedented change in the way universities and colleges conduct their businesses – instructional delivery, research, services, procurement, sharing information, planning trips and paying bills (Reich & Nelson, 2003). The infusion of information technology has prompted many institutions of higher education to follow the corporate world by creating the Chief Information Officer (CIO) position. This study examined the evolving role of information technology executive in higher education with the objective of detailing the skills and experiences necessary for the CIO employed in higher education institutions, the expectations of the leaders in higher education of these individuals, and how leaders in higher education view the role of CIO. Universities and colleges have been calling upon Chief Information Officers to join their executive management teams to bring direction to Information Technology (IT) departments. The IT executive position has evolved from that of just being the head of information technology within an organization “to that of crucial organizational decision maker responsible for the development and implementation of projects intimately connected to the survival of the organization” (Lima, 2006, p. 2). According to Evans (2009), “CIOs are given more strategic roles than ever before, yet they are simultaneously seeing their budgets being cut while expectations remain unrelenting” (p. 25).
CIOs are to ensure that the information systems at their disposal provide world-class institution processes giving an organization a competitive advantage to survive in the rapidly changing world. As the unique and complex higher education environment changes, leaders like CIOs are being challenged in unprecedented ways: to operate within tighter budgets, make accurate and reliable decisions, improve information systems processes, and understand the mission, values, and objectives of the institution to develop IT strategic plans. As institutions of higher learning become more dependent on information technology capabilities to transform their business operations, instructional delivery, as well as research, it is important to have scalable, efficient and secure systems. The success of technology integration is dependent on the performance of the CIO. The expectations from a CIO are shaped by the needs of the campus community: faculty, administration, students, and board. In an administrative context the CIO can be called to negotiate and influence the campus community on information technology investments.

The implementation of cutting-edge technology helps universities and colleges to “streamline and transform their business processes” to achieve outstanding results (Gillhouse, 2003, p. 1996). The alignment of business and technology has fueled a high demand for the CIO position with its limited longevity compared to other executive management positions (Batchelder, 1995; Cartwright, 2002). The goal of this study was to get in-depth information about the dynamics and complexity of the position, as there is no clear path to obtaining the CIO position or to being successful in that role. Since there is no clear path to obtain the position, in this study, the researcher sought to answer the question of how individuals become CIOs in higher education. According to the
literature, CIOs, often labeled as Chief Transformational Officers, need to be operationally and strategically sound, creative and excellent negotiators, visionaries, and change agents (McGee, 2008; Brown, 2009; Wailgum, 2009; Nash, 2009). The modern university requires “eminently rational solution to a massive problem of human and technological organization” (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964, p. 4). The CIOs are being challenged to embrace and drive business change and replace old and inflexible computational infrastructure with more robust and integrated ones appropriate for the behavior of the modern university.

Furthermore CIOs are attempting to change the perceptions that their departments are “cost centers rather than creators of value and accelerators of innovation” (Evans, 2009, p. 25). In higher education the CIO must not only be technologically savvy, but must also understand governance, and the real purpose of higher education (Kezar, 2004; Birnbaum, 1988; Birnbaum, 1989). Kezar (2004) defined governance as “the process of policymaking and macro level decision making within higher education” (p. 36). In higher education there is no expertise-decision making; there is due process to be followed so that all constituencies feel their input is valued (Association of Governing Boards of Universities and Colleges, 1996; Kezar, 2004).

For CIOs, to be successful in their role understanding the structures and processes in higher education and building relationships is important. Bolman and Deal (1992) provides four frames that examine leadership in colleges and universities. The four frames are: structure, human resource, political, and symbolic (Bolman & Deal, 2008).
These frames provide a useful paradigm to examine the uniqueness and complexity of the higher education environment.

Due to the uniqueness and complexity of the higher education environment there is no clear path to the job, however, individuals can develop expertise or abilities for a specific endeavor as long as they have a framework within which to operate using organizational theories. With different cultures dominating higher education, there are lots of unanswered questions about the kind of experience and expertise needed for CIOs to be employed in higher education. The following questions therefore arise from this state of affairs: Is the CIO supposed to be technically savvy, business savvy, or politically savvy? Unfortunately, there is little empirical evidence on how to be a successful CIO in the complex culture of higher education where governance is embraced, unlike the corporate world in which the leadership supports a top-down structure.

So for CIOs to survive in higher education, especially in their diffused position, they need to have a vested interest in the notion of social interaction in relation to the different constituencies on campuses. With the implementation of new expensive Student Information Systems the Chief Information Officers are expected to have a broader picture of what the university system would look like and the benefits of implementing such systems. University stakeholders have been voicing their displeasure on the decision making process within universities whereby they are not involved in the governance of the institution. This might be a chance for CIOs to sell the capabilities of the new SIS in integrating data together from multiple sources and its role in transparency and accountability. The integration of different source of data could be used in developing
recruitment strategies to improve retention rates, and provide a clear scenario on budgeting. In order to implement quality and effective information technology systems valued in an educational environment, there should be acceptable and defined standards and input from the various constituencies across campus. The challenge most of the time is communicating the return on that IT investment, when academic units are being forced to adjust and in some cases reduce their budgets.

1.2 Statement of the Problem

Institutions of higher learning seek dynamic, innovative Chief Information Officers to provide vision, leadership and coordinate comprehensive academic, research and administrative computing services (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009). CIOs are to support all institutional computing compliances activities: network security, institution data management, unified communication, desktop and laptop support, Internet connectivity, intellectual property, and government regulations applicable to systems operations (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009; Pastore, 2010; Curan 2010). The researcher adopted the Burke-Litwin organizational model (Burke, 2002) as a metaphor to understand the distributed institution of higher learning environment. Those who have been appointed to the CIO position are inevitably confronted with the challenges providing information technology infrastructure and resources in an environment that is highly independent at the college and departmental level. Looking at Burke-Litwin model the institution of higher learning
is suppose to be interconnected, but realistically there is a high degree of autonomy within the various constituencies. CIOs are functioning in an ambiguous environment. Regardless of the entire role conflict and ambiguity in their position they are expected to function at an optimal level as information technology services have become fundamental to the daily operation of the university. They are to support the decentralized computing environments, while centralized coordination is necessary to attain optimal reliability and universal equity of access (Michalak et al., 1999).

According to Parry (2010) 47% of higher education CIOs are expected to retire in the next decade, and there is a shortage of people with the “proper training and mentoring to step into these complicated jobs” (p. 1). Brown (2009) reported in a study that was done in 2008 that 47% of CIOs were projecting their departure from their current position by the next decade. In the CHECS’ 2009 study the projection was reported at 45%. The decline could be attributed to the economic meltdown leading to negative impact on retirement funds, or some of the CIOs already left their position (Brown, 2009). As this group retires, there should be another pool of up-coming IT executives ready to fill those positions. Due to the redefinition of the business of higher education, the position is no longer highly focused on technical issues and is increasingly influencing other institutions’ business strategies. The Chief Information Officer at Georgetown University, H. David Lambert said, “The scope and complexity of the role has really grown. It's easy to feel some days like I'm not the CIO but the risk-management officer for the institution, because every element of risk management comes back to IT” (Young, 2010, p. 1). The Director of Information-Technology Policy at Cornell University, Tracy
Mitrano acknowledges the complexity of the position as she said, “In the past it took strong, assertive, very traditional leadership…I think a CIO of the future is going to have to be a strong team player and much more of a negotiator, not only within the university but with the vendor community” (Young, 2010, p. 1).

According to President Emeritus of the University of Colorado, John Buechner, “based on my experience, chief information officers often view their world as distinct from the rest of the academy…From my perspective, presidents want someone who is expert in technology but also a multidimensional person who understands what university cultures are about, what governing boards can or can't do, and the politics of academe” (Buechner, 2005, p. 250). In 2003 the first and only Chief Information Officer at the University of Maryland at College Park, Mr. Donald R. Riley, resigned “after a review of his office's five-year record suggested that his involvement in several national information-technology efforts was obscuring the university's internal needs,” regardless of the fact that Mr. Riley had internal and external responsibilities (Read, 2003, p.1).

Thus, President Buechner acknowledged that the CIO job is the most complex position within the university hierarchy in this day and age (Buechner, 2005). The position comes with unrealistic expectations in a unique and complex higher education environment (See Table 1).
Table 1.

CIO Position Requirements Constructs (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010).

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<th>CIO Position Requirements Constructs</th>
<th>Position Requirements Constructs Descriptions</th>
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<td>Position Requirements Construct 1</td>
<td>CIOs must have exceptional organizational strategic, business, technical, and interpersonal skills to join the senior leadership team, and provides vision, leadership and administering of information systems, information resources and information technology supporting the academic mission and the administrative operations of the University.</td>
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<td>Position Requirements Construct 2</td>
<td>CIOs are responsible for developing, implementing, and supporting policies, practices, and technology investment strategies in support of the University’s academic mission.</td>
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<td>Position Requirements Construct 3</td>
<td>CIOs are to plan IT strategy and ensure the delivery of secure high quality and cost-effective IT services.</td>
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<td>Position Requirements Construct 4</td>
<td>The CIO is an institution-wide leader, technology advocate, and the steward of the institution information technology resources supporting teaching, research, student-life, and administrative initiatives.</td>
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<td>Position Requirements Construct 5</td>
<td>CIOs are to develop and deliver information technology, systems and services that are innovative, relevant, efficient, and cost effective basically lead innovative change that will integrate and improve University’s use of technology resources supporting teaching, learning, research, service and administrative units.</td>
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<tr>
<td>Position Requirements Construct 6</td>
<td>CIOs as catalyst for a unified campus-wide IT community committed to delivery, support, and maintenance of academic, administrative, and general campus IT services guided by the University mission, its strategic goals and by a shared strategy which is developed and managed through relevant governance and decision making processes.</td>
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<tr>
<td>Position Requirements Construct 7</td>
<td>CIOs are to work at the highest levels of integrity, honesty, and openness as well as create strong, enduring collaborative relationships with key leaders across the University, the faculty, the staff, and the Board ensuring excellent customer service and administer in a consultative manner in order to build community, maximize standards and enable local innovation.</td>
</tr>
</tbody>
</table>
In Table 1 the researcher reviewed various CIO position advertisements to produce the 11 recurring CIO requirements as universities are looking for a multidimensional person (Buechner, 2005). In the researchers quest to understand the evolving role of the IT executive position in higher education as portrayed in Table 1, three qualitative data collection techniques documents, surveys, and interviews were implemented. The researcher decided on these qualitative data collection methods because in qualitative research researchers seek to acquire more detailed information, and they typically work with small samples with a specific purpose in mind (Miles & Huberman, 2002). Unlike in quantitative research whereby researchers seek causal
determination, prediction, and generalization of findings (Hoepfl, 1997). The researcher sought “broader, deeper and more comprehensive social understandings by using multiple methods to tap into different facets or dimensions of the same complex phenomenon” (Greene, 2007, p. 101). Looking at the CIO position requirements it became evident that it was a complex and multifaceted position.

1.3 Conceptual Framework

The institution of higher learning is a multifaceted organization with several ironies as far as leadership is concerned (Morrill, 2007). From the literature higher education is about governance rather than leadership so for CIOs to survive, they should understand the decision making process as it is a joint effort. CIOs need to develop a shared vision through the institutional strategic plan. The term leadership sometimes gives wrong impression about followership yet higher education functions like a system (Morrill, 2007). Cornell University President Emeritus Frank Rhodes voiced a recurrent them in American Universities, “the development of responsible, effective, and balanced governance, leadership and management is one of the most urgent priorities for the American Universities as it enters the new millennium” (Rhodes, 2001, p. 201). In order to examine the institution of higher learning’s complex culture, this study adopts the Burke-Litwin organizational model as the lens through which the researcher examines the dynamics of the institutions of higher learning (Burke, 2002). Figure 1 depicts the unique and complex higher education environment.
The Burke-Litwin model has its roots on organizational climate (Burke, 2002). Organization climate is about the perceptions individuals have about the functioning of their unit and their working relationship with their colleagues (Burke, 2002). In Burke-Litwin model there are different objects representing different communities or stakeholders connected by arrows going in both directions signifying the continuous interaction with the environment (Burke, 2002). In the model the external environment is looked at as the input dimension and the individual and organizational performance as the output dimension. For example, in higher education, teaching could be the input and the performance of students serves as the output dimension. The institutions’ climate should provide a health environment in order to attract the best students, willing to learn, and retain them. According to Burke (2002) “the nature of the climate is determined by a number of variables, not just management or leadership approach” (p. 184). Organization consultant and theorist, Schein (1992), “a pattern of shared basic consumptions that the group learned as it solved its problem of external adaptation and internal integration, that has worked well enough to be considered valid and therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (p. 12).
There are some organizational theories that can be used to identify opportunities to satisfy the needs of the institution and the use of resources to meet the needs, and also how these organizations function. Jones (2009) defines an organization as a tool to coordinate actions to obtain value. In higher education the organizational structure is complex and the needs of all the constituencies are critical to the success of the institution. CIOs’ task is not to only manage their IT environment, but the external environments consisting of political, social, economic, and technological factors that affect organizations (Jones, 2009). CIOs have a role to play in the unique and complex higher education environment. According to Wolverton, Montez, & Gmelch (2000) roles “persist because of their consequences within a larger social system (functions) and thus,
persons must be taught (socialized into) these roles” (p. 2). Without well clearly established roles and expectations in the large social system could result into the emergency of conflict and ambiguity (Wolverton et al., 2000).

It is very important to understand the forces that influence the operations of institutions of higher learning. In higher education there is a high degree of autonomy unlike in the corporate world where the top-down management style is prevalent. The corporate world suffers from dominative principles, which promotes hegemonic tendencies (Borg, Buttigieg, & Mayo, 2002). Marxist Philosopher Antonio Gramsci defined hegemony as the dominance of one social class over other social classes or the dominance of one political unit over other units (Borg et al., 2002). In higher education the environment is unique and complex as depicted in Burke-Litwin model. Regardless of its uniqueness and complexity, dominative tendencies are not welcomed as they corrupt governance. The faculty, staff and students should be kept interested and motivated, thus innovative curriculum and inclusive governance or leadership method is very important. There should be a balance of power and governance to fulfill the mission of universities and provide students with life-changing educational experience instead of partnering corporations to deliver just-in-time skills without the participation of faculty members. The culture of higher education should always be respected with all voices being heard and participating equally.

Malinowski (1948) defines culture as “an integral whole consisting of implements and consumer goods, beliefs and customs…a vast apparatus, partly material, partly human, and partly spiritual, by which man or woman is able to cope with concrete,
specific problems that face him” (p. 36). Lessem (1990) the analyst of corporate culture believes that organizational culture “has to cultivate a humanly fulfilling context - a space and time – within which the production and consumption of needed, worthwhile, and quality products and services can take place” (p. 8). The Burke-Litwin model conforms to the open system of thinking where the different communities within higher education institutions serves as input dimension and faculty and staff performance, students’ retention, and the university prominence serves as the output dimension. The strength of the model is that it provides a visual metaphor of the large unique and complex social system of higher education. According to Burke (2002), an organizational model can be used to categorize components of an organization, enhance understanding of organization, interpretation of data about an organization, efficiency with language, and guiding action for change.

The incorporation of the Burke-Litwin model in CIO training and development or any executive leader within higher education could enable them to view the uniqueness of the environment as they engage stakeholders in various dialogues. CIOs can learn from the model as it creates an authentic participatory decision-making process and calms down the current tension culminating from leadership failures. In the Burke-Litwin model technology is the missing part. All constituencies are heavily dependent on IT applications, thus the researcher leaving technology as the integrating link among the different campus communities. The presence of robust technology makes communication and sharing of information in the interconnected and intraconnected units much easier, thus contributing to the strategic decision-making. In an open system social structures
and social norms are an important aspect of a social system. In this research the open system represented by the Burke-Litwin model is the university and its constituencies.

CIOs as proponents for technology have to examine their strategic governance and rethink the institutional mission and philosophies to make sure that their governing method is relevant and still enforces the mission and philosophy of the university. Figure 2 depicts how all the units function as a system as education evolve. The systematic functional environment allows all units to contribute towards the curriculum development resulting in an innovative education. Those in power should understand that institutions are like systems, and integrate all stakeholders, and have an understanding of the interrelationship between the different parts of the system (Senge et al., 1994).

![Figure 2. Mechanical Organizational Structure](image-url)

CIOs have to continuously learn by organizing dialogues and survey participants from different constituencies to understand their concerns. Sometimes the adoption of
technology causes problem because of IT managers’ failure to help constituencies understand the value of implementing that technology. CIOs have to empower all stakeholders regardless of their status use their power to empower students, faculty, and staff instead of making the subordinate internalize their ideals. The model encourages communication among constituencies and honoring the core values of higher education, which are encompassed in all the various constituencies. The model identifies and map relationships among the different stakeholders and uncover their interests and goals thus making the CIOs understand if their goals and interests are in conflict or congruent with the various factions. Gross, Mason & McEachern (1958) describe the notion of conflict as “any situation in which the incumbent of a focal position perceives that he or she is confronted with incompatible expectations” (p. 248). In cases whereby there is role conflict and expectations are not met those in a position of power are labeled as incompetent.

Bolman and Deal (2008) provide four theoretical frames in which leaders in higher education can view, evaluate, and learn about the operation of their institutions, departments, or centers. The frames are structural, human resources, symbolic, and political (Bolman & Deal, 2008). These four frames form the core quadrants of higher education each playing a role as they are interconnected and function like systems. As the core quadrants of higher education, multidimensional CIOs can be empowered by the information so that they are aware of what university cultures are about, what governing boards can or cannot do, and the politics of the academe. Bolman and Deal (2008) emphasize that organizations and people need each other, and there must be a good fit
between the two. For leaders to realize optimal success understanding the frames together with the Litwin-Burke model might be very important as they are expected to operate at their optimal level in a dynamic and complex environment (Evans, 2009).

1.4 Purpose of the Study

The proliferation of information technology in higher education has raised the level of institutional IT complexity (Mcrobbie & Wheeler, 2010; Reich & Nelson, 2003; Nash, 2009; Yanosky & Caruso, 2008). Research and education, the core missions of higher education, are increasingly dependent on information technology (Mcrobbie & Wheeler, 2010). Thus institutions of higher education are facing challenges in finding an applicable model for IT leadership to confront the mounting demands of technological advancements on college campuses (Mcrobbie & Wheeler, 2010). As computing power is increasing rapidly on campuses, universities and colleges are recruiting CIOs to run their complex IT departments (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009). The institutions are seeking dynamic, innovative Chief Information Officers to provide vision, leadership, and coordinate comprehensive academic, research, and administrative computing services (Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009). There is no clear path to the CIO position, and how institutions should manage IT as it increasingly plays a major role (Mcrobbie & Wheeler, 2010; Reich & Nelson, 2003; Nash, 2009; Yanosky & Caruso, 2008). CIOs are to support all institutional computing compliances activities: network security, institution data management, unified communication, desktop and laptop
support, Internet connectivity, intellectual property, and government regulations applicable to systems operations (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009; Pastore, 2010; Curan 2010).

In the midst of universities and colleges recruiting the IT Executives, there is no prescribed way of how IT will continuously support the core mission of universities and colleges, and the roles and responsibilities of CIOs are therefore ambiguous. There is no empirical evidence on how to be a successful CIO in the complex culture of higher education where governance is embraced, unlike in the corporate world where the leadership support a top-down structure. According to McRobbie and Wheeler (2010), “…higher education continues to experiment with varied models for Executive IT leadership. In contrast to the more widely accepted and evolved practices for the executive role of chief financial officer or provost, no “best practice” is yet pervasive for executive IT leadership” (p. 1). As observed by McRobbie and Wheeler (2010), universities, colleges, and for-profit organizations have experimented and continue to experiment with different “reporting lines, levels of authority, degrees of centralization, and funding models” (p. 1). Due to the redefinition of the business of higher education, the position is no longer highly focused on technical issues and is increasingly influencing other institutions’ business strategies.

A majority of recent publications especially by the CIO magazine and InformationWeek magazine have focused on corporate CIOs (Overby, 2009; CIO-2-CEO, 2009; Reich & Nelson, 2003; Nash, 2009). However, this study focused on CIOs in higher education in the US. The study contributes to the following information gap:
1. IT Leadership in Higher Education – the attributes of a strategic and adaptive Chief Information Office as well as the kind of leadership CIO’s foster or possess within higher education.

2. IT Management in Higher Education – the ways in which IT should be managed as IT is increasingly playing a major role in higher education.

3. Institutions’ expectations of a CIO and levels of authority

4. Intricate and dynamic higher education environment that has resulted in the elevation of the CIO’s position

5. Experience – the career path to the position

There seems to be a correlation between the CIO strategic and operational leadership and the organization’s successful implementation of information technology (Grover, Jeong, Kettinger, & Lee, 1993; Gottschalk, 2002). There have been ongoing studies by researchers and practitioners to better understand the factors that affect effective leadership and the repercussions of operating IT at a tactical rather than strategic level (Nelson, 2003; Viswadoss, 1999). With all the expectations on CIOs, is technological expertise enough? If so, what kind of experience they should have: business know-how and judgment or behavioral skills of higher order especially in a complex higher education environment (Earl & Vivian, 2008). These are people who are supposed to manage relationships, convey information technology relevance, lead and facilitate change in an organization.

The research is not concerned about the consolidation of IT authority and distributed IT, as those are other issues affecting many universities and colleges, the
focus here is on the attributes of a strategic and adaptive Chief Information Officers. This study examines the CIO position to understand the criteria used to select a CIO, learn about institutions’ expectations, the type of experience, education background, behaviors, and characteristics in order to be a successful CIO in the intricate culture of higher education.

1.5 Research Questions

The general research question is: What are the unique attributes of a strategic and adaptive Chief Information Office? What kind of leadership do CIO’s foster or possess within higher education? More specifically the study will address the following research questions:

1. What are the skills and experiences of CIOs employed in higher education?
2. How do leaders in higher education view the role of CIOs?
3. What are the expectations of the leaders in higher education of these individuals?

1.6 Significance of the Study

The growing demand for web applications, advance technological application, data storage and secured network in higher education resulted in the increasing demand for strategic CIOs (Chronicle Careers, 2009; Chronicle Careers, 2010). The power of the web has dramatically changed the way higher education institutions conduct business from recruitment to students’ retention to instructional delivery and research. Professors
are turning to web 2.0 technologies to share information with students, and students collaborate with their colleagues through web 2.0 technologies (Cheung, 2004; Alexander 2004; Bjerede et al., 2010). According to McCrea (2010) there are three enrollment management challenges: overwhelming data volumes and data irregularities, lack of information to help determine which students are at risk of attrition, and inability to distinguish between probable prospects and those less likely to enroll. The data could be used in developing recruitment strategies to improve retention rates. With the rise of Internet, the CIO needs to have a vision about transforming the institution through information technology. In order to implement quality and effective Information Technology systems in an educational environment, there should be accepted and defined standards, and the CIOs needs to communicate the return on investment (ROI) on IT investments. For confidentiality purposes the research used the following conversion to represents participants in the study: SportingConferenceInstitution-TypeOfInstitution-ExecutivePosition. Sometimes executive management looks at the cost forgetting the improvement in students’ learning and the ways professors conduct their lessons. Even though it is difficult for CIOs to arrive at a realistic ROI, the CIOs should be conversant on the value of investing on the particular technology.

A classical example is for the universities to have a system that can track students who are at risk earlier and be able to monitor students’ actions that might impact their education. This enables the institution to immediately address the issues affecting students to help them to be successful. The IT executives need to deal with the reality that value-on-investment (VOI) on an information system is key instead of always trying to
quantify value being added by the information system tool. Institutions of higher learning have turned their heads to the chief information officers to lead such IT management, investments, and development issues. The CIOs are expected to be versatile, dynamic, and agile in bringing change to the university as the position requirements in Table 1 indicated. The CIO should also have a broader picture of what the university systems look like and bring data together from multiple sources. CIOs are to bring new state-of-the-art technologies such as new SIS to create an integrated system that gathers and stores data from multiple sources. Such practices could foster collaboration among departments through data sharing, and put timely accurate information and analytics into the hands of the institution’s decision-makers and stakeholders (Wu et al., 2009; Hailpern et al., 2009).

This research is an effort to comprehensively examine the CIO position to understand the criteria used to select a CIO, learn about CIOs’ expectations, the type of experience, the type of training, behaviors and characteristics in order to be a successful CIO within the complex culture of higher education. The challenge in this position is that there is very little empirical evidence of the leadership practices of CIOs in higher education. As such, the aim of this study was to comprehensively examine the position to understand the criteria used to recruit a CIO, learn about CIOs’ expectations from Presidents, Provosts, and CFOs, and then learn about the evolving position from the CIOs’ perspectives too as the position does not limit itself to the notion of one-size-fits-all in institutions.
This research also sought to further understand the underlying reasons why institutions of higher education have been recruiting Chief Information Officers all over the US. There has been even a shift in the structure of the university administration making CIOs executive members of the university cabinet and reporting directly to the presidents, provosts, and in some cases to the chief finance officer. There seems to be a link between the universities’ ability to successfully enjoy the benefits of Information Technology and the type of CIO the university has, as the expectation is that the CIO is technically savvy and has strong business acumen (Boiko, 2007). According to the available literature, CIOs have to build dynamic teams, develop and implement effective objectives and goals to establish systems to meet the needs of the institution, students and to implement appropriate strategies in line with the mission and values of higher education (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009; Pastore, 2010; Curan 2010). According to Boiko (2007), the position is currently mocked by the following acronyms: “Career Is Over” and “Career in Obscurity” (p. 1). This is due to the fact that they are to meet unrealistic expectations, which continuously shift their ground, thus CIOs “landed on their feet, some on their butts” as the position still needs to be refined to meet the expectations of each and every institutions’ needs (Boiko, 2007, p. 1). To avoid any role ambiguity those aspiring to be CIOs should have access to certain information: expectations, role, and activities to be done to meet responsibilities of the position (Wolverton et al., 2000). Such information needs to be adequately communicated to avoid role conflict and role ambiguity. The changes in higher education have resulted in a complex environment that exceeds the
“span of comprehension” (Rizzo, House, & Lirtman, 1970, p. 155). The complex environment with technology growing exponential has contributed to the advancement of the CIO position.

The advancement of the CIO position has also been fueled by the importance of understanding the information space in those modern institutions of higher education (Woosley, 2010). According to Woosley (2010) the benefits cited by the boards as CIO contribution are: cost control, cybersecurity, and operational cost. Barbra Cooper, group VP and North America CIO of Toyota asserted “it takes time to prove you can survive and to show all dimensions of capability and leadership” (Nash, 2010, p. 30). It is important for CIOs to know the IT products, services, and management techniques to adopt in their working environment as they transform the institution business and core mission (Nash, 2010). These IT executive leaders are to bring the strategic view of technology values to the following areas: research, instructional delivery, governance, finance and accounting, procurements and operations. The belief is that CIOs only focus on the application of new technologies, and they can provide new perspectives for CEOs and CFOs (Nash, 2010; Woosley, 2010).

According to Brian L. Hawkins, president of the education-technology EDUCAUSE, “more and more, the leadership of universities recognizes that information technology is a critical asset that needs to be strategically managed” (Jacobson, 2002, p. 1). These are people who create a broad institutional vision on technology application to fulfill the core mission of the university. Misplaced priorities and a lack of accountability
on the CIO have no room in higher education especially as state funding is shrinking and the percentage of instructional budgets declining.

The research intended to contribute to the understanding of the complex functions of CIOs in a dynamic and complex higher education environment. The study differs from previous studies (Viswadoss, 1999; Boettcher, 2007; Russell, 2008; Lineman, 2006; O’Donnell, 1998; Woodworth, 1987; Del Valle, 2008; Brown, 2004; Schaffer, 2004; Fowler, 2003; Barber, 1999; Lima, 2006; Kelley, 2005) in several ways: (a) The triangulation of qualitative method (b) Comprehensive examination of the position in the Association of American Universities (AAU) (c) Participants (Presidents, Provosts, CFOs, CIOs, and Chair of CIOs’ Search Committees). Viswadoss (1999) study was done in selected universities within the state of Virginia, and interviews were the only technique used to collect data; in studying such a complex position with multidimensional facets it is difficult to generalize those findings. The limitation of Boettcher (2007) was that the study only focused on small private southwestern universities. The small private southwestern universities are not a true representation of universities as classified by The Carnegie Classification of Institutions of Higher Education. The Carnegie Classification has been the “leading framework for recognizing and describing institutional diversity in U.S. higher education for the past four decades” (Carnegie Foundation for the Advancement of Teaching, 2010).

Russell’s (2008) study focused on CIOs’ perception on technology adoption, instead of the CIO’s characteristics, roles, and behaviors in higher education. Lineman (2006) performed a study that focused on managerial roles of CIOs in higher education.
In this study 232 higher education CIOs and senior technology employees were surveyed. The study lacks the depth and “naturalistic approach to its subject matter” as if followed a quantitative approach (Denzin & Lincoln, 1994, p.2). In quantitative methods, researchers use “postpositivist claims for developing knowledge” (Creswell, 2003, p. 18). Using a mixed methodology would have provided the researcher with multi-layered data to understand the perceived managerial roles of CIOs in higher education and industry.

O’Donnell’s (1998) study provided significant data to show that the CIO position is rapidly growing in private institutions. The limitation on O’Donnell’s (1998) work was the focus on private institutions only, yet the position was growing both in public and private institutions. The environment in private institutions is unique to that of public institutions, thus using the Carnegie Classification would have provided a diverse group of institutions (The Carnegie Classification of Institutions of Higher Education, 2010).

Close to the current study was a study performed by Woodsworth (1987), whereby the goal was to understand their role, connection with other positions, decision-making, and its range of administrative configuration. Woodsworth’s study (1987) was also exclusive as it focused only on CIOs in private institutions of higher learning.

Brown (2004) studied four-year institution CIOs in the United States with the goal of creating a comprehensive description of an effective and successful CIO in higher education. The strength of the study was the application of mixed methodology in data collection. The limitation was involving only CIOs in his quest to create a comprehensive description of an effective and successful CIO in higher education. For the study to be more comprehensive other voices like the people who actually make the decisions hiring
the CIOs should have been recruited to participate in the study. These would have countered any biases coming from the CIOs themselves and also provided different layers of data on their view and expectations of the position. Del Valle’s (2008) study examined the lack of alignment between business and information technology strategy, and the impact such misalignment has on technological advancement in higher education. The evaluation was based on three CIO individual variables: roles, education level, and self-perceived leadership styles. Schaffer (2004) examined the level of experiences that contribute to the success of the CIO and also identified the formal educational and career experiences that CIOs believe are important for his or her success in leading an information technology department in higher education. Fowler (2003) performed a comparative study to investigate the role of CIOs in higher education. This study was more comprehensive as it compared perceptions from the CIO, Chief Academic Officer (CAO), and Chief Financial Officer as investigating the role of the CIO in higher education.

Barber (2002) examined the emergence of the CIO function in small innovation-oriented community colleges. The limitation compared to other studies was the focus on 23 innovative-oriented community colleges. Becker (1999) examines the degree of cognitive complexity that CIOs in colleges and universities bring to that role and responsibilities of the position. The study was more in line with other studies by trying to develop a current profile of the characteristics and responsibilities of the CIOs. Lima (2006) investigated the leadership behaviors of CIOs of Fortune 500 companies in the United States of America. The limitation of the study compared to the previous studies is
that it was intended only for CIOs in fortune 500 corporations. Kelley (2005) examined the systematic decision-making procedure for Chief Information Officers (CIOs) to use when considering significant technology investments. In comparison with other studies, the author was more interested in the decision-making process not on the roles, characteristics, and expectations of someone in the position.

In this study, the researcher engaged multiple qualitative techniques (documents, online survey, and interviews) of data collection, studied CIOs from AAU member institutions, as well as engaging various participants (Presidents, Provosts, CFOs, CIOs, and Chair of CIOs’ Search Committees). Employing multiple qualitative data collection techniques enabled the researcher to provide detailed descriptions of the critical skills or the kind of professional experience CIOs need to be hired and be successful in their role in higher education. This approach helped the researcher to provide comprehensive social understanding of the position. This study provided useful information on the critical skills and experience or the right combination of skills when evaluating potential CIOs. IT management is no longer dealing with just tweaking hardware, designing and developing software, but the need to face the new dominating workload in IT in the past decade: end users and information.

Due to the nature of the study, the Burke-Litwin framework, and the position requirements constructs as provided in Table 1 it is evident that a new genre of leaders is desirable. From the new genre of leadership theory constructs these types of leaders are charismatic, transformational, visionary, and inspirational (Shamir, House & Arthur, 1993). As the CIO position’s responsibilities expand significantly, there is a great need to
engage the Burke-Litwin framework to understand the uniqueness and complexity of the environment. Bolman and Deal’s (1992) four frames become the lenses to navigate Burke-Litwin framework. The Burke-Litwin framework portrays metaphorically the higher education environment. Thus, from the researcher’s perspective a new genre of leaders is a requirement, leaders with multidimensional personalities. These are leaders with extraordinary effects on the followers, the environment, and the social systems. The researcher developed questions in line with the following organizational cultural constructs: humane orientation, future orientation, gender egalitarianism, collectivism I, and collectivism II (House, Javidan, Hanges & Dorfman, 2002). In Bolman and Deal (1992) the human resources frame focuses on the human interaction with the organization and meeting the needs of the organization. Thus, the human resources frame agrees with the organizational cultural constructs that people should be valued and inspired. The political frame emphasizes dialogue as different groups work on a sharing model for scarce resources (Bolman & Deal, 2008). There should be no top-down approach at all in higher education. The structural frame emphasizes rationality in all dealings, focusing on the basics to provide clear directions, so that there is always accountability and transparency (Bolman & Deal, 2008). This is achieved through restructuring by setting new policies and rules. The symbolic frame cannot be ignored as in this frame meanings are socially constructed (Bolman & Deal, 2008). As the researcher focused on leadership within the unique and complex higher education environment, the conclusion was to provide a multi-perspective approach through the engagement of multiple qualitative data collection techniques.
Thus, data generated from the study provide valuable information to universities and colleges getting ready to hire a new CIO or create the CIO position. The findings of the study provide CIOs with implicit expectations from the university executive leadership and the institution of higher learning community. The CIO placement search firms also benefit immensely with the current information on the state of the CIOs in higher education. The study is significant because it provides a comprehensive analysis of the CIO position and the necessity for its existence in higher education. The study provides useful information on the critical skills and experience that CIO’s currently possess from their perspective. The ultimate goal is to add to the literature on the right combination of skills or acumen that a potential CIO should possess.

The previous studies only focus on trying to learn about the position from the CIOs themselves, instead of bringing other voices such as the presidents, provosts, CFOs, and chairs of search committees who play a key role in hiring CIO’s. The findings from the hiring personnel assist those who prepare people for these positions to understand what skills are important for a CIO in higher education to be successful. Finally, the voice of CIO’s or their story enhanced our understanding of how the position is evolving within the context of higher education. The voices of presidents, provosts, and CFOs provided different layers of information on the characteristics and experiences they are looking for from a CIO as well as their expectations for those occupying the position.
1.7 Background of the Study

The proliferation of information technology in higher education has been a subject of numerous publications. Such growth drove the evolution of the information technology executive leadership position to transform IT departments from a cost center to a strategic value driver. IT management has to drive institutions’ confidence of information technology by paying more attention to the human-centric aspect of computing as users attitudes and interactions drive IT development and investment (Boiko, 2007). The literature demonstrates how the core mission of higher education was rapidly dependent on IT. The lack of models on how to manage them was another factor that led to the study (McRobbie & Wheeler, 2010). The challenge of IT authority consolidation to leverage institutional IT resources was another factor (McRobbie & Wheeler, 2010). The literature states that CIOs had to shape the future of IT by providing innovative solutions using the latest Student Information System to support admissions, enrollment, instructional delivery, financial services, students life and campus wide administration (CIO, 2009; Nash, 2010). As mentioned above, the literature demonstrated that the CIO is a highly visible facilitator bridging the campus community, with no proper training to step on the complex CIO position (Parry, 2010).

During the decoding and data analysis phase the new genre of leadership theory constructs had to be brought in as the researcher tried to understand the kind of leaders needed in the CIO position. The new genre of leadership theory constructs claims that the leader has to be charismatic, transformational, visionary, and inspirational (Shamir, House & Arthur, 1993). Those attributes are very common to the CIO position adverts
found in the Chronicle of Higher Education publication dating five years ago as shown in Table 3. The CIO position constructs in Table 1 were derived from multiple sources advertising the CIO position (Chronicle Careers, 2009; Chronicle Careers, 2010). The study began with literature review of the InformationWeek on global CIO, 14 dissertations related to CIOs in higher education, CHECS report examining the roles and effectiveness of CIOs in higher education, and the CIO magazines (Viswadoss, 1999; Boettcher, 2007; Russell, 2008; Lineman, 2006; O’Donnell, 1998; Woodsworth, 1987; Del Valle, 2008; Brown, 2004; Schaffer, 2004; Fowler, 2003; Barber, 2002; Becker, 1999; Lima, 2006; Kelley, 2005; InformationWeek, 2008; Brown, 2009; Evans, 2009; CIO-2-CEO, 2009).

The CIO position constructs provides valuable evidence that institutions of higher learning are “ensuring that the expensive, complex, indispensable, and strategy-enabling domain of information technology” and information resources are appropriately governed (Yanosky & Caruso, 2008, p. 1). The position suffers from new emerging complex technologies and work cultures thus further politicizing the position (Weill & Ross, 2004; Yanosky & Caruso, 2008). According to Yanosky & Caruso (2008) there are four major IT governance catalysts for change: “growing impact of commodification services and consumer choice”, “research cyber-infrastructure”, “enormously larger quantities of data”, and “the increasing difficulty of funding innovation” (p. 9). The focus is on leaders with extraordinary effects on the followers, the environment, and the social systems. The questions are also in line with the following organizational cultural constructs explained in details in the literature review: humane orientation, future orientation, gender
egalitarianism, collectivism I, and collectivism II (House, Javidan, Hanges & Dorfman, 2002). In this cultural construct people are encouraged, valued, and inspired. According to Morrill (2007) the institution of higher learning is multifaceted and is about governance rather than leadership as everything is a joint effort. The classic statement of 1967 on government of colleges and universities the “joint effort” is the key in the document (Morrill, 2007). According to Morrill (2007) the statement defines “expectations for joint effort on central matters of institutional purpose, direction, and program” (p. 25).

According to the literature, the complex responsibility of CIOs include: leadership, managing budgets, business alignments, Information Systems infrastructure upgrades and maintenance, security, compliance, resource management, managing customers, managing change and board politics (Evans, 2009; Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009; Pastore, 2010; Curan 2010). CIOs drive technological advancement strategies, improve data management, integration of information systems across campus and also perform simple and complex financial concepts. According to Jacobson (2002) “the CIO position did not exist 20 years ago, and there continues to be no standard career path to the job” (p. 1). According to Heresniak (1999) the CIO position is “the most maligned and misaligned occupation around” (p. 51).

Since the literature claims that a lot of aspiring CIOs lack proper training and mentoring to perform well in the position, it was important for the researcher to look at the following theories of content and process: social cognitive career theory (SCCT) and
social learning theory (SLT). The theories assert the importance of career development
process as is evident in the CIO position does not have a standard career path (Savickas
& Lent, 1994; Patton & McMahon 2006). Even though there is no clear path to the
position, SCCT with its dynamic nature compared to other career theories, illustrates that
through a process individuals can develop an expertise or abilities for a specific endeavor,
thus the study aims to provide answers to the general and specific questions of the field.
Patton & McMahon (2006) define process as the series of “interaction and change over
time through which individuals pass” (p. 10).

During 2008 and 2009, the researcher was immersed in the literature on CIOs, thus
decided to conduct interviews and survey the following individuals: presidents, provosts,
CIOs, and CFOs from the Inter-University Council of Ohio. The pilot study led to a
comprehensive survey report published by the Center for Higher Education Chief
Information Officers Studies (CHECS). From the pilot data and the CHECS 2009 and
2010 report it became evident that the theories with wider explanations should be
incorporated (Brown, 2009). These theories include the social dominance theory,
women’s career development theory and career construction theory (Savickas & Lent,
1994; Savickas, 2005; Patton & McMahon, 2006). The conclusion to incorporate theories
with wider explanations came from the percentage of female CIO’s in 2008 and 2009
who participated in the CHECS’s study, which was 26 % and 24 % respectively, and
those from the Inter-University Council of Ohio which accounted for only 14%. The
statistics from the pilot study showed a gender imbalance as only 14 % of the CIOs from
the Inter-University Council of Ohio represented women.
The researcher learned from the pilot data that CIOs are to educate the university community on the best practices on technology and determine the future trends of its application in higher education. From the data collected there was an agreement on what executive leaders in higher education and CIOs expect of the position. This is key to avoid any misunderstanding of the functions of the position. From the researchers perspective it became obvious that CIOs need to educate their campus on technology use. It is important that sponsors (presidents, provosts, CFOs) of such projects have a clear understanding of the technology. For people to buy-in into huge investments they have to be educated on the advantages that the technology would bring in the organization. An advice from a seasoned CIO who participated in the interviews to those who are aspiring to be CIOs:

Need to be involved in multiple activities and if CIOs spend MOST of their time on one activity they would certainly fail as a CIO. Security is critical for the importance of protecting privacy, preventing attacks on systems, and public relations. Coordination and communication on campus is critical so students, faculty and staff have the information and resources to use information resources in their learning and jobs.

Even though CIOs do not have to be technology experts it is important that they have knowledge of systems and information technology; skills in managing projects, people, resources, and systems; ability to prioritize needs and balance available resources. CIOs have to be good managers to balance all the competing demands in higher education. As IT evangelists understanding the academic enterprise is important. From a higher education executive perspective on CIOs from the survey and interview:

Have a good sense of humor and the ability to put things in perspective.
Know your institution and its needs; communicate in all directions - with your supervisors and their peers, with faculty and students, with the employees in IT, and with vendors and other outside constituencies.

The data also provided the study with key lessons emphasizing the importance of strategic business planning, negotiation skills, instructional delivery, customer service and support as well as building relationships across the university community (see Appendix E and CHECS report). From the data generated from interviews and surveys there is more to learn from other institutions around the United States, thus a triangulated qualitative methodology approach will be used in the study to answer the general research question: What are the characteristics of a strategic and adaptive Chief Information Officer in higher education? However, it is first important to elaborate on this pilot study that the researcher already conducted to explain how lessons would be drawn. Most importantly the results from the pilot study were strengthened arguments for the need of the triangulated qualitative methodology.

From the pilot data the researcher learned that the position provides the overall management of computing and communication infrastructure. It is expected that they provide leadership within the IT department by managing technology strategic plans, policies, IT projects, network communications as well as IT budgets. From a provost perspective on CIOs:

are responsible for developing IT strategic plans and implement the objectives related to the information technology needs of the institution…interact with senior executives of all functional units.

provides strategic plans and manage the following functions: systems and applications programming, communication infrastructure, ERP projects, implementation of ITS policies.
CIOs are to establish the computing operating policies and provide advise to the university executive board on information technology. They are to explicitly explain how technology supports the institution’s business goals and mission. Security was another issue brought up in the pilot data by both CIOs and executive leaders in higher education. The participants also cited graduate education with minimum of ten years of progressive professional experience in higher education as another important attribute to those aspiring to be CIOs. Large project management experience and implementation came up several times during the interview sessions. The advice some of the CIOs gave through the survey to those who aspire to be CIOs were as follows:

- have working knowledge of project management and implementation.
- excellent communication, presentation, writing skills as well as problem solving skills.

From the researchers perspective soft skills enable individuals to effectively communicate and build relationships with people especially in a campus community. The population on campuses is very diverse so CIOs need to be able to communicate their vision to all stakeholders and build rapport across campus. These people are to communicate the IT strategic plans and how they align with the institution’s business needs. Dealing with complex systems from the researcher observation CIOs need to have a working knowledge of system design and development as well as being able to translate users’ need into business and system requirements. Such information should be communicated to all stakeholders using non-technical language. Other skills associated with the position were: negotiation skills, creativity, problem solving, self-motivation,
adaptive, team player, interpersonal skills, collaborative, as well as team building skills. From the pilot study the researcher revisited the interview and online survey questions to make adjustments where necessary. The results also helped the researcher formalized the topic of the study.

The application of wider explanation and constructivist approaches will enable hiring firms and search committees to respond to issues of socioeconomic status, women, racial and ethnic groups, and the needs of today’s dynamic work environment, unlike the limited person-environment and vocational development theories (Patton & McMahon, 2006). The position gained momentum as universities started to consolidate their distributed information technology offices under one executive and developing new IT strategic plans (Brown University, 2008; Indiana University, 2009; Miami University, 2009; Ohio State University, 2010; University of Florida, 2002). As the CIO position responsibilities grew significantly university administrators challenged IT departments to come up with strategic plans inline with the university mission and objectives. The CIOs come on board to develop and implement feasible Information Technology Strategic Plans. The IT Strategic Plans (ITSP) provide university-wide vision for information technology so that an institution can achieve its mission and objectives as well as guiding change in their IT investment decisions (Brown University, 2008; Indiana University, 2009; Miami University, 2009; Ohio State University, 2010; University of Florida, 2002). These IT strategic plans demonstrate the commitment of universities to IT development and delivery capabilities, and services to support the core missions of the university. The plans emphasize the use of unified communication system-and integrated information
systems to create one secure network. Table 2 illustrates the alignment of different IT strategic goals with different universities. As universities are increasingly more dependent on IT solutions to transform their dynamic and complex environment it became clear that an IT strategic plan should be developed to act as a roadmap on IT investments. It became clear that universities needed to be versatile and action-oriented.

The top-ten IT issues continued to swap places with the exception of the top three: IT funding, security, and administrative/ERP/information systems. IT funding and security continue to be the top issues in the top-ten IT issues in higher education as shown in Table 2. From 2008 administration became an issue and is evident with the complex requirements of the position presented in Table 1. IT funding issue will be around for a while as the universities’ core mission, which is teaching, and research continue to depend heavily on the state of the art technology tools. The introduction of new SIS system could be another issue leading to IT funding and security. Legacy systems are being retired with new module based systems being introduced at higher cost. The introduction of the new SIS requires new infrastructure and software compatible to the vendor awarded the tender. The 21st century college and university is learner-centered institution with technology stimulated students. Segall and Freedman (2007) asserted that higher education is “facing the demands of a world with new quickly changing student demographics, an increasingly flat global environment, and tighter funding and accountability constraints” (p. 5). For institutions to compete with their counterparts they are to change with time.
As institutions are calling on strategic CIOs the literature explain that a strategic leader should understand the needs and key issues that directly affect the business strategic plan of an institution (Overby, 2009; Pastore, 2010). According to one of the CIOs from a university in the Mid American Conference (MAC),

CIOs should be in touch with the whole world and keep up with what the media is reporting about other institution’s IT and Strategic Development Plans, and know the concerns of the president, provost, deans, faculty, staff and students, all of whom are the IT department customers.

Thus the CIO spends time maneuvering between and within these different bodies trying to understand the needs and develop a rapport with all constituencies. Failure by the CIO to address the needs of the constituencies and providing efficient and reliable services can result in their tenure cutshort. Paul Bergamo, former CTO of Liberty Mutual provides advice on three areas CIOs should concentrate on (Bergamo, 2010):

1. “Improving direct communications with business stakeholders to build relationships and trust, and also staffers to help them transition to the desired behaviors” (p. 28)
2. “Encourage joint business and IT investment” (p. 28)
3. “Strengthening IT capabilities and operational performance” (p. 28)
Table 2.

Top-Ten IT Issues in Higher Education (Maltz et al., 2005; Dewey et al., 2006; Camp et al., 2007; Allison et al., 2008; Agee et al., 2009; Ingerman et al., 2010)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Issue Description</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Funding IT</td>
<td>Security and Identity Management</td>
<td>Funding IT</td>
<td>Security</td>
<td>Funding IT</td>
<td>Funding IT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Security and Identity Management</td>
<td>Funding IT</td>
<td>Security</td>
<td>Administrative/ERP Information Systems</td>
<td>Administrative/ERP Information Systems</td>
<td>Administrative/ERP Information Systems</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Administrative/ERP/Information Systems</td>
<td>Administrative/ERP/Information Systems</td>
<td>Administrative/ERP/Information Systems</td>
<td>Funding IT</td>
<td>Security</td>
<td>Security</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Strategic Planning for IT</td>
<td>Disaster Recovery/Business Continuity</td>
<td>Identity/Access Management</td>
<td>Infrastructure</td>
<td>Infrastructure/Cyberinfrastructure</td>
<td>Teaching and Learning with Technology</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Infrastructure Management for IT</td>
<td>Faculty Development, Support, and Training</td>
<td>Disaster Recovery/Business Continuity</td>
<td>Identity/Access Management</td>
<td>Teaching and Learning with Technology</td>
<td>(tie) Identity/Access Management</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Faculty Development, Support, and Training</td>
<td>Infrastructure</td>
<td>Faculty Development, Support, and Training</td>
<td>Disaster Recovery/Business Continuity</td>
<td>Identity/Access Management</td>
<td>(tie) Governance, Organization, and Leadership</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>E-Learning/Distributed Teaching and Learning</td>
<td>Strategic Planning</td>
<td>Infrastructure</td>
<td>Governance, Organization, and Leadership</td>
<td>Governance, Organization, and Leadership</td>
<td>Governance, Organization, and Leadership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Governance, Organization, and Leadership for IT</td>
<td>Governance, Organization, and Leadership</td>
<td>Strategic Planning</td>
<td>Change Management</td>
<td>Disaster Recovery/Business Continuity</td>
<td>Learning Management Systems</td>
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<tr>
<td>8</td>
<td>Enterprise-Level Portals</td>
<td>E-Learning/Distributed Teaching and Learning</td>
<td>Course/Learning Management Systems</td>
<td>E-Learning/Distributed Teaching and Learning</td>
<td>Agility, Adaptability, and Responsiveness</td>
<td>Strategic Planning</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Web Systems and Services</td>
<td>Web Systems and Services</td>
<td>Governance, Organization, and Leadership for IT</td>
<td>Staffing/HR Management/Training</td>
<td>Learning Management Systems</td>
<td>Infrastructure/Cyberinfrastructure</td>
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<tr>
<td>10</td>
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With the different cultures dominating higher education there is a lot of unanswered questions about the kind of experience and expertise needed to transform higher education. In this “market-driven, student-centered and businesslike management and accountability strategies” it is imperative to place IT leadership that would adapt so that the academic mission, focus, and values is preserved (Segall and Freedman, 2007, p. 5). Jacobson (2002) reported that 653 of 1626 EDUCAUSE institutions have characterized their IT Executive as CIO and in the past “five years at least 10 to 20 major research universities have conducted CIO searches” (Jacobson, 2002, p. 1). In the last five years the Chronicle of Higher Education has advertised about 10 CIO positions on average per year at both public and private institutions. In the past three years the following major universities hired a new CIO or created the CIO position: University of Illinois at Urbana-Champaign, The Ohio State University, Ohio University, University of Cincinnati, Harvard University, University of Buffalo, The University of Iowa, The University of New Mexico, The University of North Dakota, The University of North Carolina at Chapel Hill, The University of Colorado at Boulder, The University of Florida, Cornell University, The University of Kentucky, The University of Notre Dame, Arizona State University, University of the Pacific, Western Carolina University, etc.

In a survey conducted by the InformationWeek Magazine (InformationWeek, 2008) some of the high profiled CIOs in the industry offered some of the top initiatives they have for their companies and a complete summary of the initiatives can be found in Chapter 2. Below is a brief summary of some of the key initiatives:
1. Continuously training of staff and developing middle-management team, designing and developing robust processes, and applications to improve the customer experience through people, process, and technology improvements.

2. To improving reliability on infrastructure and implement unified communication systems to increase productivity, decrease cost, and drive efficiencies to transform the way companies do business.

3. The implementation of Web 2.0 to promote collaboration and collaborative thinking

4. The implementing robust core systems to enhance product offerings, and the advancement data analytics to analyze emerging quality issues.

5. The strengthening of information security practices as all corporations continue to implement innovative digital technologies.

6. The integration of systems across corporations e.g. the ERP projects.

7. Implementing electronic documentation systems to improve flexibility, productivity, and simplifying the process of serving customers.

8. Providing a consistent and up-to-date view of business information across an organization in order to achieve a balanced portfolio of IT initiatives highly aligned to the company business strategy.

9. Embracing continuous learning and create an entrepreneurial environment where creativity is encouraged.

10. Standardization of information systems tools to provide persistent asset visibility, compliance reporting, vulnerability scanning, security alerts, etc.
There is congruence in what institutions of higher education are trying to do with what the industry is looking at as key initiatives. The terminology differs as in higher education it is labeled as top IT issues, while in industry called it key initiatives. Both higher education and industry CIOs could learn from each other as resources are dwindling in both places.

1.8 Design of the Study

The implementation of the technology in higher education is central to the way instruction is conducted, research is done, and the day-to-day business of the university is run. Information technology has been empowering the world of higher education and helps them to deal with huge amount of data as students grow on campuses and systems integration. The questions were constructed in reference to the 11 position requirements constructs generated by the researcher.
Table 3.

<table>
<thead>
<tr>
<th>Position Requirements Constructs</th>
<th>Specific Questionnaire and Interview Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position Requirements Constructs 1</td>
<td>Which skill is most important in their role?</td>
</tr>
<tr>
<td>Position Requirements Constructs 2</td>
<td>Which skill is least important in their role?</td>
</tr>
<tr>
<td>Position Requirements Constructs 3</td>
<td>On what activity do you think Chief Information Officers should spend the most amount of time?</td>
</tr>
<tr>
<td>Position Requirements Constructs 4</td>
<td>On what activity do you think Chief Information Officers should spend the least amount of time?</td>
</tr>
<tr>
<td>Position Requirements Constructs 5</td>
<td>What are the critical skills or the kind professional experience do you think a Chief Information Officer needs to have in order to be successful in higher education? Why?</td>
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<tr>
<td></td>
<td>What are the levels of decision-making that Chief Information Officer have for academic computing services, administrative systems, library automation, and telecommunications?</td>
</tr>
<tr>
<td></td>
<td>On what activity do you think Chief Information Officers should spend the least or the most amount of time?</td>
</tr>
<tr>
<td></td>
<td>What are some of the forces that are shaping the role of Chief Information Officers in higher education?</td>
</tr>
<tr>
<td>Position Requirements Construct 6</td>
<td>What would be the best advice(s) for future Chief Information Officers in Higher Education or expertise do you think Chief Information Officers need to have to become successful in higher-education? Why?</td>
</tr>
<tr>
<td>Position Requirements Construct 7</td>
<td>What are the critical skills or the kind professional experience do you think a Chief Information Officer needs to have in order to be successful in higher education? Why?</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Position Requirements Construct 9</td>
<td>What types of education (training) or academic credentials do you recommend Chief Information Officers should have in order to successful administer their duties in higher education? Why?</td>
</tr>
<tr>
<td>Position Requirements Construct 10</td>
<td>What are some of the forces that are shaping the role of Chief Information Officers in higher education?</td>
</tr>
<tr>
<td>Position Requirements Constructs 11</td>
<td>Which business process CIOs should improve with Information Technology systems?</td>
</tr>
</tbody>
</table>
The responses from the questions provided empirical data on how CIOs can be effective in the complex culture of higher education by influencing, motivating, and enable others to contribute towards a networked and strategically placed environment. For credibility, confirmability, dependability, and transferability, this study followed the guidelines on naturalistic inquiry (Lincoln & Guba, 1985). In any research trustworthiness and credibility are very important so that people can pay attention to the study. The research followed the phenomenological approach. The phenomenological approach has a long history in social research disciplines: psychology, sociology and social work. It emphasizes a focus on people's subjective experiences and interpretations of the world (Creswell, 1998; Creswell & Clark, 2007). Edmund Husserl known to be father of phenomenology describes it as a reflective study of the essence of consciousness as experienced from the first person point of view. In this approach, researchers are encouraged to use the words used by the participants in describing their views; data is collected in the “field at the site where the participants experience the issue under study” (Creswell, 2009, p. 175).

According to Lester (1999) the phenomenological approach “illuminate the specifics, to identify a phenomena through how they are perceived by the actors in a situation” (p. 1). This is to gather in-depth information and perceptions through interviewing, documents analysis, personal texts, and surveys to have an understanding of the CIO position from the CIOs and other administrators’ perspectives. By using interviews, documents analysis, personal texts, and surveys will ensure credibility of the data and the results. Byrne (2001) asserted that phenomenological researchers hope to
gain understanding of the essential truth of the participants lived experience. The phenomenological approach is based on the “paradigm of personal knowledge and subjectivity, and emphasize the importance of personal perspective and interpretation” (p. 1). The method seeks to describe rather than explain and there are no hypotheses (Lester, 1999). This a method that challenges structural and normative assumptions, while bringing to the fore the experiences and perceptions of individuals from their own perspectives, and surface deep issues (Lester, 1999; Byrne, 2001).

1.9 Definitions of Terms

Adaptive is the ability to respond and shape change as values and missions of the institution become less relevant to business environments.

Chief Information Officer senior executive leader responsible for information technology policy, standards, and management of all university information resources.

Fortune 500 companies the 500 US companies with the largest revenue in the previous fiscal year.

Information System (IS) is a “set of information resources organized for the collection, storage, processing, maintenance, use, sharing, dissemination, disposition, display, or transmission of information” (Committee on National Security Systems, 2006, p. 33).

Information Technology (IT) concerns the technology and other aspects of managing and processing information using computer software and hardware to convert, store, protect, process, transmit, and retrieve information (iBerry, 2011).
Leadership is the “the art of mobilizing others to want to struggle for shared aspirations” (Kouzes & Posner, 1997, p. 30).

President is the highest governing head of an institution of higher learning or the functional head of a university; the liaison of the university in the community, as well as the public face of an institution (Chronicle Career, 2010).

Provost is the senior officer providing planning, development and administration of the academic mission of the University and is responsible for the advancement of the University academic and scholarly mission as well as making sure that the University delivers exceptional learning experience (Chronicle Career, 2009; Chronicle Career, 2010).

Chief Finance Officer is the senior officer responsible for sound and strategic management of University financial resources. They have a broad portfolio that directly serves and supports all aspects of campus life: budget and finance, human resources, sustainability, public safety, parking and transportation, campus planning and real estate, and campus operations.

Strategic is an interactive method of leadership that details purposes and priorities in an organization.

1.10 Delimitations of the Study

The study was performed to understand chief information officers in higher education. The goal was to understand the IT executive leader in the complex higher education with a lot of expectations as shown in Table 1. The participants were limited to
CIOs in the Association of American Universities (AAU). The existence of the CIO position in the corporate world and higher education provides an interesting comparison. The position has a lot of similarities, but higher education provides a unique environment with emphasis on governance. The focus on CIO in higher education will expand the body of literature.

1.11 Limitations of the Study

The results may not generalize to other institutions as classified by the Carnegie Foundation for the Advancement of Teaching (2010) since the focus was on CIOs in AAU institutions. AAU institutions are dominated by top research public and private institutions. The results may still be of great assistance in understanding these positions. The second limitation was the limited number of participants in the study as the participants hold executive positions in their institutions of higher learning. Accessing such individuals proved to be very difficult. The only way to access such individuals was through emails, and emails of executive leaders are sometimes managed by personal assistants or chief of staffs who evaluate what the executive can attend to or participate in. The responses to the online and telephone interviews items were subject to personal biases.
CHAPTER II REVIEW OF THE LITERATURE

In recent years, studies (Woodsworth, 1987; O’Donnell, 1998; Becker, 1999; Viswadoss, 1999; Zastrocky and Schlier, 2000; Barber, 2002; Hawkins and Marcum, 2002; Fowler, 2003; Brown, 2004; Schaffer, 2004; Kelley, 2005; Brown, 2006; Lineman, 2006; Lima, 2006; Boettcher, 2007; Del Valle, 2008; Russell, 2008) have been done to investigate the role of Chief Information Officers in higher education. The goal of this section is to use the existing literature to learn about leadership theories, management theories, the complex culture of higher education, and the forces that are shaping IT in higher education as well as the evolution of the CIO position in higher education. The chapter will be structured as follows: Evolution of the Chief Information Officers, Leadership Theories, Evolution of Web 2.0 Technologies and the University, Cultures in Higher Education, Management Styles, and Related Dissertations. The current literature provided the study with a foundation and the basic information to construct our questions.

2.1 Evolution of the Chief Information Officers

There is a growing demand for web applications, advanced technological applications, data storage and secured network in higher education, resulting in the growing demand of new Student Information Systems (SIS). The power of the web has dramatically changed the way higher education institutions conduct business i.e. from recruitment to students’ retention to instructional delivery and unified communication. It is in the best interest of institutions of higher education to invest in highly dynamic and
reliable systems; it is for that reason that institutions must invest in three-dimensional leaders instead of one-dimensional leaders. According to the McCrea (2010) there are three enrollment management challenges: overwhelming data volumes and data irregularities; lack of information to help determine which students are at risk of attrition; and the inability to distinguish between probable prospects and those less likely to enroll. From the literature and the pilot data the researcher learned that the CIO should be a multi-leadership facet in order to cope with institution internal business and politics, and effectively deal with external challenges. The three-dimensional leader will be a person who has all the three attributes as CIOs are expected to bridge the gap between IT and the institutional business.

Thus the Chief Information Office should possess those skills necessary to motivate and build people’s confidence in technology (Brown, 2004; Zastrocky & Schlier, 2000). As more and more CEOs understand the value that technology brings they have created CIO positions at the senior level of administration unlike in the past when they were called IT directors or assistant vice-president and some were just library deans also in charge of computing. Frank Rhodes president emeritus of Cornell University asserted that:

“The development of responsible, effective, and balanced governance, leadership, and management is one of the most urgent priorities for the American universities as it enter the new millennium” (Rhodes, 2001, p. 201).

This work intends to contribute to the understanding of how Chief Information Officers (CIO) can successfully lead within the complex culture of higher education, in an atmosphere where a one-dimensional leader cannot survive. In higher education the
organizational structure is complex and the needs of all the constituencies are critical to the success of the institution. The concept of One-dimensional is defined as “conforming to existing thought and behavior with no critical dimension to transcend the existing society” (Kellner, 1984, p. 235). Marcuse (1964) views liberation, technology, culture and democracy as dialectic one. He believed that ideological manipulations hinder radical social change. In his 1965 essay “Repressive Tolerance” he chronicled how capitalism and democracy are portrayed as totalitarian and repressive systems (Gabardi, 1987). Marcuse (1964) provides a powerful critique of new modes of domination and social control. In academia where shared governance is a way of life there is no room for forces of domination, which continue to disqualify a “freer and happier mode of human existence” (Marcuse, 1964). Most IT executives have faced resistant as they try to dominate in the IT implementation conversation and in some cases going ahead with an investment without a campus-wide community input. The following researchers reported the following numbers on the tenure of a CIO: Viswadoss (1999) reported 18 to 36 months, Latimer (2000) reported four and a half years, and Brown (2004) reported five years and five months.

In the researchers quest to provide a comprehensive image of the CIO position it is important to look at career theory and constructivists approach theory in the 21st century. Such theories could provide the lens to end the legacy of male domination in higher education IT executive positions especially white males, which has resulted in the deterioration of the open and democratic process in decision making (West, 2002). The higher education environment does not allow closed and non-inclusive process in
decision-making. Unlike the corporate structure that allows executives to control how people functions, and control the use of resources, in academia there is a lot of autonomy especially with the faculty members. Morrill (2007), defines culture as “an integral whole consisting of implements and consumer goods, beliefs and customs…a vast apparatus, partly material, partly human, and partly spiritual, by which man is able to cope with concrete, specific problems that face him.” Analyst of corporate culture, Morrill (2007), “[An organizational culture] has to cultivate a humanly fulfilling context...” In One-Dimensional Man Marcuse articulates the Hegelian-Marxian concept of philosophy and critiques the dominant philosophy. In critiquing the scientific civilization, the modes of thought, and the technological rationality, he viewed technological imperatives as a way to colonize everyday life and failing to recognize the importance of freedom and individuality (Marcuse, 1964). For him, technology imperatives impose rules and structures on how people think and behave. The CIOs have to be open and accept criticism. Critical thinking promotes the seeking of alternative modes of thought and behavior leading to what Herbert Marcuse calls negative thinking (Marcuse, 1964).

For the position to be inclusive there is a need for those making decisions on CIOs to be aware of the gender gap in the position. There is an interesting trend in the CHECS report as far as women by different age groups: the percentages from ages 31-35 to ages 66-70 are almost the same at 25 % of those who participated in the survey, and 9 % between the ages of 36 – 40. The gender percentage gap is alarming, as it remains the same over a long period of time. This is despite the fact that the American Council on
Education claim that women “have represented 57% of enrollments at American colleges since at least 2000” (Williams, 2010, p. 1).

The Aberdeen Group (2007) suggests that IT executives should align the department goals with those of the organization or institution to avoid any conflict that may arise inside the boardroom. There were recommendations from the article that IT should support the business and be viewed as the business driver, demonstrate value of security and compliance, increase cross functionality alignment and seek out technology partners who understand their needs. The qualities of a leader that is doing the right things vs. doing things right are determination, willingness to serve, conviction, integrity and improvisation (Bailey, 1995; Goldstein et al., 2003). The InformationWeek Magazine surveyed 99 corporate CIOs and below is the summary of top initiatives for the year 2009 (InformationWeek, 2008):

1. Continuously training of staff and developing middle-management team, designing and developing robust processes, and applications to improve the customer experience through people, process, and technology improvements.

2. To improving reliability on infrastructure and implement unified communication systems to increase productivity, decrease cost, and drive efficiencies to transform the way companies do business.

3. The implementation of Web 2.0 to promote collaboration and collaborative thinking as well as simplifying, personalizing, humanizing systems users across an organization, and reduce carbon emissions and travel costs.
4. The implementing robust core systems to enhance product offerings, and the advancement data analytics to analyze emerging quality issues.

5. The strengthening of information security practices as all corporations continue to implement innovative digital technologies.

6. The integration of systems across corporations e.g. the ERP projects.

7. Implementing electronic documentation systems to improve flexibility, productivity, and simplifying the process of serving customers.

8. Providing a consistent and up-to-date view of business information across an organization in order to achieve a balanced portfolio of IT initiatives highly aligned to the company business strategy.

9. Embracing continuous learning and create an entrepreneurial environment where creativity is encouraged.

10. Standardization of information systems tools to provide persistent asset visibility, compliance reporting, vulnerability scanning, security alerts, etc.

11. Robust website to provide consistent customer experience featuring upgraded search functionality, and the ability to change language to meet customer or user’s needs.

12. IT support desk or call centers with access to more content, categorize content to make it easier to find, and highlight information people look at the most in order to provide superior customer service.
13. Global capability to build strong partnerships to expand trading functionality and supply chain as is a fundamental aspect of remaining competitive in the global market.

14. Centralization of IT departments from decentralized architecture delivering applications on a company-wide environment.

15. Leveraging technology as an agent of outreach to communities

16. Personalizations of portals with people pages looking like social networking sites.

17. Increase the value of IT across the company by changing management processes to improve cycle times, improve quality, and reduce infrastructure spending.

18. Integration of Geographic Information Systems to provide visibility into different data for business intelligence purposes to drive market value, business growth, retention in the investment areas, to predict future events so that companies make sound decisions.

19. Continuous systems modernization so that users can perform online self-service to access/update personal information, procurement, and time-off requests.

20. Virtualization hardware and software to reduce carbon footprint and increase operational efficiencies

21. Formalizing project management systems
2.2 The CIO Role

In the process of “strengthening the IT capabilities and operational performance” CIOs’ task is to be proactive in the boardroom and develop money saving initiatives, point to areas where IT can leverage the budget and resources available. In IT department’s failures are not tolerable as they are more visible and have real consequences to the university-at-large. IT executive leaders should always bridge any gap between IT department goals and university wide mission so there is a need to understand the kind of training or experience important in such environments as the expectations and reality in the era of tight budgets, building credibility for IT is essential. Brown (2004) summarizes the expectations of a CIO in different roles as illustrated in Table 4 below.

Table 4.

(Brown, 2004, (permission granted))

<table>
<thead>
<tr>
<th>CIO Role</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business partner</td>
<td>Organizational strategic planning and revising business processes</td>
</tr>
<tr>
<td>Classic IT support provider</td>
<td>Foundations of IT support and responsive department</td>
</tr>
<tr>
<td>Contract oversight</td>
<td>Relationships with IT vendors, contract negotiation, and contract supervision</td>
</tr>
<tr>
<td>Integrator</td>
<td>Integration of all internal and external systems</td>
</tr>
<tr>
<td>Informaticist and IT strategist</td>
<td>Ensure security and accuracy of institutional data and alignment of IT department with the institution</td>
</tr>
</tbody>
</table>
CIOs as technology evangelist should learn the art of “managing more with fewer resources, developing efficient workflows, keeping pace with the operational upkeep of systems, communicating explicitly the value of IT investments in financial terms, and managing costs and making more informed and transparent strategic decisions” (CIO, 2009, p. 19). They should implement technology as a source of inspiration to empower the university campus to improve its services and productivity. Technology can be looked at as “the field of research and action, aiming at controlling and transformation of reality whether natural or social” (Scharff & Dusek, 2003, p. 172). The availability of IT portfolio management (ITPM) enables IT to create a sustainable process that captures and displays strategic information helping organizations to make informed decisions. The key is to make sure that there is no disconnect between the organization’s mission and the technology required to achieve outstanding customer service.

In order to manage technologies the CIOs should understand them in four themes: hardware (artifacts), sociotechnical system of manufacture, procedures or processes to accomplish tasks, and sociotechnical system to extend human capabilities. CIO should understand how the IT department functions and the university at large because everything is open, unlike technology, as pointed out by the social constructivists (Krippendorff, 2008a; Higgs & McCarthy, 2005). Social constructivists question the
Cartesian separation between objective world and subjective experience and ask for an open and less dogmatic approach (Higgs & McCarthy, 2005; Krippendorff, 2008a).

The rapidly growing technology should not drive the CIO’s decision-making process, not unless they want to make technology determine the direction of the university. Krippendorff (2008a) argues that the growth of technology should not in any way start to shape human actions. The researcher learned from a MAC institution CIO that,

CIOs should always make sure that technology is embraced as a tool to enhance an organization decision making process by helping to assess both internally and externally environment, and ultimately improve business performance.

According to surveys conducted by IDG Research Services and CFO Research Services on IT and Finance executives on systems, tool, and type of information available at their companies for strategic planning, IT wants an increased functional role, while the Finance executives thought IT’s role should stay the same or lessen (CIO, February 1, 2010). In lieu of such results there is a need for corporate strategies to be inclusive especially when “technology helps analyze the past, the future, and helps companies predict and prepare for the future” (CIO, February 1, 2010, p. 8).

With the series of huge technology investments on IT products the CIO magazine (CIO, 2010) suggests more integrated strategic planning with IT a priority for growth. Thus CIOs have huge responsibility to shape the IT departments by bringing new reliable systems, collaborative tools, unified communication, establish standards for documentation, security, and streamline automated workflows (CIO, 2010). For CIOs to successfully negotiate the challenges of the budgets cuts with projects pending they need
to have “the ability and the platform in their corporations to identify the projects on their multiyear road maps that will guide the majority of IT investments, thus streamlining the planning process” (CIO, 2010, p. 22). The planning process needs to align with and balances business priority, and it must be iterative to “provide better visibility into delivery objectives” (CIO, 2010, p. 22). Some CIOs have to develop IT policies while others have to revise what was already in place to establish tighter compliance. This helps to facilitate management of resources and improve security and control of services. In some cases they have to work with insufficient budget, but still have to deliver the best services to meet users’ needs. For CIOs, it is important to be technologically savvy but in addition, they have to be mentors, coaches and create an environment for the staff to grow and be more productive (InformationWeek, 2008). It is also imperative for CIOs to develop working relationships with all stakeholders.

The other area of concern for CIOs is talent to transform the IT capability within an organization or institution (CIO, 2009; Nash, 2010). Kristen Lamoreaux an executive recruiter with Jarvis Walker Group believes that paying attention to personal network is key in finding talents (CIO, 2010). She calls the relationship “friends with benefits” (p. 34), while Michael Iacona, CIO of TMP Worldwide Advertising and Communications made it clear that: “relationships can’t be built exponentially because a relationship implies time invested in learning about and knowing about those other people. It’s about building those relationships such that you have a network of strong relationships, and LinkedIn is just a facilitation of that; it’s not the other way round” (CIO, 2010, p. 34). Maintaining personal and professional networks can provide an avenue to draw talent of
new hires who have the core competencies an organization might need (CIO, 2010). The IT staff should comprise of effective talent so that they can immediately have an impact on the desired cultural changes. These hires have a task to accelerate all innovative ways in which IT can deliver business value and competitive advantage to an organization. The same thing applies in institutions of higher learning as CIOs looks to bring intelligent storage that are reliable with great performance and scalability the IT departments must have competent teams. They have to strategically implement centralized IT infrastructure to drive operational efficiency and growth while protecting data in a cost effective and timely manner (CIO, 2009). This is done in order to deliver innovative solutions so that applications developed have the ability to adapt to and execute change as needed (Nash, 2010). This in entirety means understanding of the basic networking concepts in order to optimize network accessibility to meet university needs.

Brown and McClure (2009) argue that CIOs have a very complex role in higher education. They are in charge of all processes and practices to support the flow of information within an institution. Due to redefinition of the business of higher education the position is no longer highly focused on technical issues, as it has influence on the institutions business strategies. CIOs are to bring in new technologies to provide the following services (CIO, 2009; Nash, 2010):

1. Unified communication
2. Tools for collaborative and assimilation of data into information
3. End-user support of physical and online learning environments
4. Business system processing of transactions so that there is fiscal accountability to promote efficiency

5. Data access by various stakeholders for institutional development purposes

6. Media and academic computing

7. Desktop support

As much as higher education is complex Chief Information Officers must be effective strategists if their units or organizations are to fulfill the mission of the university and satisfy the different communities in higher education. Adding value is key thus CIOs have to exercise discretion as much as possible and develop a coherent and defensible basis for their decisions (Bryson, 2004). It is important to apply some stakeholder identification and analysis technique, which are embedded in the mission, vision and goals of the institution. This enables the leadership in particular the CIO to then come up with strategic formulation - the organizations’ mandate and strategic plan to implement the mandate. Lev S. Gonick, vice president for information-technology services and chief information officer at Case Western Reserve University said universities must develop and implement creative collaborative means to cut costs in a long-run offering shared services (Fischman & Young, 2008). Managing information technology (IT) project portfolio can be a challenge as it can saturate a lot of capital-money, time, human resources, etc. To successfully negotiate this process a framework is key as it provides a common language to talk through the different constituencies that exists in higher education (Feldman, 2010). According to Feldman (2010) frameworks are like high-quality maps. The grassroots approach is important in higher education so
that all constituencies feel valued and appreciated in the decision making process (Kezar & Eckel, 2002; Anthony, 2004). There is merits in knowing the stakeholders, and in this case the following groups: faculty, administration, staff, students, and community members.

2.3 Leadership Theories

The diffusion of innovations’ theory has been widely used to study the spread of new ideas and practices (Rogers, 1988; Shaw, 1991; Valente, 1995; Valente & Davis, 1999). Diffusion of innovation depends on social conditioning (Valente & Davis, 1999). The diffusion of innovative theory details how ideas, information, and practices spread within and between diverse communities (Rogers, 1995; Sviokia, 1986; Valente & Davis, 1999). Studies have showed that social relationships partly determine the choice on economic transactions (DiMaggio & Louch, 1998; Biggart, 1989). In order to successful engage different stakeholders in technological advancement and diffusion of technology leaders need to make sure that bifurcation occurs to evaluate the situation, and catalyze diffusions. Leadership theories can be used as interventions to transform an organization instead of the vicious legacy of male domination in higher education administration, which has arrested the notion of the democratic process in decision-making.

The issue of authority in an organization or leadership is one of the critical dimensions, so the adoption of some of the leadership theories is another way of ameliorating confusions and gap in an institution (Bennis, 1959). For an example in higher education shared governance has been troublingly deteriorating in the face of institutional budget impasse leading to frustrations among the diverse university
constituencies. Institutional governance statement that was formulated by the American Association of University Professors (AAUP), the American Council on Education (ACE), and the Association of Governing Boards of Universities and Colleges (AGB), provides “clarification of the respective roles of governing boards, faculty, and administration” (American Association of University Professors, 2006, p. 135). The statement basically advocate for an inclusive decision making process even as colleges and universities are becoming less autonomous. Birnbaum (2004) described the term “governance” as a system that gives structures and processes to academic institution for “organizational control and influence” (p. 2). For the purpose of this study I will elaborate on the two terminologies as they appear on the title of the study:

2.3.1 *Strategic Leadership*

Strategic leadership involves the systematic strategic process in decision-making that “integrates reciprocal leadership into its concepts and practices” (Morrill, 2007, p. xii). It is an interactive method of leadership that details purposes and priorities in an organization. Strategic leadership is key in a dynamic and complex environment like higher education as leaders are expected to be multidimensional as by nature colleges and universities are assumed to be collegial in their decision making (Schuster, Smith, Corak & Yamada, 1994). In a dynamic and complex environment identity and aspirations are key factors of strategic leadership (Morrill, 2007). Due to different hierarchical structures in a college environment it is important for strategic leaders to articulate their sense of purpose and vision (Morrill, 2007). Strategic governance entails “intelligent
strategic planning with those of legitimate, participative governance” (Schuster et al., 1994, p. 11). The AAUP 1940 statement promotes the participatory mode of governance, and provide details on standards for participatory decision making process (American Association of University Professors, 1966).

2.3.2 Adaptive Leadership

The rapidly changing higher education environment needs leaders who will pay attention to both internal and external issues affecting their institutions so that they can adapt. In the organizational literature it is well document why it is important for organizations to align their internal structure and processes to the demands of the external environment (Howard, 1994; Miller, 1997; Barriere, Anson, Ording, & Rogers, 2002). In this study adaptive will be defined as an individual’s ability to deal flexibly with rapidly changing environment. Flexibility enables leaders to learn provide them with ways to respond to and shape change. In higher education in the United States of America changes in states’ funding, technology, types of students, and societies have forced colleges and universities to seek new ways to dramatically counter the situation by developing new strategic plans and find new ways of operating (Heifetz & Laurie, 2001). It is very important to strategically adapt if the values and mission of an organization are becoming less relevant to new business environments (Heifetz & Laurie, 2001). Heifetz & Laurie (2001) provide five key responsibilities of a leader when adaptive work calls:

1. “Identify the adaptive challenge and frame key questions and issues” (p. 9)
2. “Let the organization feel external pressures within a range it can stand” (p. 9)
3. “Challenge current roles and resist pressure to define new roles quickly” (p. 9)
4. “Expose conflict or let it emerge” (p. 9)

5. “Challenge unproductive norms” (p. 9)

The capacity to adapt and shape change as a CIO in higher education is an important characteristics in a dynamic and complex environment. Facing the dynamic and complex environment gives leaders in higher education a new role in their decision making process. As a leader in such environments “understanding should continuously updated and adjusted” (Folke, Hahn, Olsson, & Norberg, 2005, p. 447). According to Heifetz, Grashow, & Linsky (2009), emphasize the importance of creating a culture of courageous conversations even in most difficult topics so that they gain insights from dissenters and unfamiliar voices. Adaptive leadership requires focus and uses strategy which is a highly flexible tool (Heifetz, Kania, & Kramer, 2004; Heifetz, Linsky, & Grashow, 2009).

It is very important to adopt leadership theories that support shared governance, even as “legal authority” within higher education has evolved (p. 2). The concept of leadership within higher education can be very complex as it deals with power, status, authority, rank, prestige, influence, control, manipulation and domination (Bennis, 1959). There are different kinds of leadership: bureaucratic, charismatic, democratic-autocratic-laissez-faire, group-centered, reality-centered, and leadership by objective (Bennis, 1959; Morrill, 2007; Schein, 1992). It is of great importance that colleges and university administrators continuously identify the relevant leadership styles. There is no consensus among the different types of leadership making it difficult to even study and identify the ones that suit higher education due to their complexity and value-laden potency.
The emerging plutocracy in higher education is challenging the very foundation of institutions of higher learning to advance academic freedom and provide value-added education (West, 2002). The glorification of callous market-driven corporate culture in higher education has contributed immensely to the deterioration of shared governance (West, 2004). Even though this research is not about coming up with a framework on leadership in higher education, one of the goals is to make recommendations based on some of the theories provided in Table 6. The institution of higher education is very complex there are different sources of power, different methods of influence to be applied that have consequences of power utilization (Bennis, 1959). The goal is to extract the chief constructs that will provide the research with a foundation on the successful CIO in higher education. This will be done by aligning research questions with some of the theories to view trends in the data collected and come up with themes and assumptions for a successful CIO in higher education. The data will come from a variety of sources: Presidents, Provosts, Vice-Presidents for Finance and Administration, Chief Information Officers, Chief Human Resources Officers, and those who have chaired search committees to hire CIOs. There are eight leadership theories identified in the literature as shown in Table 5:
Leadership Theories (Bass & Avolio, 1994; Shamir et al., 1993; Bass, 1998; Avolio & Gibbons, 1998; Dvir et al., 2002)

<table>
<thead>
<tr>
<th>Theories</th>
<th>Characteristics</th>
</tr>
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</table>
| Great Man Theory      | - Assumes that great leaders are born, and in some cases inherent  
                        - This theory was born out of the myth that leaders were male figures especially in terms of the military leadership. |
| Trait Theory          | - Assumes that people inherent leadership qualities  
                        - Also ascertain that certain behavioral and personality traits are the roots characteristics that make certain individuals better suited for leadership |
| Contingency Theory    | - Success depends mainly on the environment, quality of followers, and aspects of the situation  
                        - No leadership style is best in all situations |
| Behavioral Theory     | - This is upon the leader to choose the best course of action based on situational variables  
                        - Integration various leadership styles might be appropriate for certain types of decision-making |
| Participative Theory  | - Focuses on the action of the leaders and ascertain that great leaders are made  
                        - People can learn to become leaders through training, observation, and experience |
| Management Theory     | - Encourages participation from various groups  
                        - The leader has the right to accept input from others |
| (Transactional)       | - Focus on the role of supervision, organization, and group performance  
                        - Based on a system of reward and punishment  
                        - Leaders exert influence by setting goals  
                        - Leaders do not encourage followers to greater responsibility for development |
Table 5. (continued)

| Relationship Theory (Transformational) | - Focus upon connections formed between leaders and followers  
- Leaders in this category have high ethical and moral standards  
- Motivate and inspire group members to realize their potential (follower development)  
- Three domains of follower development: motivation, morality, and empowerment  
- Leaders exhibit charismatic behavior and provide intellectual stimulation to followers  
- Creation of value congruence between the leader/organization and followers |

The structure of an institution of higher learning can be thought of as a network of interconnected constituencies. The impact of the leadership theories varies depending on their characteristics and the behavior they promote. Some leadership theories (transformational, participative, etc) promote inclusive decision-making process, and some are not inclusive in the decision-making process; they follow a top-down process, and sometimes have some overlaps. The basic premise confirmed by the literature is the importance of interpersonal communication in the leadership theories (Rogers, 1995; Valente & Rogers 1995; Valente 1995). According to Valente & Rogers (1995) social contacts, social interaction, and interpersonal communication are very important influences on social change. Relationship theory, which focuses on the connections formed between leaders and followers can function as the theoretical framework to cultivate new leaders to motivate and inspire group members to realize their potential.

Collinson’s (2005) study highlighted the value rethinking leadership as a set of dialectic relations, exploring three interrelated ‘dialectics’: control/resistance, dissent/consent and men/women. Collinson (2005) ascertained that dialectical
perspectives could provide new and innovative ways of understanding leadership.

Shepherd (1956) identified five key differences between traditional and modern organizational theory (human relations theory):

1. Inclusive decision-making than the centralized decision-making process
2. Collective participation of groups as the basic unit of an organization
3. Trust and mutual confidence between followers and leaders
4. The immediately managers or supervisors as agent for maintaining inter and intra communication instead of being an agent for higher authority
5. Allowing all members of the organization to realize the potential

The modern organizational theory blends well with the new leadership theories as they emphasize “symbolic leader behavior, visionary and inspirational messages, nonverbal communication, appeal to ideological values, intellectual stimulation of followers, display of confidence in self and followers, and leader expectations for follower self-sacrifice and for performance beyond the call of duty” (Shamir et al., 1993, p. 578). This is viewed as giving meaningfulness to work, boosting moral, and showing commitment and appreciation to the work being done to fulfill the mission of the organization. To fully realize this kind of leadership institutions should be viewed as a dynamic entity in need of functional leadership who places emphasis on situational theory. A functional leader does not place emphasis “on a fixed set of personal characteristics nor on particular kinds of leadership behavior, but upon the circumstances under which groups of people integrate and organize their activities toward objectives, and upon the way in which that integration and organization is achieved” (Bennis, 1959,
In Shamir et al. (1993) study provides empirical evidence that “leaders who engage in theoretical charismatic behaviors produce the theoretical charismatic effects” (p. 578). Weber (1922) long-established that charisma account for the process of radical change. Later on several studies confirmed that charismatic leaders bring change in a society (Friedland, 1964; Weber, 1968; Trice & Beyer, 1986).

Even though there is no explanation of the process by which charismatic leadership has its profound effect, the study shows that charismatic leaders bring change to the followers’ “values, goals, needs, and aspirations” (Shamir et al., 1993, p. 579). There must be a dynamic relationship between the followers and the leader leading to personal growth and development (Bennis, 1959). According to Bennis (1959) organizations should be treated as organisms rather than machines as portrayed by earlier organizational theorists. Thus the “great man” and “trait” theory will not fit in the modern society or in a complex environment like higher education, as organizations must be concerned with the cognitive power of individuals regardless of their status or rank within an organization. The transformational or charismatic leadership seems to have a profound impact on effects on followers (Shamir, House & Arthur, 1993). The transformational leaders “transform the needs, values, preferences and aspirations of followers from self-interests to collective interests” (Shamir et al., 1993, p. 577).

There is a current criticism about current institutional governance not responding well to external environment, thus “timely decisions are difficult to make, and small factions often are able to impede the decision-making process” (Association of Governing Boards of Universities and Colleges, 2001, p. 3). If such arguments are being
made this is a great opportunity for board members and administration to clarify any ambiguity on stakeholders’ authority (Birnbaum, 2004). Stakeholders need to be valued in governance instead of being persuaded and manipulated to put their weight behind what has been decided without their input.

The studies conducted by Burns (1978) and Bass (1985) suggests that charismatic leaders “elevate followers’ needs to higher levels on Maslow hierarchy”, “raise followers to higher levels of morality”, and “transcend their self-interests for the sake of the organization” (Shamir et al., 1993, p. 579). As pointed about by Burns (1978) and Bass (1985) on charismatic leaders maybe those are the kind of leaders institutions of higher learning need as they respond to external environment. The decisions to be made should not be of self-interest and speed, but be based on reliability and trust, and have great regard institutional core values (Birnbaum, 2004). Institutions are places where debates should be a norm as they do not reflect differences, and that’s why “governance and institutional purpose are related” (Birnbaum, 2004, p. 6).

In the early 90s, a study by Shamir et al. (1993) introduced motivation theory, which has four parts: leaders behavior, effects on followers’ self-concepts, effects on followers, and motivational process, to supplement the current theories of charismatic leadership. Motivation theory explains the relationship between leader behaviors and effects of followers. It also account for the transformational effects of charismatic leaders (Shamir et al., 1993). Motivation theory was developed on the basis of Bandura’s social-cognitive theory, Stryker’s identity theory, and Tajfel and Turner’s social identity theory (Shamir et al., 1993). The authors came with a set of assumptions underlying the
motivational theory: humans as pragmatic, goal-oriented, and self-expressive, people’s motivation to maintain and enhance self-worth and self-esteem, retain and increase of sense of self-consistency, self-concepts, and faith (Shamir et al., 1993).

According to Shamir et al. (1993) charismatic leaders engage in communicative processes that mobilize followers to action by interpreting the past and the present, providing followers with a clear image of the future leading to sense of continuity. In Shamir et al. (1993) such leaders “activate self-concepts which in turn affects further motivational mechanisms” (p. 590). Meindl (1990) criticized the charismatic leadership theory as being too leader-centered, and provided a follower-oriented approach. From the literature Meindl’s idea is more of a complementary, than contradictory as in his view charismatic effects function of social psychological forces, which functions autonomous from the traits and behavior of the leader (Shamir et al., 1993).

Robert House, Mansour Javidan, Paul Hanges and Peter Dorfman’s (2002) study, focusing on culture, provides nine dimensions to examine national cultures. The nine dimensions are: performance orientation, future orientation, assertiveness, power distance, human orientation, institutional collectivism, in-group collectivism, uncertainty avoidance, and gender egalitarianism. Even though history, class, geography, ethnicity, and political boundaries have created distinction among various communities, the advancement in technology enable us to have access to the various communities to learn from them and about them. It is imperative for CIOs to take advantage of technology advancement to quickly gain access and learn about the cultural values and practices (House et al., 2002). This will enable not only the CIOs, but any administrator to quickly
learn about the culture, what works, and what does not work, and uncover new variables often not considered in contemporary leadership theories (House et al., 2002). There is a lot of argument about the impact of culture on leadership styles (House et al., 2002). Higher education is a complex environment with various cultures subscribing to different values, traditions, and ideologies (House et al., 2002). Thus, there must be a degree of cooperation and commitment to the university’s cultural environment by new aspiring Chief Information Officers. Table 6 nine cultural dimensions studied in the GLOBE project (House et al., 2002):
### Table 6.
The Nine Cultural Dimension Studied in the GLOBE Project

<table>
<thead>
<tr>
<th>Cultural Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty Avoidance</td>
<td>“the extent to which members of an organization or society strive to avoid uncertainty by reliance on social norms, rituals, and bureaucratic practices to alleviate the unpredictability of future events” (p. 5).</td>
</tr>
<tr>
<td>Power Distance</td>
<td>“the degree to which members of an organization or society expect and agree that power should be unequally shared” (p. 5).</td>
</tr>
<tr>
<td>Collectivism I</td>
<td>“societal collectivism reflects the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action” (p. 5).</td>
</tr>
<tr>
<td>Collectivism II</td>
<td>“in-group collectivism reflects the degree to which individuals express pride, loyalty and cohesiveness in their organizations or families” (p. 5).</td>
</tr>
<tr>
<td>Gender Egalitarianism</td>
<td>“is the extent to which an organization or a society minimizes gender role differences and gender discrimination” (p. 5).</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>“the degree to which individuals in organizations or societies are assertive, confrontational, and aggressive in social relationships” (p. 6).</td>
</tr>
<tr>
<td>Future Orientation</td>
<td>“the degree to which individuals in organizations or societies engage in future-oriented behaviors such as planning, investing in the future, and delaying gratification” (p. 6).</td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>“refers to the extent to which an organization or society encourages rewards group members for performance improvement and excellence” (p. 6).</td>
</tr>
<tr>
<td>Humane Orientation</td>
<td>“is the degree to which individuals in organizations or societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others” (p. 6).</td>
</tr>
</tbody>
</table>

The theory of spiritual leadership, which incorporate vision, hope/faith, and altruistic love (Fry, 2003). According to Fry (2003) the purpose of spiritual leadership “is to create vision and value congruence across the strategic, empowered team, and
individual levels, and ultimately, to foster higher levels of organizational commitment and productivity” (p. 693). According to Fry (2003), in order to motivate followers leaders must not lose their touch with the core values and explicitly communicate them to followers “through vision and personal actions to create a sense of spiritual survival through calling and membership” (p. 693). With the emerging and accelerating forces of global societal and organizational change there is a need for holistic leaders that embraces the human four fundamental arenas: “the body (physical), mind (logical/rational thought), heart (emotions, feelings), and spirit” (Fry, 2003, p. 694). These are leaders subscribing to the notion of an inclusive and value-based leadership. In such scenario followers are motivated as they are holistically valued and are part of the change-taking place in an organization. To respond to such forces, organizations will need to be transformed beyond the traditionally centralized, standardized, and bureaucratic (Moxley, 2000). As in higher education there is a great need for intrinsically motivated and empowered constituencies so that the administration can be in alliance with all stakeholders. The spiritual leadership is necessary in the transformation of learning organizations as in most theories the spiritual component of the fundamental of human existence has been neglected. Fry (2003) define spiritual leadership as “comprising the values, attitudes, and behaviors that are necessary to intrinsically motivate one’s self and others so that they have a sense of spiritual survival through calling and membership” (p. 694) and entails the following:

“creating a vision wherein organization members experience a sense of calling in that their life has meaning and makes a difference” (p. 695).
“establishing a social/organizational culture based on altruistic love whereby leaders and followers have genuine care, concern, and appreciation for both self and others, thereby producing sense of membership and feel understood and appreciated” (p. 695).

In regard to this theory, a distinction between religion and spirituality must be made (Fry, 2003). The spiritual theory advocates for the totality of the human being in the work place. There has been a lot of calls to restructure academic governance in essence to improve productivity, decision-making, as well as cutting costs (Tierney & Minor, 2003). Unfortunately with all this calls there is no well-defined role of faculty, students, bargaining unit staff, and administrators on governance systems (Tierney & Minor, 2003).

2.4 Evolution of Web 2.0 Technologies and the University

The evolution of information systems in higher education has contributed to rapid change in how universities operate. Education has evolved over the years from being an institution that would bring a certain degree of social leveling, social justice, and social cohesion (Borg & Mayo, 2006). Today, we are dealing with schools and educational institution’s ability to empower, democratize knowledge, and create a genuinely meritocratic society. With that change universities have to recognize that it is a new era dealing with technological driven students and different learning styles. Learning styles are defined as “cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (O'Hara & Sternberg, 1999, p. 147). Universities are looking at technology to engage all students regardless of their learning styles. Academic-student affairs are
doing their best to create an environment to nurture and enable students to collaborate. Collaborative environment allow students to develop their problem solving skills and nurture their independence of thought through experiential learning.

The processes of constructing collaborative learning environments is not systematic; those involved in the process understand its value and embrace the fact that learning is not a linear process. Collaborative environments accommodate the limits of the working memory as they encourage engagement and management of load on working memory. The problem with overloading student’s working memory is they may lose interest and active cognitive processing is reduced (Sweller, 1988; Sweller, 1989; Mousavi at al., 1995).

Having collaborative environments that supports constructivists design activities provide multiple point of communication among students, faculty, and student affairs staff, help create a community of learners as learning and construction of knowledge occurs when learners interact with some content to construct shared meaning (Damer, 1997; Damer et al., 1999; DiPaola & Collins, 2002). Rossett and Hoffman (2007) provide characteristics of informal learning as “authentic, happening beyond the control of facilitators, outside the limits of the classroom, or training facilities” (p. 167).

Sociological interpretations refute the structural-functionalist view of schooling; this is due to the emergence of various schools of thought (Gumport, 2007). The growing of various schools of thoughts promotes “threaded discourse” which encourages reflection. Brown and Campione (1996) describe the turning over to students’ part of their educational process as metacognitive. Hannum and McCombs (2008) the key to informal
learning is to find strategies that respond to individual differences and diversity of learner needs, abilities, and interests. De Castell & Jenson (2004) acknowledge that learners are increasingly demanding greater accommodation to their learning needs and preferences. Informal learning allow “learners the freedom to be protagonists in an adventure they themselves navigate” (Wilson et al., 2008, p. 40). Researchers have been performing studies on different learning technologies to enhance students’ educational experiences (Jonassen, 2000; Prensky, 2001; Navarro & van der Hoek, 2004; Rapeepisarn et al., 2006; Maier & Baron, 2005b; Maier et al., 2005a; van ‘t Hooft, & Vahey, 2007).

Web 2.0 is described as advanced interactive users experience through Rich Internet Applications, connectivity, and communication (O’Reilley, 2005; O’Reilley, 2007). Cummings et al. (2009) define Web 2.0 as “a platform via which individuals provide content and services in the public domain creating a network effect through which others can remix and continually update content.” Web 2.0 technologies are blogs, wikis, multimedia-sharing services, content syndication, podcasting and content tagging (Anderson, 2007). They are developed using development frameworks such as Ruby, Python, and AJAX. They are identical with desktop applications with simple interactive interfaces, which allows data and information to flow on web systems, thus creating dynamic content (Lewis, 2006).

It can also be described as an integration of interactive web based applications to create a collaborative cyberspace environment with content dynamically altered unlike in the traditional static web pages. Web 2.0 facilitate more socially connected web, where users are able to add and edit an information space. According to O’Reilly (2007) Web
2.0 applications “are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences”.

The application can provide user keyboard commands, which allow users to treat Web browsers as application delivery systems and access complex functionality e.g. online games (Hailpern et al., 2009). Such technology facilitates dynamic retrieval of new content without having to press any key as in AJAX. Web 2.0 infrastructure transform how people collaborate, interact, share, and analyze data (Wu et al., 2009). Indeed, the power of Web 2.0 has blurred the line between desktop applications and the Web (van Wamelen & de Kool, 2008; Hailpern et al., 2009). Cummings et al. (2009) assert that “Web 2.0 technologies are changing the Internet from a search and consume environment to a dynamic and interactive experience emphasizing contribution and collaboration.” Web 2.0 can facilitate internal and external communication and collaboration with less time and technical background. Information can be gathered from multiple sources in real-time and displayed on a single Web space.

It is important for institutions of higher education to design and develop the most reliable systems. That’s why there is a great need to get the best CIO who will understand the business of the university and the technologies that can transform the institution. With the advancement of Web applications like Web 2.0 they are able to formulate policies on
what is good for the university and the students. Education institutions can use the technology for virtual and mass collaboration (Cummings et al., 2009; Watkins, 2009). The Web 2.0 can be useful in communication and collaboration on projects, online discussion, online courses, project management, and planning. Most education entities are using Web 2.0 for storage, scheduling, assessment, and logging purposes. Such technologies are also used as repository or centralized location for updating documents in real-time. They are also effective in oral (videoconferencing or teleconferencing) and written communication (Watkins, 2009). The Web 2.0 technologies have successfully brought desktop programs to the Web.

2.5 The Burke-Litwin Model

The Burke-Litwin model has its roots on organizational climate and suggests the interconnectivity that theorizes how performance is affected by internal and external forces (Burke, 2002). Organization climate is about the perceptions individuals have about the functioning of their unit and their working relationship with their colleagues (Burke, 2002). In Burke-Litwin model there are different objects representing different communities or stakeholders connected by arrows going in both directions signifying the continuous interaction with the environment (Burke, 2002). The Burke-Litwin model provides a framework to reflect on various organizational and environmental dimensions to diagnose an organization and manage organizational change (Burke & Litwin, 1992; Burke, 2002). In the model the external environment is looked at as the input dimension and the individual and organizational performance as the output dimension. For example,
in higher education, teaching could be the input and the performance of students serves as the output dimension. The institutions’ climate should provide a health environment in order to attract the best and willing to learn, and retain them. According to Burke (2002) “the nature of the climate is determined by a number of variables, not just management or leadership approach” (p. 184). In the model the following variables: strategy, leadership, and culture hold a significant weight than the following variables: structure, management practice, and systems (Burke, 1995).

2.6 Cultures in Higher Education

Higher education is dominated by various cultures and structures from pre-modern to postmodern social structures. Today we have modern workers who look to the government for social services such as education, health and retirement. In pre-modern times citizens looked at their church or charitable organization for support. The post-modern social structures comprises of new communities that are formed around electronic communication systems and digital economies and talks of global business. According Tierney and Lechuga (2004), “strong, congruent cultures supportive of organizational structures and strategies are more effective than weak, incongruent, or disconnected cultures.” The current trend is for administrators to try building unified cultures and let them be dominated by the administration (Bergquist & Pawlak, 2008). All cultures should be honored with their unique perspectives they bring. Even though the culture shift is irreversible, current administrators have a challenge to create new social structures to meet emerging needs and challenges (Bergquist & Pawlak, 2008). Thus,
CIOs have an uphill path because in the midst of all the complexities there is a need to bring order. It is very important for leaders to have a cultural understanding for them to lead. Culture can be used as guidelines to what is valued by members.

Unlike the corporate world, universities are made up of diverse communities with different cultures. Faculty, staff and students are more diverse than before beyond race and ethnicity. In those communities people have different philosophies and values, even their skills, characteristics and experiences are different. For CIOs, and any other executive members, should continuously review their performance within those communities in order to transform institutions of higher learning, thus building bridges across different communities is key. Bergquist & Pawlak (2008) identify six cultures that CIOs need to learn about before hitting the road running on their new position in higher education. These include managerial, developmental, advocacy, virtual, collegial and tangible culture.

The *managerial culture* provides a synopsis of how the university was governed under the Catholic Church to the Protestants Church and the new structure whereby institutions are under the auspices of the government. This culture is about upward social mobility through vocational and granting of credentials and degrees. (Bergquist & Pawlak, 2008). The Catholic Church appointed priests as the presidents of the universities to control the academics and non-academic affairs. The protestant church appointed the lay presidents because of their wealth and financial support. The system worked very well then but today the universities have moved beyond the walls of religious organizations. The institutions of higher learning were more hierarchical and authority
driven then and the focus was on high quality instruction. In the new structure with
government funding shrinking institutions of higher learning are turning to research.

This shift is evident through the interaction with the literature and through
observation that presidents’ are becoming managers of the existing bureaucracy (Garrett,
back on track the Burke-Litwin organizational model can be engaged in order to
successful accomplish all the changes needed (Burke, 2002). The key words in
managerial culture are efficiency and competence, which borrowed from corporate
settings (Bergquist & Pawlak, 2008). The concern should be on efficiency and
competence in instruction, not on managing people and money. Thus there is a great need
for an organizational model not driven by the corporation principles. It is important that
leadership engage all constituencies in their effort to transform and meet the demands of
the new era. Birnbaum (2007) suggest that higher education should be looked at as a
social institution.

“In essence, in the managerial culture there is a quest for efficient and competent
administrators, faculty members, and students who respect and work in a formal,
hierarchical structure, this structure in turn encourages clarity of communication,
specificity of roles and outcomes, and careful delegation of responsibilities”
(Bergquist & Pawlak, 2008, p. 68).

The efficient and competent teacher should be rewarded or acknowledged as the
manager of the instructional process. By embracing the importance of teaching and
research, students will be vocationally and intellectually inclined (Bergquist & Pawlak,
2008). In developmental culture, meaning is found in the creation of programs and
activities to mold and shape the people’s professional growth. This culture values
openness and service, men and women personal cognitive, and behavioral maturation. 

*Advocacy culture* values fair bargaining among constituencies, primarily management, faculty and staff. It compliments the managerial culture for its failure to meet the personal and financial needs for the different constituencies. Thus, creating a learning organization is crucial as it grows and adapt to new environmental challenges (Bergquist & Pawlak, 2008).

The *virtual culture* values openness, sharing, responsive educational systems and finds its meaning by answering the knowledge generation and dissemination capacity of the postmodern world (Bergquist & Pawlak, 2008). Service learning, for example, brings together community agencies with colleges and universities to work together to enrich students learning experiences and most importantly add value to local and international communities. The *tangible culture* finds meaning in its roots, its community, and its spiritual grounding, and has boundaries defined by the location and specific actions (Bergquist & Pawlak, 2008). The Burke-Litwin organizational model, as an open and social model, supports the collegial or academic culture as it values all constituencies’ voice. The model is transformational in nature, as it will allow university officials to engage with all communities and from the feedback received be able to make democratic decisions. There is nothing wrong with universities learning from corporate culture on how they operate and eliminate any redundancy in their organizations. Adopting the corporate culture as it is could lead to resistance as the corporate culture by nature is bully (Bergquist & Pawlak, 2008). Even though there are other models the Burke-Litwin
model could bring stability in a social system environment while administrators would learn how to apply social process means of governing.

2.7 Management Styles

It is inevitable for leaders to realize that organizations must be treated as living organisms that grow and adapt to changes in society and the challenges of the day (Mackie, 2009). Administrators need to be committed to democracy and find ways to integrate all communities to share authority and stop acting like they have a fiduciaries obligation to the corporate world for their survival (Burke, 2002; West, 2002). Thus the CIO needs to continuously grow, listen, build and improve their relationships with all constituencies. The autocratic approach does not suite higher education as it is exploitative and is top-down in nature (Burke, 2002). The characteristics of this approach could cause uprising on campus by the different communities, which in turn ruin the students, faculty, and staff experience. Even though benevolent autocracy is not exploitative in nature, it still hierarchical and does not support a social system as it allows administrators to have absolute power, while the consultative management approach allows management to seek people’s opinion, ideas and suggestions whereas reserving the right to make the final decision. The participative approach suite the academic environment as it values all constituencies and is policy-driven (Burke, 2002).
Table 7.

**Management Styles (Burke, 2002)**

<table>
<thead>
<tr>
<th>Likert Management Style and Approach</th>
<th>Autocratic Approach</th>
<th>Benevolent Autocracy</th>
<th>Consultative Management</th>
<th>Participative Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Top-down</td>
<td>- Top-down</td>
<td>- Not inclusive in decision making</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Exploitative</td>
<td></td>
<td>- Hegemonic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hegemonic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Top-down</td>
<td>- Not inclusive in decision making</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Seek opinions, ideas and suggestions</td>
<td>- Management reserve right to make the final decision (hegemonic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inclusive</td>
<td>- Descriptive and is a management style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Decisions are policy driven</td>
<td></td>
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</tbody>
</table>

The leadership must have both transformational and transactional leadership qualities in order to successfully bring strategic change to higher education (Senge et al., 1994). Transformational leaders are defined as change agents who never leaves a situation the way they found it, while transactional leaders believe in gradual and evolutionary change (Senge et al., 1994). The transformational factors are: the mission and strategy, leadership, and culture, while transactional factors are: structure, systems, management practices, work unit climate, skills, motivation, and individual needs and values (Bergquist & Pawlak, 2008).

Senge et al. (1994) identified five components of organizational learning: systems thinking, personal mastery, shared vision, team learning, and mental models and they are all interrelated. If the Burke-Litwin model is properly applied the mission of the institution could increase students, faculty, and staff value, while providing insight to the
administration on how the system works. Using Senge’s and Burke-Litwin enlightenment model the mission of the institution of higher learning could be more inclusive, and the administration could learn from the model and appreciates the value of shared governance. According to Hunsicker & Christenson (1976) leaders must develop an appropriate system of management so that they understand the traits and how the system components function. Hunsicker & Christenson (1976) also noted that leaders should understand that the environmental interchange is continuous with dynamic internal and external forces.

2.8 Related Dissertations

Viswadoss (1999) examined the Chief Information Officer role, leadership and career-path in selected universities in Virginia. The author found a diverse background and career paths that led them to their positions. There were themes found during the interview process in relation to their Information Technology leadership. The themes were Collaboration, Reconstruction, and Concordance. The study failed to adequately portray the constant changing CIO position, its role in higher education and the CIO career path. The study used the qualitative interviewing method.

Boettcher (2007) investigated the technological expertise, professional experience, and academic credentials of the higher education CIO. In her investigation Boettcher used Baldrige Criteria 4: measurement, analysis, and knowledge management. The author used the mixed methodology approach to collect their data. Boettcher (2007) found that the position was headed by those with experience in higher education and
extensive technological expertise. The limitation of the study was that they focused on managing technology in a small private southwestern university. In contrast with an earlier study by Viswadoss (1999) the CIOs grew out of other roles in higher education. During that time majority of the CIOs came through the ranks in higher education.

Russell (2008) examined the behavioral patterns in adoption of information technology to solve problems by institutions of higher learning. Russell (2008) used a quantitative instrument with six constructs to examine the patterns of adoption. The six constructs were diffusion, infusion, alignment, recruitment, advocacy, and differentiation quadrant. Unlike the other studies (Viswadoss, 1999; Boettcher, 2007) their intention was to investigate the CIO’s perception on technology adoption, instead of trying to understand the CIO’s characteristics, roles, and behaviors. Throughout the study the author employed the following theories: social construction theory, diffusion of innovations theory, and differentiation theory. The author found that institutions were diffusing more technology than can needed, and there was poor aligning of technology with institutional goals. The technologies were used for recruiting purposes. Russell (2008) also found that students were not actually pushing for technological innovations. The author acknowledged that it also depended on the nature of the institution. Russell (2008) last finding was that “CIOs perceived the use technology as a differentiator of their institutions within the higher education industry” (p. ii).

Lineman (2006) surveyed 232 higher education CIOs and senior technology employees with the intention of examining the current state of managerial roles of CIOs in higher education. The data significantly pointed to the differences existing between the
perceived managerial roles of CIOs in higher education and corporations. Even though the study was focusing on the differences between higher education and corporate CIO, there is a connection with the previous research by Viswadoss (1999) and Boettcher (2007). Lineman (2006) used higher education CIOs and senior technology employees compared to Viswadoss (1999) and Boettcher (2007) whereby their focus was mainly on CIOs, leaving another layer of data out. Viswadoss (1999) study focused on CIOs on a few selected universities in Virginia. Generalizing the findings of Viswadoss (1999) study and applying them across all institutions of higher learning could be challenged, as the participating universities are regional based with a very small sample.

O’Donnell (1998) study provided significant data to show that the CIO position is rapidly growing in private institutions. It also pointed out to Synnott and Gruber (1981) prediction of expanding roles information managers as technology is woven into the fabric of an organization. The study employed an ex post facto research design with repeated measures that was guided by theoretical and empirical data and specific research hypotheses. The instrument was sent over period of three years 1994, 1995, and 1996 and multiple linear regressions was used to test 15 specific research hypotheses. O’Donnell (1998) study show that the CIO position was growing in private institutions, and CIOs in private institutions prominent compared to their peers in public institutions. The same applied in larger institutions compared to smaller institutions. The CIOs who were located in libraries had a “higher reporting level and greater span of control” (p. iv). The study complimented the studies performed by Viswadoss (1999), Lineman (2006), and Boettcher (2007). O’Donnell (1998) provided another layer of information on
prominence and reporting structure of the position in private institutions. The author also informed other researchers about how the state of the position over a period of three years.

Woodsworth (1987) describes the role of the Chief Information Officer (CIO) in American research universities. The role was defined in different levels from academic computing to administrative systems and library automation and telecommunications. Woodsworth (1987) also looked at the biographic and demographic characteristics of the position itself. Structure interviewing was employed during 1986 – 1987 period, whereby 28 CIOs were interviewed. The goal was to understand their role, connection with other positions, decision-making, and its range of administrative configuration. Compared to Viswadoss (1999), Lineman (2006), Boettcher (2007), and O’Donnell (1998) the study was exclusive as the author only interview CIOs in private institutions of higher learning. The researcher observed that the position has grown compared to the studies’ findings that were conducted from 1987 to 2011. Two decades ago the position was more on configuration of software, setting up hardware installation, network installation, and general management of the IT units. The position then was not part of the executive suite.

Del Valle (2008) study “evaluated the lack of alignment between business and information technology strategy and its effect on the increasing demand for technological services within higher education, with a focus on the roles and leadership of IT management” (p. iv). The evaluation was based on three CIO individual variables: roles, education level, and self-perceived leadership styles. The study compliments the following studies Viswadoss (1999), Lineman (2006), Boettcher (2007), O’Donnell
(1998), and Woodsworth (1997) as it tries to understand the roles, educational background and leadership style. Del Valle (2008) found that “there was no significant difference in Business Strategy Planning (BSP)/ Information System Strategy Planning (ISSP) alignment in IT leaders’ perception of observed transformational leadership styles” (p. 118). In the second finding “there was statistically significant difference between the alignment extent and transactional leadership style” (Del Valle, 2008, p. 118). In the third finding “there was a statistically significant relationship noted between CIO Role as the independent variable and BSP/ISSP alignment extent as the dependent variable” (p. 121). In the last finding the researcher “found no significant relationship between BSP/ISSP alignment extent and CIO education level (no degree, bachelor’s degree, master’s degree, and doctorate)” (p. 123).

Brown (2004) studied higher education CIOs in the United States with his goal to create a comprehensive description of an effective and successful CIO in higher education. He employed mixed methodology to collect data and the results showed a correlation between CIO attributes and effectiveness in all of the CIO roles. The study compliments the following studies Viswadoss (1999), Lineman (2006), Boettcher (2007), O’Donnell (1998), Woodsworth (1997), and Del Valle (2008) in providing the characteristics of an effective and successful CIO. Brown (2004) found that there was “a correlation between CIO attributes and effectiveness in all of the CIO roles” (p. 103). The CIO membership in the institution management team has no negative impact on their effectiveness with the exception of the business partner role in their decision to centralize
IT (Brown, 2004). In his last finding there was “no correlation between the effectiveness of the CIO and institutional view of IT” (Brown, 2004, p. 103).

Schaffer (2004) examined the level of experiences that contribute to the success of the CIO and also identified the formal educational and career experiences that CIOs believe are important for his or her success in leading an information technology department in higher education. This was a quantitative study whereby forty-eight CIOs were surveyed and the data was analyzed using chi-square frequency tables to determine the importance by ranking the identified formal educational and career experiences based on a Likert-scale measurement of very important (3), important (2), and not important (1). The study would have been comprehensive if a mixed method approach was applied and those who hires CIOs interviewed and surveyed to fully understand the position and its expectations in higher education. Shaffer (2004) found that understanding the campus politics was the single most important experience for a CIOs career. The focus must be on strategic initiatives (Shaffer, 2004).

Fowler (2003) performed a comparative study to investigate the role of CIOs in higher education. They compared perceptions from the CIO, Chief Academic Officer (CAO), and Chief Financial Officer (CFO). They used the following as their template: Synnott and Gruber's (1981) roles and Pitkin's (1993). This was a quantitative study whereby surveys were used to collect data. The study was more comprehensive compared to the following studies: Viswadoss (1999), Lineman (2006), Boettcher (2007), O’Donnell (1998), Woodsworth (1997), Del Valle (2008), Brown (2004), and Schaffer (2004). The major findings were as follows: CIO position increasing at master’s
institution, executive level position, CFO and CAO believed CIOs tend to have limited understanding of higher education and that the CIO position was a technical one, increasing of IT presence in higher education have the greatest influence on the position (Fowler, 2003).

Barber (2002) examined the emergence of the CIO function in small innovation-oriented community colleges. The study attempted to compare the usefulness of the three organizational theorists approaches to design process as they examined how the CIO position has been structured: contingency theory, institutional isomorphism, and idiosyncratic job creation. The study followed a non-experimental qualitative research design (McMillan & Schumacher, 2000, p. 176-205): an online survey, follow up telephone interviews (CIO & Presidents) and document analysis. The limitation compared to other studies was the focus on 23 innovative-oriented community colleges. The author found that the contingency theory and institutional isomorphism approach provided better description for the process other than the concept of idiosyncratic jobs (Barber, 2002).

Becker (1999) examines the degree of cognitive complexity that CIOs in colleges and universities bring to the role and responsibilities of the position. Becker also wanted to develop a current profile of the characteristics and responsibilities of the CIOs. The study was based on Bolman and Deal conceptual model, which is based on the four organizational leadership perspective: structural, human resource, political, and symbolic. The study employed a mixed method approach: survey questionnaires, document analysis, and semi-structured telephone interviews. The study was more inline with other
studies by trying to develop a current profile of the characteristics and responsibilities of the CIOs. Becker (1999) found that CIOs need to develop more cognitively complex leadership perspectives. From the position requirements constructs it is obvious that the position is very complex and need leaders with multidimensional skills and experience.

Lima (2006) investigated the leadership behaviors of CIOs of Fortune 500 companies in the United States of America. This was an effort to contribute to the understanding of how CIOs lead IT knowledge workers, as they attempt to affect the performance of their organizations in a rapidly changing and technologically rich global environment. The study was based on the Tailored Design Method (TDM), “a set of procedures for conducting successful self-administered surveys that produce both high quality information and high response rates” (Dillman, 2000, p. 29). The limitation of the study compared to the previous studies it was intended for CIOs in fortune 500 corporations. Lima (2006) found that there was no significant statistical relationship between the reported CIOs’ leadership behaviors and their demographic characteristics. The CIOs reported working as agents for change within their organizations (Lima, 2006).

Kelley (2005) examined the systematic decision-making procedure for Chief Information Officers (CIOs) to use when considering significant technology investments. The study assembled a framework built upon multiple perspectives, investigated the rationales that CIOs give for their investment recommendations, and chronicled one use of the framework to guide the investment of human and financial resources. The study came up with four perspectives in the decision-making framework: political, economic, cultural, and civic (or social). In comparison with other studies the author was more
interested in the decision-making process. Kelley (2005) found that successful CIOs are those who apply the decision-making framework consisting of four perspectives: political, economic, cultural, and civic. The CIOs apply the methods to understand their constituencies and then educate them on both the benefits and the drawbacks of a certain technology.

2.9 AAU Institutions IT Strategic Plans Common Goals

The researcher gathered all IT strategic plans for the AAU institutions trying to understand their IT strategic goals. From interacting with the IT strategic plans the researcher came with six goals being pursued by the institutions as demonstrated in Table 8. The goals in Table 8 were the common IT strategic goals among the AAU institutions. Institutions of higher learning were looking at improving their enterprise architecture, collaboration among “cross-component executive leadership”, IT resources management, cybersecurity, information sharing standards, and institution-level services (DHS, 2009, p. 3). Some of the challenges that were faced by universities included “immature IT governance, data ownership and data sharing, improved management of capabilities and prioritization of critical activities, priorities to available funding, and leveraging of Enterprise IT services” (DHS, 2009, p. 4). The CIO office was created to serve as the top-level IT executive leader to manage IT, aligning IT investments with its mission, translating institutional needs into IT investments, high quality IT services to the university community, IT investment management, standardization, consolidation, and administrative support systems (Brown University, 2008; DHS, 2009; Indiana University,
Due to the growing demand of information technology it became imperative that institutions deployed strategically developed, secured, and properly structured information systems. In Table 8 the researcher demonstrate how the AAU institutions are working on some common goals to effectively support the core mission of institutions of higher learning. The researcher studied the various IT strategic plans and extracted the common goals among the 61 institutions. This is significant as the researcher studies IT executives in higher education.
Table 8.

AAU Institutions IT Strategic Plans Common Goals

<table>
<thead>
<tr>
<th>Reviewed AAU Universities IT Strategic Plans</th>
<th>Institutions of Higher Learning Common IT Strategic Plan Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown University</td>
<td>✓</td>
</tr>
<tr>
<td>California Institute of Technology</td>
<td>✓</td>
</tr>
<tr>
<td>Carnegie Mellon University</td>
<td>✓</td>
</tr>
<tr>
<td>Case Western Reserve University</td>
<td>✓</td>
</tr>
<tr>
<td>Columbia University</td>
<td>✓</td>
</tr>
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CHAPTER III METHODOLOGY

3.1 Introduction

This chapter details the methodology used in this research to fill the gap of the literature on CIOs in higher education. The purpose of the study was to get in-depth information about the dynamics and complexity of the position, as there is no clear path to the CIO position. Since there is no agreed upon method for obtaining and thriving in this position, in this study, the researcher sought to answer the question of how individuals can become successful CIOs in higher education. The data was acquired through qualitative methodology to increase the depth of understanding of CIOs in higher education. Information technology has been empowering the world of higher education and helps it to deal with the huge amounts of data produced as student populations grow on campuses.

The research questions addressed the 11 recurring CIO requirements from the position advertisement literature as universities are looking for a multidimensional person: exceptional strategic business and technical skills, person with a big picture perspective, technology investment background, IT strategic planning, deliver technology to support teaching and research, think outside the box, hybrid personality, IT governance, someone honest and open, communicate effectively, someone with 10 plus years of experience in management and holding a graduate degree. Qualitative methodology was used in the research to understand the evolving role of CIOs in higher education, as the researcher sought broader, deeper, and more comprehensive social understandings of the position, thus using documents, surveys, and interviews as data
collection techniques to tap into different facets of the same complex phenomenon (Greene, 2007). In the case of CIO characteristics, the position is very complex and multifaceted, thus using multiple approaches was a good fit for the research to provide detailed descriptions of the critical skills or the kind of professional experiences CIOs need to be successful in higher education and detail the forces that are shaping the role of Chief Information Officers in higher education.

3.2 Restatement of the Problem

Since the inception of the IT executive position in higher education it has evolved considerably and is showing considerable growth and expansion of responsibilities. Early in the adoption of technology the position focused on hardware purchasing, and software purchasing and configuration. As the core mission of higher education became dependent on information technology the position became more visible with additional roles such as developing IT strategic plans, management of IT, IT investments, technology compliance, providing unified communication systems, and secured network. The position became accountable to internal and external institutions. Now, institutions of higher learning are seeking dynamic, innovative Chief Information Officers to provide vision, leadership, and coordinate comprehensive academic, research, and administrative computing services (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009).

Today, CIOs are to support all institutional computing compliance activities: network security, institution data management, unified communication, desktop and
laptop support, Internet connectivity, intellectual property, and government regulations applicable to systems operations (Chronicle Careers, 2009; Chronicle Careers, 2010; Overby, 2009; CIO-2-CEO, 2009; Heller, 2009; Pastore, 2010; Curan 2010). The CIOs are to represent the university within the community and also maintain a healthy work environment. The drawback is that there is limited empirical evidence on how to be successful as a CIO in the complex culture of higher education where shared governance is often, all thought not always valued, unlike the corporate world where the leadership supports a top-down structure. Even if consultation is conducted the IT executives reserves the right to make a final decision. In higher education the due process is important and the expectation is that decision makers are driven by data or feedback received from various constituencies. The executives need to transition to new leadership perspectives “that accounts for the complex adaptive needs of organizations” (Lichtenstein, Uhl-Bien, Marion, Seers, Orton, & Schreiber, 2006). From Lichtenstein et al. (2006) the top-down leadership theories are overly simplistic in decentralized organizing structures like in higher education. The modern university needs individuals who will understand that leadership is a dynamic process that transcends individual skills, education background and experience.

Lang et al. (2009) asserted that a number of CIOs were projecting their departure from their current position by the next decade. As the group of CIOs in higher education retires, there should be another pool of well-trained and mentored up-coming IT executives ready to fill those positions. Due to the redefinition of the business of higher education, the position is no longer highly focused on technical issues and is increasingly
influencing other institutions business strategies. The Chief Information Officer at Georgetown University H. David Lambert said, “The scope and complexity of the role has really grown. It's easy to feel some days like I'm not the CIO but the risk-management officer for the institution, because every element of risk management comes back to IT” (Young, 2010, p. 1). The Director of Information-Technology Policy at Cornell University, Tracy Mitrano acknowledge the complexity of the position and she stated, “In the past it took strong, assertive, very traditional leadership…I think a CIO of the future is going to have to be a strong team player and much more of a negotiator, not only within the university but with the vendor community” (Young, 2010, p. 1).

According to President Emeritus of the University of Colorado, John Buechner, “based on my experience, chief information officers often view their world as distinct from the rest of the academy…From my perspective, presidents want someone who is expert in technology but also a multidimensional person who understands what university cultures are about, what governing boards can or can't do, and the politics of academe.” (Buechner, 2005, p. 250). The unrealistic expectations of those occupying the position led to the resignation of the first and only Chief Information Officer at the University of Maryland at College Park, Mr. Donald R. Riley, this was due to his involvement in several national information-technology efforts that was perceived as the university's internal needs in spite of the fact that Mr. Riley had internal and external responsibilities (Read, 2003). Thus, President Buechner acknowledged that the CIO job is the most complex position within the university hierarchy in this day and age (Buechner, 2005).
The position comes with unrealistic expectations in a complex higher education environment.

Mixed data collection methods were used for the “purpose of complementarity as it seeks broader, deeper and more comprehensive social understandings by using methods that tap into different facets or dimensions of the same complex phenomenon” (Greene, 2007, p. 101). In the case of CIO characteristics this is complex and multifaceted, thus, the multiple qualitative data collection techniques were used and they are a good fit for the research to provide detailed descriptions of the critical skills or the kind professional experience CIOs need to be successful in higher education and detail the forces that are shaping the role of Chief Information Officers in higher education.

3.3 Research Questions

The central research question is: What are the unique attributes of a strategic and adaptive Chief Information Officer with regard to leadership in higher education? More specifically the sub-questions of the study helped the researcher to generate the necessary data to formulate the skills, experience, views of the role, and expectations of those aspiring to be CIOs:

1. What are the skills and experiences of CIOs employed in higher education?
2. How do leaders in higher education view the role of CIOs?
3. What are the expectations of the leaders in higher education of these individuals?
The research questions provided the basis of the study in an effort to understand the role of the CIO as a business strategist, information technology strategist, and as technology advocate (Evans, 2009). In Table 3 in Chapter one the researcher constructed the survey and interview questions to answer specific position requirement constructs. The research questions examined some of the new genre of leadership theory constructs whereby the leader has to be “charismatic, transformational, visionary, and inspirational” (Shamir, House & Arthur, 1993, p. 577). Therefore, the primary objective of the research was to generate data to learn about the position and generate knowledge that will be helpful in understanding the position and its existence in a higher education environment. In order to provide credible and valid knowledge, this research is examined from the dynamic and complex higher education environment, as well as its historical corporate beginning. The goal is to provide a comprehensive understanding of the position, its attributes and characteristics.

3.4 Research Design

*Qualitative research as “a form of systematic empirical inquiry into meaning”* (Shank, 2002, p. 5)

The aim of the study was to comprehensively examine the characteristics, experience, and the expectations of a CIO to be successful in higher education. The researcher was seeking answers to the following questions: What are the unique attributes of a strategic and adaptive Chief Information Officer with regard to leadership in higher education? What is the right combination of skills or experiences CIOs need to be successful in higher education? Why has the CIO position become so important in higher
education administration? What are the intricate institutional dynamics in a higher education environment that has resulted in the elevation of the CIO’s position? What is their role in decision-making and in the life of the institutions beyond IT leadership in the 21\textsuperscript{st} century? The best methodology for answering the research questions were multiple qualitative data collection methods, which was driven by the nature of the general and specific research questions that need to be answered with regard to the creation of a comprehensive profile of a CIO in higher education. At the same time the study was designed to discover new and comprehensive information about the evolving CIO position, which is very diffuse.

Due to the nature of the questions asked in this study, a multiple qualitative data collection methodology is ideal. Denzin and Lincoln (1994) define qualitative research as “a multi-method in focus, involving an interpretive, naturalistic approach to its subject matter” (p. 2). The qualitative method will provide information about processes, expectations, experiences, meanings, and strategies, while quantitative methods will provide information on gender, salary, skills, and reporting structure. The multiple qualitative data collection methods balanced the outcome of the study with the rich text captured from documents and open-ended questions as well as interviews (Creswell, 2003; Tashakkori & Teddlie, 2003; Brewer & Hunter, 2006; Creswell & Plano-Clark, 2007; Sosulski & Lawrence, 2008). Multiple qualitative data collection methods combine the following approaches: documents analysis, online interviews, and telephone interviews.
Using multiple qualitative methods was important as the researcher sought broader, deeper, and more comprehensive social understandings by using methods that tap into different facets or dimensions of the same complex phenomenon (Greene, 2007). In the case of CIO characteristics, this is complex and multifaceted, thus the mixed methods approach was a sound methodological choice for this research. In qualitative research there are rules agreed upon by members of the qualitative research community (Ospina, 2004). According to Denzin and Lincoln (2000) qualitative research involves an interpretive and naturalistic approach. In their work that meant, “qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them” (Denzin and Lincoln, 2000, p. 3). By studying things in their natural settings gave the researcher the flexibility to follow unexpected ideas, as the CIO position “involves multiple levels of phenomena, possesses a dynamic character and has a symbolic component, elements better addressed with qualitative methodologies” (Ospina, 2004, p. II).

Different methods in data collection and data analysis help expand understanding from one method to the other. This is to confirm findings from different data sources for credibility and trustworthiness in the research (Lincoln & Guba, 1985). The advantage of using multiple techniques in data collection was that one technique would offset the weakness inherited within one method (Creswell, 2003; Barbour 2003; Tashakkori & Teddlie., 2003). Even though the approach was extensive and time demanding it was a worthy challenge as it was the best way to answer the research questions. Such methods enhance validity and credibility of the study, broader and deeper understanding of the
phenomena, engages multiple perspectives and lenses, and advances the dialogue between the researcher and the participants (Greene, 2007). The other advantage of applying multiple data collection methods was that, it elevated the integrity and strength of the results (Sosulski & Lawrence, 2008).

By interviewing and surveying of presidents, provosts, CIOs, chief financial officers (CFO), and chairs of search committees, the goal was to gain different perspectives about the position. By studying the position requirements and expectations (Summarized in Table 3) as advertised on different media outlets, led me to the conclusion that the presidents, provosts, CFOs, and those in charge of sifting through the different CIO applications would provide an important layer of the data about the role, expectations, and experience of the CIOs (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010). Therefore, employing the mixed method of enquiry further strengthens the objective of the study.

Also, due to the complexity and dynamic nature of the position as the researcher, the researcher decided to apply the multiple data collection techniques as according to Morse (2003), using multiple data collection techniques provides a comprehensive data and the study is addressed more widely and completely, thus increasing validity. The core of multiple data collection techniques in social inquiry is the ability to draw from multiple sources to generate a better understanding of the phenomena being studied (Greene, 2007). Such approach encourages diverse thinking in order to find deeper and enhanced understanding of the research as in this case the CIOs will be better understood. A limitation of multiple data collection techniques was that it requires expertise to study a
phenomenon, and comparing results of two analysis, as well as difficulty in resolving discrepancies that may rise in the results especially when results are not congruent.

3.5 Pilot Study

The pilot study provided the researcher with an opportunity to verify and clarify items on the survey and the interview questions. It provided an opportunity for the researcher to examine the survey questions and modify the instrument as necessary. Wiersma (2000) points out that conducting a pilot study allows a researcher to confirm the effectiveness and reliability of an instrument. So prior to the formal study the researcher conducted a pilot study targeting the public university CIOs in a Midwest state. The purpose of the pilot study was to learn more about the dynamics of the CIO position from the IT executives. CIOs from Inter-University Council were interviewed and surveyed. In Appendix E the findings from the group are presented. From the pilot study the researcher learned about the skills, path of participating CIOs to the position, their educational background, aspiring educational background recommendation, advice to the aspiring CIOs, as well as initiatives to implement.

From data it became evident that those aspiring to be CIOs need to be good a multitasking, communication, building relationships, be visionaries, well developed people skills, business skills, and marketing skills. Few comments from the CIOs:

Skilled communicator, politically savvy without being political, visionary outlook, ability to build and lead effective IT team, tech savvy, be able to manage expectations, ability to think strategically to support business goals and objectives, and ability to understand business especially financials.
Good technical grounding. Solid domain expertise. Ability to embrace and thrive within complex and ambiguous organizational realities.

Understanding of university business, at least one core competency in IT including project management, leadership skills, team building skills, patience, thick skin.

An interesting comment reported was “being politically savvy without being political” as this comment speaks to the complexity of the role the CIOs have to play. They are to be technically sound with a solid IT expertise in one of the areas of information technology for credibility. Regardless of the complexity of the position they are expected to navigate the complex and ambiguous environment with ease.

Management was another key factor in the position beyond building teams or relationships, patience, and good coordination and communication skills.

The pilot study provides various paths that were taken by the current CIOs. All the CIOs have IT experience of some sort from higher education and industry with years of information technology experience. The current CIOs spent years preparing for the position:

I have spent nearly 20 years (since 1988) teaching and working on the Net. Beginning in 1993 I started working with University Administration. In 1995 I became the Dean of Academic Technology at a West Coast Institution and then the CTO at a West Coast Institution in 2000 and now the CIO at a Midwest University since 2001.

Worked as a faculty member in a community college and due to frustrations with the Computer labs moved on to pursue a doctorate. One member of my committee became a provost and brought me to her school and created the CIO position and became the first CIO. Then left for West Coast Institution also became the first CIO. Now I have been here for 11 years.

I was a Senior Engineering Consultant, working for a software engineering company, contracted to the University when the position became available.
I was appointed Interim CIO after successfully implementing a Student Information System under budget and on time. After national search 3 years later, I was selected for permanent role.

… worked for some years as a sr. business systems analyst. Over time I moved into roles of greater responsibilities ie. manager, director and currently CIO.

Started as a computer operator and progressed through almost all jobs within IT.

30 years of progressive IT experience in manufacturing, distribution, retail, health care and higher education industries.

Even those who came from industry they were either working as contractors in higher education or consultants when they eventually became CIOs. It is evident that higher education experience is very important so that people with academe do not look at an individual as a stranger. The CIOs academic background varied immensely: business administration, computer science, information science, accounting, and administrative leadership. The CIOs had different suggestions on the educational background those aspiring to be CIOs should have. Below are some of their comments:

IT Background is a requirement, with at least 8-10 years of experience in Higher education. Advanced degree in Business is helpful. Advanced degree in academics/Higher education can also provide a solid path to this position.

Education is less important than experience. I believe any background can work under the right circumstances, and especially, that a technical background is neither necessary nor sufficient.

MBA, Masters in Public Administration, Masters level with business focus. Undergraduate technical degree is helpful.

I recommend 10-15 years of domain expertise with a PhD (or terminal) degree for servicing and supporting higher education

There was a dissent about the type of education CIOs should have. One CIO said education was less important, experience was key to the position, while the rest of the
CIOs believed a graduate degree was necessary and in some cases the CIOs went on to say a terminal degree (Ph.D.) was necessary. The experience and advanced degree was popular among the CIOs. Now the researcher looked at the advice from those in the position to those aiming for the position:

- Align your goals with business of the university. Pay attention to where the money goes. Manage university resources well and bring new technologies to improve teaching and research.

- It's about the institutional mission. Every plan you implement, every technology you deploy, every decision you make should align with your institution mission. Engaging in collaborative efforts with your peers at other institutions will afford you long-term success.

- Stay in the dialogue occurring in the industry between developers, educators, CIOs and technical company CEOs.

- Dedication to teaching, research and learning, good listening and people skills. Communicate well

- Embrace ambiguity. Learn the culture of the organizations you work with. Keep true to your own values. Know what you are good at and what you are not good at.

- Time management, never being satisfied with the status quo and being open to where the next great idea may emerge.

Learning the institution business, managing resources, and bringing new technologies to improve teaching and research is important. As one of the CIOs said it is about the mission of the institution. The continuous dialogue within the university is as important as the external dialogue between educators and various industry agencies. This is a great opportunity for CIOs to learn what others are doing to improve their functional units. Apparently CIOs need to be dedicated to teaching, research, and learning; this is
for obvious reasons to stay connected with the core mission of the institution. Lastly the researcher learned about various initiatives being led by the current CIOs:

- Operationalize technical strategic plan, attend more CIO summits, facilitate the use of technology for instruction and business process management across the enterprise.
- Implement technology to deliver online lessons Improve communication with our offshore campus in China, Middle East, Russia, and South Korea. Improve infrastructure
- Enterprise Collaboration (email, calendar, messaging) Building a Research Computing infrastructure Developing a professional standards based requirements management practice
- ERP upgrade, Network upgrade, Storage Infrastructure upgrade
- Help my university generate incremental revenue and be more efficient, delight out customers – students, find a way to combine administrative units to serve multiple universities - shared services
- Data Center Remediation Collaborative Software deployment ERP upgrade

The initiatives are in agreement with the IT strategic plans in higher education. Institutions are working on deploying integrated systems (ERP), unified communication systems, deliver state-of-the-art classroom technology, and purchasing state-of-the-art research equipments for faculty to conduct state-of-the-art research.

Upon finishing the pilot study it was realized that another layer of data could strengthen the study. It was decided from the pilot study to examine the position from the CIOs’ point of view, as well as the presidents, provosts, and CFOs’ point of views. Thus, it was decided to incorporate the AAU institution presidents, provosts, and CFOs. The pilot study provided the opportunity to learn more on how to communicate with executive leaders and the process of accessing them, which might have been a limitation.
A president and a CIO, who initially participated in the study, offered their names to be used to reach out to other participants. From interacting with the two individuals it became obvious that “snow balling” was an effective way to reach other executives. This was a training ground in preparation for any difficulties that might surface during the actual study. The researcher also learned about the significance of the position in higher education. Through the pilot study data, as provided in Appendix E, the researcher was able to improve the research questions provided in Appendix A.

3.6 Data Collection Methods

The researcher interviewed and surveyed AAU presidents, provosts, CIOs, CFOs and Chairpersons of the CIO Search Committees. The study followed a concurrent approach to collect data. This was done to “confirm, cross-validate, or corroborate findings within a single study” (Creswell, 2003, p. 217). There was no priority given to any of the techniques, as data was collected concurrently then results integrated during the interpretation or analysis phase to strengthen claims made in the study, as well as validate and substantiate the findings (Creswell, 2003).

The concurrent data collection approach shortens the data collection timeline compared to a sequential approach whereby one method leads the other. Triangulation is the process whereby researchers use multiple and different sources, methods, investigators, and theories to provide corroborating evidence (Creswell, 1998; Tashakkori & Teddlie, 2003). Also, it is a metaphor for the geometric shape – the triangle. Thus, triangulation sheds more light on a theme or perspective. According to Creswell and
Clark (2007) triangulation design makes intuitive sense and has been used as a framework for researchers thinking about mixed methods research.

The challenges in using the triangulation method are that much effort and expertise is required, especially when results from different methodologies are not agreeing (Creswell & Clark, 2007). Greene (2007) goes on to argue that “the classical rationale for triangulation is to increase the validity of construct and inquiry inferences by using methods with offsetting biases, thereby counteracting irrelevant sources of variation and misinformation or error” (p. 100). Triangulation “seeks convergence, corroboration, or correspondence of results from multiple methods” (Greene, 2007, p. 100).

A multiple data collection strategies were used in the study: face-to-face or in-depth telephone in-interviews, documents such as public documents, magazines, journals, and newspapers were reviewed, and an online survey was used (Creswell, 2003). The advantage of using in-depth interviews was that participants could provide their insights and historical information and also “allow the researcher control over the line of questioning” (Creswell, 2003, p. 186). The only limitations were biased responses, “information filtered through the views of interviewees” (Creswell, 2003, p. 186). The application of multiple methods of data collection compensated for the biased responses. Below are the three ways the researcher engaged in collecting data: documents, online survey, and phenomenological interviewing.
3.6.1 Documents

There are many different kinds of documents. For example newspapers, magazines, memoirs, curriculum vitae or resume, field notes, etc. In this research, the particular kinds of documents sought were CHECS report, magazines, memoirs, and curriculum vitae or resume. These documents provided multiple perspectives, realities and meanings as the researcher build explanations from the themes in the data. The strengths of documents were that they provided multiple truths on how the participants understand themselves in their world. The documents provided thoughtful data by participants, written evidence so no transcribing was necessary, data could be accessed anytime, as well as the researcher obtains the language and words of the participating group (Creswell, 2003). The limitations of the documents were the authenticity of the information, hidden information, and protected information (Creswell, 2002; Creswell, 2003). The assumption was that what people say is valid and reliable, thus it was meaningful as they reveal what people do or did and what they value. Since this behavior occured in the natural setting the data was valid.

3.6.2 Online Interviews

An online interview link was distributed to the participants as an email message accompanied by the confidentiality letter as approved by the IRB committee. It was utilized in this research to understand the processes, skills, remuneration, and gender distribution in the CIO position. The strength of an online interview was that it enabled the researcher to quantify the data and generalize the results from the sample. The online
survey was used in this research to measure the various views and opinions from the CIOs and other administrators. The weakness of such technique was that, it is linear in nature with limited ability to probe answers. Because this research uses a multiple data collection strategy, data sets from the three methods enabled the researcher to look for patterns in the data to build explanations. The online survey data provided a more general data set from the sample population which helped the researcher to identify the attributes of the large population (Creswell, 2003). The data collected from the online survey was longitudinal with the data concurrently collected from interviews and documents analysis. The advantage of using the online surveys was economically sound and the rapid turnaround time was short (Creswell, 2003).

3.6.3 Interviewing

The researcher conducted an in-depth interview allowing participants in the study to give their thoughts on phenomena. The emphasis was on people's subjective experiences and interpretations of the world (Creswell, 1998; Creswell & Clark, 2007). According to Marshall & Rossman (1999), “phenomenology is the study of lived experiences and the ways we understand those experiences to develop a worldview” (p. 112). Edmund Husserl known to be the father of phenomenology describes it as a reflective study of the essence of consciousness as experienced from the first person point of view (Husserl, 1962). The CIOs provided details of their work experience and the meanings associated with their experience as CIOs in higher education. The challenges of in-depth interviewing methodology were cost, time and limited access to research
participants who were all in executive positions (Denzin & Lincoln, 2005; Gubrium & Holstein, 2002; Kvale, 1996; Miles & Huberman, 1994; Patton, 2002; Strauss & Corbin, 1998; Taylor & Bogdan, 1998). In order to successfully achieve the comprehensive examination of the CIO position, interviewing was essential.

In this approach the researcher was encouraged to use the words used by the participants in describing their views as it measures outcomes and maintains that a phenomenon has a meaning in itself; and it may be thought, object, or concept (Creswell, 1998; Creswell & Clark, 2007). The goal was to engage the AAU institutions CIOs, Presidents, CFOs, Provosts, and CIO Chair Search Committees in a series of in-depth interviews for depth-and-breadth data as the researcher seeks to understand - not to generalize. Since this was a concurrent study, online interviews were distributed to university presidents, provosts, CIOs, CFOs, and CIO Search Committee Chairs for general data. This was an effort to understand the underlying reasons why institutions of higher education have been recruiting CIOs, and including them in their executive management team. Thus, one of the primary research questions is to answer: What are the unique attributes of a strategic and adaptive Chief Information Officer with regard to leadership in higher education?

Using multiple data collection methods allowed for a holistic understanding of the research problem instead of relying on one data source. Documents, interviews, and online surveys were the sources of data used in this research. This approach helped the study to develop a “complex picture of the problem… [by] reporting multiple perspectives, identifying the many factors involved” (Creswell, 2009, p. 177).
multiple data sources often employed in a mixed methodological framework permitted the researcher to use varied approaches to analysis. Due to the complexity and expansion of the position it was important to use multiple data source as the researcher’s goal was to eventually develop a formal description of an institution of higher learning CIO, as the position places them at the helm of innovation to transform and improve the day-to-day operations of an institution (Evans, 2009).

3.7 Credibility and Trustworthiness

In any research the following terms are essential criteria for quality: trustworthiness, confirmability, dependability, transferability and credibility were very important so that people can pay attention to the study (Lincoln & Guba, 1985). Credibility is defined as the quality, capability, or power to elicit belief about conceptual interpretation of the data drawn from the participants’ original data. Dependability is defined as something worthy of trust and reliable enough for people to believe. Transferability interpreted as an act of transferring findings of an inquiry to be applied beyond the bounds of a phenomenon. Confirmability is a measure of how well the inquiry’s findings are supported by the data collected. The validity of a study depended on the quality of the research methods applied to measure what is intended. According to Joppe (2000) validity “determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull’s eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others” (p. 1). In contrast qualitative researchers are not
concerned with replication of the results (Glesne & Peshkin, 1992) but are concerned with precision, credibility and transferability (Winter, 2000; Hoepf, 1997; Golafshani, 2003).

Using multiple data collection methods does not always guarantee credibility, thus researchers still “need to test and demonstrate that their studies are credible” (Golafshani, 2003, p. 10). Lincoln and Guba (1985) asserted that "since there can be no validity without reliability, a demonstration of the former (validity) is sufficient to establish the latter (reliability)" (p. 316). In the literature the concept of validity was “not a single, fixed, or universal concept” (Golafshani, 2003, p. 6), but “rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects” (Winter, 2000, p.1). In the purpose of the study to establish confidence in the findings, the triangulation method was used to maximize the validity and reliability of the study as the terms are viewed and treated equally in both research methods.

The credibility of this study depended on the researcher as the instrument and on his ability and effort to sustain an intellectually inquisitive academic focus (Golafshani, 2003). The use of interviewing, documents analysis and surveys “led to more valid, reliable and diverse construction of realities” (Golafshani, 2003, p. 8). To further strengthen the study analysis and understand peer researchers, professional advisors were consulted at different times. The validity of the study was achieved through comparison and reconciliation of different findings. As Merriam (1988) puts it “the human instrument can become more reliable through training and practice” (p. 206). The
credibility of a study is achieved through sufficient data to merit any claims made and a systematic comparison of categories (Charmaz, 2006). Thus, the researcher opted to engage documents, surveys, and interviews to generate sufficient data.

Document analysis involved mediation between the frame of reference of the researcher and those who produced the document. This becomes more of a dialogue between the researcher and the document at hand. In a qualitative study, researchers are constructionist-oriented, as they are more concerned with the process through which texts depict reality than with whether such texts contain true or false statements. According to Patton (2002), documents provide a researcher with information that cannot be observed, and in some cases reveal some things that might have taken place before a formal study is conducted. Such information could reveal “interchanges to which the evaluator would not otherwise be privy” (Patton, 2002, p. 293). Documents could point in directions of “inquiry that can be pursued through only direct observation and interviewing” (Patton, 2002, p. 294). The documents provided behind-the-scenes quotations as long as they were part of public records (Patton, 2002). Creswell (2003) disclosed that documents allow researchers to “obtain the language and words of participants, as well as thoughtful data that saves the researcher time and the expense of transcribing” (p. 186). As the researcher engaged multiple data collection methods it became imperative to have measures to validate some of the instruments for reliability purposes. This is to make sure that the instrument is fulfilling what the study is trying to accomplish especially answering the research questions. To validate the results from ranked items in the survey the researcher used the nonparametric technique Cronbach alpha.
Cronbach’s alpha (Nunnaly, 1978) was used to test reliability on the survey results, and the response biases were determined. The key in this case was for the instrument to measure what was supposed to be measured, ensuring replicability or repeatability of the results (Crocker & Algina, 1986; Golafshani, 2003). Reliability of the instrument was important. Joppe (2000) defined reliability as “the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable” (p. 1). In this study, this was achieved through wave analysis whereby one “select(s) items week by week to see if average responses change” (Creswell, 2003, p. 160). In case the responses began to change then there was a possibility of response bias (Creswell, 2003).

Rubin and Rubin (2005) claim qualitative interviewing is good for describing social and political process. The literature pointed out that interviewing provides the most direct research-focused interaction between the researcher and the participants, in which rambling and going off at tangent is encouraged (Kvale, 1996; Stroh, 2000; Rubin & Rubin, 2005). During interview sessions the researcher asked follow-up questions depending on the interviewees’ response, unlike in the online survey where the questions were standardized. The researcher learned that qualitative interviews were flexible, which allows interviewers to get detailed answers depending on researchers’ ability and effort (Golafshani, 2003).
3.8 Sampling Strategy and Participants

The purposive sampling method, as well as the probability sampling was adopted in the identification process of the participants. The purposive sampling method worked very well with this study because accessing people in executive positions can be difficult. The purposive sampling was used in the process to make sure that the sample would be “information rich” (Patton, 2002, p.40) for in-depth analysis (Miles & Huberman, 1994; Morse, 1994). According to Patton (2002) the information rich data yields “insights and in-depth understanding rather than empirical generalizations” (p. 230). Since qualitative inquiry focuses on relatively small sample the purposive sampling were ideal as they “permit inquiry into and understanding of a phenomenon in depth” (Patton, 2002, p. 46). According to Merriam (1988), purposeful sampling is based on the assumption that “one wants to discover, understand, gain insight; therefore, one needs to select a sample from which one can learn the most” (p.48). The purposive sampling strategy used was the homogeneous sampling to make sure that the researcher’s sample was “information rich” (Patton, 2002, p.40) and increased confidence in conclusions (Miles & Huberman, 1994; Morse, 1994). The disadvantage of this method was the fact that the available people could not be the same as those in the population, thus leading to source of bias. The homogeneous sampling is a guiding process by which qualitative researchers used to pick small sample with similar characteristics to describe some particular sub-group in depth (Patton, 2002). To select participants an email (Appendix D) was sent to all AAU CIOs asking them to participate in the study. The email explained to them the purpose of the study and the confidentiality of the study.
Another email (Appendix D) was sent to the presidents, provosts, and CFOs requesting their participation in the study. The email explained to them the purpose of the study, the confidentiality of the study, and the link to a web-based survey. The majority of the participants came from AAU member institutions. The online survey (Appendix A) was hosted by Qualtrics, a leader in market research and enterprise feedback management systems headquartered in Utah. The organization is available at www.qualtrics.com. The participants in the online survey had complete anonymity.

The participants were chosen based on their position within higher education as presidents, provosts, and CFOs make the decision on whom to hire. Based on the pilot study results, CIOs reported to the above individuals depending on the university structure (see Appendix E). The participants come from diverse administrative and institutional background four-year institutions both public and private nationwide.

The data was collected from different schools holding membership in the Association of American Universities. There were six participating groups in the survey (Presidents, Provosts, CFOs, CIOs, CFOs, and Chairpersons of CIO Search Committees). The presidents, provosts, CFO provided the researcher with information on how they arrive at their decision to hire a CIO. They provided more information on the role and expectations they have for a CIO. The AAU CIOs provided more details on their evolving position in higher education, their career path, experience, and even educational background. The hiring officials also provided details on the characteristics, specific skills, experience, and educational background they look for as they arrive at their decision.
The results were drawn from the three qualitative methods of data collection. This research studied 58 out of 61 United States universities CIOs found in the Association of American Universities (AAU) membership list through document analysis and interviews to learn about their professional experience, career path to the CIO position, educational background, forces shaping the position, top three problems or challenges that come with the position, governance, barriers to CIOs effectiveness, advices for those aspiring to be CIOs, and years spent in higher education. There were 3 institutions with interim CIOs, thus the researcher opted not to use them. There were 8 higher education executives who participated in the telephone interviews: 4 Chief Information Officers, 1 President, 2 Executive Vice President & Provost, and 1 Chief Financial Officer. There were 16 higher education executives who participated in the online interviews: 6 Chief Information Officers, 2 Presidents, 4 Executive Vice President & Provost, 2 Chief Financial Officer, and 2 Chair of CIO’s Search Committees.

In the beginning emails were sent to CIOs at the 58 institutions selected from the AAU membership list. In the email the purpose of the interview was explained with a consent form attached to the email assuring their privacy and confidentiality. The email detailed the time it would take to complete the interview and the interview questions were provided. The 8 interviews were completed and transcribed. The interview questions can be found in Appendix A. The telephone interviews lasted between 20 minutes to 30 minutes in length. Most of those who responded declined to participate in the study citing busy schedule and the high volume of requests to participate in different surveys.
Another request was sent through the Center for Higher Education Chief Information Officer Studies LinkedIn group, and only two CIOs accepted the request to participate in the interview. The majority of the CIOs and the University Executive Administration cited busy schedule and equity issues. The researcher in pursuit of the most recent surveys conducted decided to engage the Center for Higher Education Chief Information Officer Studies, Inc report. Initially the researcher sent a request to access the survey raw data, unfortunately the request was turned down due to an agreement between participants and CHECS on confidentiality. The researcher then purchased the 2009 CHECS report to examine the higher education chief information officers’ role and effectiveness. In the report there were 352 CIOs who responded to CHECS’ survey, then a second survey was sent to the institution management team (IMT) of the 352 responding CIO institutions. There were only 124 IMTs who responded to the survey that was meant to provide a different layer of information on how IMTs view the CIO position. The respondents in Brown (2009) report came from all types of institutions and classifications. According to Brown (2009) “the respondents have worked at service academies, large public universities, research institutions, community colleges, technical colleges, liberal arts and tribal colleges, and Ivy League institutions” (p. 22). This was the most comprehensive report available.

In the final stage people who chaired CIO search committees were contacted but only two were willing to participate in the online interview. Those chairing the committees cited university policy as the instrument that prevents them from participating in the study, and some cited equity issues, thus declining to participate.
3.8.1 The Setting

It is important to inform the reader about the environment where the study took place. The participants came from AAU organization.

3.8.1.1 Association of American Universities

The AAU is comprised of 63 leading public and private universities located in the North America, with 61 in the United States. AAU member institutions “are on the leading edge of innovation, scholarship, and solutions that contribute to the nation's economy, security, and well-being” (Association of American Universities, 2010, p.1). Their focus is on the following issues: funding for research, research and education policy, and graduate and undergraduate education (Association of American Universities, 2010). Association of American Universities (AAU), “a prestigious association of major academic and research institutions in the United States and Canada” (The BigTen, 2010, p. 1).

3.8.1.2 President

President is the title given to the highest governing head of an institution of higher learning. Presidents are the functional heads of universities; they are the liaison of the university in the community, as well as the public face of an institution. According to the Chronicle Career (2010), presidents are the chief administrative officers of a university, and they are responsible for effective operation and accomplishment of its mission. They
provide broad responsibilities for academic, student, financial aid, and administrative matters, as well as providing critical leadership to advance the academic reputation and distinctiveness ensuring excellence in the faculty, students, and curriculum (Chronicle Career, 2009; Chronicle Career, 2010). They are responsible for maintaining a sound fiscal management, as well as making the final decision on who will be the next CIO.

3.8.1.3 Provost

The Provost is the senior officer providing planning, development and administration of the academic mission of the University. Provosts are responsible for the advancement of the University academic and scholarly mission as well as making sure that the University delivers exceptional learning experience (Chronicle Career, 2009; Chronicle Career, 2010). They are also responsible for quality academic programs: teaching, research, and services (Chronicle Career, 2009; Chronicle Career, 2010). The provost reports directly to the president, is a member of the cabinet, and is the officer in charge in the absence of the president (Chronicle Career, 2010).

3.8.1.4 Chief Finance Officers

The CFO or Vice-President for Finance and Administration is the senior officer responsible for sound and strategic management of University financial resources. They have a broad portfolio that directly serves and supports all aspects of campus life: budget and finance, human resources, sustainability, public safety, parking and transportation,
campus planning and real estate, and campus operations. Basically they provide the essential fiscal and administrative support required in an institution of higher learning.

3.8.1.5 Chief Information Officers

Chief Information Officer senior executive leader responsible for information technology policy, standards, and management of all university information resources. The position does not focus on technology only, but someone with comprehensive knowledge of technology, understanding of higher education, as well as someone who is politically savvy, business savvy, and technology savvy.

3.8.1.6 Chair of CIO Search Committee

The Search Committee Chair is an individual appointed by the university authorities to chair the proceedings of a CIO search committee for an institution.

3.9 Data Analysis Procedures

Bogdan and Biklen (1998) define data analysis as “the process of systematically searching and arranging the interview transcripts, field notes, and other materials that you accumulate to increase your own understanding of them and to enable you to present what you have discovered to others” (p. 157). Data gathered in this research was inductively analyzed by breaking it into manageable units to find recurring themes, thus, further guiding data collection if necessary; no data was unworthy of examination in the approach. There was a thorough analysis on each individual interview before the whole
group was considered. The data analysis occurred on both the descriptive and inferential numerical analysis and the descriptive and thematic text (Creswell, 2003). The plan was to perform parallel analysis on both data types to provide richer understanding of the position variables and their relationship (Tashakkori & Teddlie, 2003).

Analyzing the qualitative data comprised of four steps: transcription, phenomenological reduction, horizontalization, and imaginative variation to garner credible phenomenological results. Transcription is the process of transforming face-to-face and telephone interviews transcripts from audio to text (Shuy 2002; Sturges & Hanrahan 2004). Therefore once the data had been transcribed prevailing themes were identified and categorized using three forms of data analysis, which sought to provide depth and breadth of understanding of the phenomena under examination. Phenomenological reduction is the technique whereby the researcher puts him or her in a position to provide adequately rigorous grounds for scientific or any other kind of inquiry (Kockelmans, 1967). This is the same as in reduction in the constant comparative method, which involves continually reviewing the data to find recurring themes. In phenomenological reduction the researcher returns to the self as they experience things that exist in the world from self-awareness, self-reflection, and self-knowledge point of view (Moustakas, 1994).

Horizontalization is the process of explaining the meaning of a phenomenon by recognizing and describing themes in all of the equally weighted data (Moustakas, 1994). According to Moustakas (1994) horizons are unlimited, but always reach an ending point as the possibility for discovery is unlimited (Moustakas, 1994). The imaginative variation
involved the examination of the data from various perspectives deriving structural themes (Moustakas, 1994). There were codes and themes created for the qualitative data, this was done in order to compare the data from both methods. Coding is defined as the process of organizing the material into themes or groups before bringing meaning to it (Creswell, 2003; Rubin & Rubin, 1995).

The online survey data was qualified by creating factors or themes so that they could be compared with themes from the qualitative data. Nonparametric techniques were also used to tests the survey results. This is a method that do not assume that the structure of a model is fixed and does not require any specific form for the distribution of the population from which the sample come from (Crichton, 1998). The following non-parametric statistical tests methods were used to test the data from the online interviews:

1. Kruskal-Wallis Test
   
   Used to compare three or more independent samples with respect to an ordinal variable. The null hypothesis of the test is that all k distribution functions are equal. The alternative hypothesis is that at least one of the populations tends to yield larger values than at least one of the other populations (Conover, 1999; Sheskin, 2004).

2. Cronbach Alpha Test of Reliability

3. ANOVA test

The triangulation method was used to check for accuracy or “coherent justification of themes” to provide informative results (Creswell, 2003, p. 196). Creswell and Miller (2000) described triangulation as “a validity procedure where researchers search for convergence among multiple and different sources of information to form
themes or categories in a study” (p.126). At the same time the crystallization process was used to compare and contrast the results searching for convergence, divergence, and discrepancy (O’Cathain, Murphy, & Nicholl, 2007a; O’Cathain, Murphy, & Nicholl, 2007b). In case of any discrepancy or conflict this was “an opportunity for transformation, enrichment, and explanation, which lead to further understanding of a phenomenon” (O’Cathain et. al, 2007b, p. 150). The final step was the synthesis of meanings and essences.

3.10 Ethical Issues

In compliance with Institutional Review Board (IRB) policies and standards the names of the participants in the study were not used. Throughout the process participants were aware that their participation was voluntary and that their responses would be held in confidence. In case they were quoted, they would only be identified as follows: Organization Affiliation-Position e.g. AAU-Provost. This was done to maintain confidentiality of the participants. During the interviewing process, all interviews were recorded using digital tape recorder and permission to record the interviews was approved by the Institutional Review Board. The interview transcripts were kept and the original tapes and were securely stored whereby the researcher is the only one with access.
3.11 Researcher as Instrument

From the researcher’s perspective IT leadership is very important as research and teaching, the core mission of higher education are increasingly dependent on information technology. The researcher is a doctoral student in instructional technology and currently working as an Academic Technology Consultant at a western university for, and recently. Recently worked as a multimedia lab manager, University College IT Support and instructor for academic computing courses. Prior to joining the Academic Advancement Center (AAC) the researcher was a Teaching Assistant for the following courses: Software Engineering, Intelligent Robotics, and Engineering Methods for the College of Engineering. The researcher had previously worked as an adjunct professor at teaching the following courses: Data Communication and Object-Oriented Programming in C++ and Java. I also worked as an Assistant to the Director of Science, Technology, Engineering Preeminent Undergraduate Program (STEP-UP), assistant network administrator and computer labs manager.

The researcher has extensive working experience as a coop student for two Fortune 500 corporations, as a web developer and programmer. The researcher also spent some time as a database programmer. The researcher is not a stranger in the IT field and has an understanding of how complex the environment can be. The experience gained throughout the years as an information technologist, computing lab manager, instructor, and researcher enhanced the researcher’s ability to perform the study. The advantage the researcher has is his experience in the IT field and currently working in higher education so the researcher examined the CIO position as an information technologist and
academician. Due to the complexity and dynamics of higher education and the IT field the researcher decided to employ the qualitative methodology to study the CIO position.

The three qualitative data collection techniques allowed for a holistic understanding of the research problem. This is due to the multiple data sources that provided the researcher with multiple perspectives. Even though the qualitative methodology was time consuming the advantage was the rich amount of data captured from different sources. Due to the nature of the qualitative methodology, the researcher played a major role in the process and the way the results are presented. The researcher has taken courses in qualitative methods and quantitative methods. The researcher’s educational background is in computer science, engineering and management, quantitative methods dominate these fields. The researcher took courses in engineering statistics and in those courses parametric statistics techniques were learned. On the other hand being an educational studies student, the researcher has been exposed to qualitative methods. So the researcher has an appreciation of both fields and has an understanding of the different perspectives presented by the two methods as they bring different realities. As the instrument the researcher has made the following assumptions: there would be more than one essential meaning from the data, participants present their actual experiences and meanings. From those assumptions the researcher concluded that the study was dynamic thus opted for three qualitative data collection methods.
3.12 Limitations of the Study

The results may not generalize to other institutions as classified by the Carnegie Foundation for the Advancement of Teaching (2010) since the focus was on CIOs in AAU institutions. AAU institutions are dominated by top research public and private institutions. Nonetheless, results may still be of great assistance in understanding these positions. The second limitation was the limited number of participants in the study as the participants hold executive positions in their institutions of higher learning. Accessing such individuals proved to be difficult. The only way to access such individuals was through emails, and emails of executive leaders are sometimes managed by personal assistants or chief of staffs who evaluate what the executive can attend to or participate in. The responses to the online and telephone interviews items were subject to personal biases.
CHAPTER IV PLAY IT BY THE NUMBERS: THE RESULTS

In the analysis the researcher followed four steps: transcription, phenomenological reduction, horizontalization, and imaginative variation. The interviews were transcribed and summaries of the transcriptions reduced into three different tables to answer the research questions. In the documents analysis the research looked for the career experience of the CIO, educational background, years of experience in higher education prior to the CIO position, average number of years in the position, gender distribution, as well as race. The interviews and the documents provided different experiences, skills, and expectations of chief information officers in higher education. In the researcher’s quest to answer the general research question: What are the unique attributes of a strategic and adaptive Chief Information Office? What kind of leadership do CIO’s foster or possess within higher education? The next sections presents the results grouped according to the three specific research questions found in Chapters I and III:

1. What are the skills and experiences of CIOs employed in higher education?
2. How do leaders in higher education view the role of CIOs?
3. What are the expectations of the leaders in higher education of these individuals?

4.1 Documents Analysis

4.1.1 Biographies, News Releases, Curriculum Vitae, InformationWeek, CIO Magazine

These five types of documents were studied to learn more about the CIOs path to their position, educational level, average number of years prior to becoming CIOs, as
well as their number of years in their current position. The CIO Position Requirements Constructs (Table 1) were examined in reference to their expectations and skills as CIOs in higher education. Some representative of the position requirements include (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010):

CIOs are expected to possess exceptional strategic, business, technical, and interpersonal skills to join the senior leadership team in a university setting.

CIOs are responsible for the development, adoption, and implementation of information systems and they are the stewards of the university information resources supporting the academic mission and administrative operations of the University.

The CIOs are to develop information technology strategic plans aligned with the mission of the university. They are to provide leadership in the planning, development, and evaluation of technological resources supporting a full array of Information Technology Systems (ITS) functions. The ITS functions include systems and applications programming, computer operations, voice/data networks, and ERP system. They are to establish priorities based on the needs of functional institutional and academic units.

The ideal candidate will also possess excellent management, planning, communication, organizational, and budgeting skills.

We seek a proven leader who has successfully managed people, planned and implemented change, established and maintained an efficient and productive organization, interacted effectively with a variety of internal and external constituencies, and skillfully managed a complex ITS organization with vision.

We seek an individual to lead innovative change that will integrate and improve University’s use of technology resources supporting teaching, learning, research, service and administrative units.

Institutions of higher learning are looking for individuals with exceptional leadership and management skills. From the requirements the individuals hired in the position need to be visionaries continuously analyze the needs of the functional units, as they are important in supporting the university academic mission. According to Weiss &
Adams (2010), “the business and technology contexts surrounding the CIO are substantially different than ever before. The job has become far more complex at the same time that the critical nature of information systems has gone up. To compound matters, there's an unprecedented urgency to develop and implement IT capabilities--an urgency that often flies in the face of what has traditionally constituted good IT management practice” (p.1). Those aspiring needs to have experience in policy development, managing people, managing complex projects as well as delivering innovative solutions. In the next section the researcher looked at the educational background requirements (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010):

An advanced degree and proven experience as a dynamic leader who will provide vision and strategic planning necessary to lead a University in all aspects of instructional, research and non-academic computing, applications, data and voice communications.

Bachelor's degree in Business Administration, Computer Science or a related field or equivalent combination of education and experience; Master's degree is highly desirable 10+ years in a business, finance or information technology related senior leadership position. Recent experience working within information technology strongly preferred.

Bachelor’s degree, MA preferred along with 10 years experience in management, strategic planning, operation & maintenance of technological and/or risk management with 5 years supervisory experience

The successful candidate will possess education/formal training equivalent to the completion of a Bachelor’s degree in Computer Science, Information Systems or a related discipline, along with 15 years of progressive professional experience in information systems management, including 5+ years managing a large ITS organization.

From the researcher’s perspective the individual needs to have a degree with proven work years of experience in management. An advanced degree has always been
sought with 10 plus years of experience. The degree requirement is business administration, computer science, information systems, or a related discipline. Recent work experience in an IT environment is preferable. Then the researcher studied the expectations or the skills these individuals should possess. Some of the requirements representing the expectations according to the advertisements of the position (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010):

- Demonstrated knowledge/experience in project management & implementation of new technologies, support of help desk operations & security administration
- Outstanding communication, presentation, writing & design skills, analytical & problem solving abilities
- CIOs as catalyst for a unified campus-wide IT community committed to delivery, support, and maintenance of academic, administrative, and general campus IT services guided by the University mission, its strategic goals and by a shared strategy which is developed and managed through relevant governance and decision making processes.
- Knowledge of systems design and development process, including requirements analysis, feasibility studies, software design, programming, pilot testing, installation, evaluation and operational management required.
- Strong business, financial, and process skills with the ability to negotiate and defuse conflict.
- Self-motivator, independent, cooperative, flexible, creative, ability to comprehend complex, technical subjects, and successful in translating technical language to lay audiences.
- Lead a governance structure that aligns IT initiatives with institution priorities while balancing resource constraints to optimize IT investments.

The expectations and skills of the position demand a multidimensional leader to lead and influence in an environment full of well-qualified individuals. These individuals are expected to work “the highest levels of integrity, honesty, and openness as well as
create strong, enduring collaborative relationships with key leaders across the University” (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010). They are to have excellent customer service and administrative skills in order to build a networked campus community, maximize standards and enable local innovation (Chronicle Careers, 2009; Brown, 2009; Chronicle Careers, 2010). As IT executive leaders they are to develop and execute IT strategies that support institutions initiatives and is a key representative on campus and system-wide committees focusing on technology development (Chronicle Careers, 2009; Chronicle Careers, 2010). They are to navigate the unique and complex higher education environment and the dynamic ever-changing technology environment.

From the position requirements constructs it is evident that CIO is expected to be a strategic leader, an institution-wide leader, technology advocate, and the steward of the institution technology resources supporting teaching, research, student-life, and administrative initiatives. It is also expected that they are the catalyst for a unified campus through information systems, and to work at the highest levels of integrity, honesty, and openness. CIO should have a strong motivation to learn and contribute to the mission of the University. From the documents description of the position it is very complex with different layers of expectations: to lead, to manage, to advocate, and to balance the investments. As far as the education background is concerned the requirement is a bachelors degree with 15 plus years of experience. In the next sections the researcher focuses on 58 CIOs from the AAU institutions to compare and contrast what is provided in the documents.
4.1.2 Demographic Information

From the 58 studied AAU institution CIOs the level of education varied:

4.1.2.1 Degrees and Years of Experience in Higher Education

Table 9.

<table>
<thead>
<tr>
<th>Education</th>
<th># of CIOs</th>
<th>Average Years in Higher Education Prior to Becoming CIO - Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Masters</td>
<td>26</td>
<td>16</td>
</tr>
<tr>
<td>Bachelors</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Not Available</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 3. Educational Level & Number of Years in Higher Education

The educational level for the CIOs varied significantly with a majority of them holding a graduate degree, while only 2 institutions were in the process of hiring a CIO.
There were 17 who completed a doctorate degree, 27 completed their master’s degree, and 15 completed their bachelors degree. The fields of study varied immensely: Business Administration, Computer Science, Public Administration, History, Information Systems, Engineering, Management, Geography, International Affairs, Economics, Education, Psychology, America Studies, Latin American Studies, and Liberal Studies. Basically, the majority of the CIOs had completed their graduate work with significant professional experience in the IT field from both public and private sector. Those who completed their doctorate degrees had average of 19 years of experience in higher education prior to being appointed CIOs, and some of them hold professorate positions within their institutions. Those who earned a masters degree averaged 16 years in higher education prior to their appointment as CIOs, while those with bachelors had an average of 16 years in higher education prior to their appointment. The MBA degree dominated those with graduate degrees. There is a strong belief from people in administration about the value of business school case studies, finance training, and management theories. The argument is that the MBA degree gives aspiring managers valuable knowledge about business strategies and concepts through hands-on training involving rigorous training, assignments, reports, presentations, and group projects, all of which give an individual the necessary abilities to handle real-life business situations (Voboril, 2009).

4.1.2.2 Educational Background

The educational background for those holding the office shows that most of them have earned a graduate degree. Those with masters’ degree dominated the group. The
AAU institutions are in comparison with the research institutions in the CHECS 2009 report (Brown, 2009). From the 2009 CHECS report, 91% of CIOs in research-institutions held a graduate degree (master’s or doctorate), compared to 74.2% from AAU institutions. There were three universities currently without CIOs. There was no CIO with an associate degree. Comparing documents analysis on Table 10 and the position requirements there is congruence in the preferred academic background. A graduate degree with 10 plus experience is preferred above and beyond bachelor’s degree. In the AAU institutions 29.3% of the CIOs have doctorate degrees followed by 45.9% with graduate degrees. Even though an individual with bachelors is not discriminated, but they must have 15 plus years of experience with extensive management experience.

Table 10.

<table>
<thead>
<tr>
<th>Highest Degree</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td>17</td>
<td>29.3</td>
</tr>
<tr>
<td>M.A.</td>
<td>7</td>
<td>12.1</td>
</tr>
<tr>
<td>M.S.</td>
<td>8</td>
<td>13.8</td>
</tr>
<tr>
<td>MBA</td>
<td>11</td>
<td>19.0</td>
</tr>
<tr>
<td>B.A.</td>
<td>7</td>
<td>12.1</td>
</tr>
<tr>
<td>B.S.</td>
<td>8</td>
<td>13.8</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>100</td>
</tr>
</tbody>
</table>
4.1.2.3 Gender

There is gender imbalance in the CIO position. There were only 15 females holding the CIO position within the AAU member institutions. This is about 25.9% females in the position, compared to 74.1% males. The numbers from this study show no significant difference to those from CHECS report. From the 2009 CHECS report CIO distribution was as follows: 24% females and 76% males. Table 11 and Figure 6 demonstrate the actual number of CIOs according to their educational background and gender.

<table>
<thead>
<tr>
<th>Highest Degree</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td>Males</td>
<td>Female(s)</td>
</tr>
<tr>
<td></td>
<td>16 (94.1%)</td>
<td>1 (5.9%)</td>
</tr>
<tr>
<td>Masters</td>
<td>Males</td>
<td>Female(s)</td>
</tr>
<tr>
<td></td>
<td>16 (61.5%)</td>
<td>10 (38.5%)</td>
</tr>
<tr>
<td>Bachelors</td>
<td>Males</td>
<td>Female(s)</td>
</tr>
<tr>
<td></td>
<td>11 (73.3%)</td>
<td>4 (26.7)</td>
</tr>
<tr>
<td></td>
<td>43 (74.1%)</td>
<td>15 (25.9%)</td>
</tr>
</tbody>
</table>
4.1.2.4 Race

There is an underrepresentation of minority groups at the CIO level in the AAU institutions. The group is dominated by Caucasians (93.1 %), more specifically white males (72.4 %). The data indicate a substantial gap in race and ethnic distribution as shown in Table 12. From the researchers perspective career pathways and lack of minority cohorts could be the contributing factor. Such imbalance and lack of cohorts could lead to minority groups thinking like the CIO terrain is not welcoming to minority groups.
Table 12.

<table>
<thead>
<tr>
<th>Race &amp; Ethnic Categories</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>1 (1.7 %)</td>
<td>0</td>
<td>1 (1.7 %)</td>
</tr>
<tr>
<td>White (not of Hispanic Origin)</td>
<td>12 (20.7 %)</td>
<td>42 (72.4 %)</td>
<td>54 (93.1 %)</td>
</tr>
<tr>
<td>Black (not of Hispanic Origin)</td>
<td>0</td>
<td>1 (1.7 %)</td>
<td>1 (1.7 %)</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>0</td>
<td>2 (3.4 %)</td>
<td>2 (3.4 %)</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
<td>0</td>
<td>0</td>
<td>0 (0.0 %)</td>
</tr>
</tbody>
</table>

With such a gap in race and ethnic distribution those underrepresented groups could have a difficulty time ascending to such positions especially since there is no clear diversification mission and strategy in place.

4.1.2.5 Professional Experience

The CIO in higher education professional experiences included the following: professorship, years working as IT consultants, working for a number of years in the armed forces as well as working both in higher education and industry. According to the 2009 CHECS report higher education CIO comes “from many different places within and outside the institution; they hold a variety of degrees, and their major studies are spread broadly across the academic board” (Brown, 2009, p. 9). This work adds to the available literature on the position as understanding the type of CIO for higher education would be very helpful to those holding the position, aspiring CIOs, and those institutions currently searching for new CIOs, or in the process of creating the position. CHECS report asserted that 36% have held the same role in another organization and the most commonly held position before becoming CIO is that of academic or administrative technology director.
In the AAU institutions majority of the CIOs came through the ranks in higher education as professors from various fields, academic technology directors, IT directors or managers, programmers, as well as systems analysts.

4.1.2.6 Higher Education Experience

![Average # of Years in Higher Education Prior to CIO Position](image)

Figure 6. Higher Education Experience Prior to CIO Position

About 29% of the CIOs in AAU had doctorate degrees with an average of 19 years in higher education prior to rising to the CIO position. Those who have doctorates have been working as faculty members in their institutions. Those with masters’ degrees account for 44% of the CIOs with an average of 16 years in higher education. In the AAU member institutions the majority of the CIOs have graduate degrees with experience as faculty members, industry consultants, as well as military service personnel. This is approximately 70% of the CIOs. The rest of the CIOs which account for 24.8% have bachelors degree with an average of 16 years in higher education prior to their current position. From the data it is evident that the numbers of years spent in higher
education may compensate for the lack of graduate degree. Experience in higher education is one of the valuable requirements for the CIO position. Those who have been hired as CIOs came through different administrative ranks in higher education and worked their way up to the position. Some of the experience required (Chronicle Careers, 2009; Chronicle Careers, 2010; Chronicle Careers, 2011):

The successful candidate must also have at least eight years of successful supervisory experience and prior experience working in a higher education environment.

MBA and/or Masters preferred, as is experience in leveraging technology in higher education for teaching, research, and administration.

Master’s degree, in-depth knowledge of computer technologies and applications within a higher education organization; leadership experience in higher education information technology management.

Experience working in a research-intensive university.

Experience in Higher Education IT and/or professional associations preferred. The higher education experience is as important as the academic background.

There does not appear to be a short cut to the position. There are CIOs who came from the corporate world and have successfully navigated the unique and complex higher education environment. These individuals have 20 plus years managing IT in various organization and have participated in various leadership and management programs offered by various leading business schools across the country. From the researcher’s perspective the mandatory requirements for experience in higher education might be because of the way the governance process works. Technology is dynamic and ever-changing CIOs need to be able to filter through all the new technology and identify those that will add value to the university services. Those kinds of investments require a due
process whereby all stakeholders are kept abreast of the projects initiatives coming from
the CIO office. In Table 13 displays the average number of years CIOs have been in the
position according to their level of education.

Table 13.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Average # of Years in the Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate Degree</td>
<td>5</td>
</tr>
<tr>
<td>Masters Degree</td>
<td>6</td>
</tr>
<tr>
<td>Bachelors</td>
<td>6</td>
</tr>
</tbody>
</table>

*Figure 7. Number of Years as CIO*

When examining the number of years of CIOs in the position there was an
interesting trend as most of the CIOs average years in the position were as follows:
doctorate (5 years), masters (6 years), and bachelors (6 years). So the average number of
years in the position is roughly the same. The CIOs with masters degree dominated the
position with most CIOs falling in the 3 – 6 years range and greater than 6 years.

4.1.2.7 CIOs Career Path

Table 14.

<table>
<thead>
<tr>
<th>Career Path Categories</th>
<th>Doctorate</th>
<th>Masters</th>
<th>Bachelors</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>17</td>
<td>24</td>
<td>14</td>
<td>94.8</td>
</tr>
<tr>
<td>Nontraditional</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Table 14 shows 94.8% CIOs in AAU institutions followed the traditional path to
become CIOs in their institutions. The traditional paths are: scholar and steward
(Birnbaum & Umbach, 2001). A scholar is someone who has served as faculty then rose
through the administrative ranks with increasing responsibility in their institution
“never taught, but their two prior positions were in higher education” (p. 206). There
were only 5.2% of those who followed the nontraditional path to the CIO position. The
5.2% according to Birnbaum & Umbach (2001) they are considered strangers, as they
have no prior experience in higher education. The career path seems to be an influencing
factor in the appointment of CIOs in AAU institutions. About 74.5% of those who followed the traditional path have graduate degrees: 30.9% (Ph.D.), 43.6% (Masters), and 25.5% (Bachelors). From the CHECS 2009 report CIOs classified their career path into four areas: “higher education IT, IT outside higher education, higher education outside IT, outside higher education and IT” (Brown, 2009, 20). This report shows that spending some time in higher education is important. The most common insight from CHECS report and this study was that all CIOs have experience in IT. The CIOs have significant experience in IT from higher education or outside higher education, as well as significant experience in higher education through professorship or stewardship. The professorship and stewardship concepts emerged on the different paths taken by current CIOs to the position.

From comparing and contrasting the findings from the literature and position requirements, it seems that the CIOs need to be very strategic, adaptive, highly educated, and vast experience in leadership and management. From the two categories (traditional and nontraditional) those aspiring to be CIOs need to figure out where they belong and then seek training to make up for what they lack. The CIO daily activities is no longer operational, but strategic IT management.

4.2 Online Survey

4.2.1 Factors affecting the CIO Position

In the literature review there were ten top IT issues in higher education identified by various EDUCAUSE groups (Maltz et al., 2005; Dewey et al., 2006; Camp et al.,
The latest top-ten IT issues comprise of: “funding IT, administrative/ERP/information systems, security, teaching and learning with technology, identity/ access management, governance/ organization/ leadership, agility/ adaptability/ responsiveness, learning management systems, strategic planning, and infrastructure/ cyberinfrastructure” (Ingerman, Yang, & the 2010 EDUCAUSE Current Issues Committee, 2010, p. 49).

Levine (2000) documented some of the challenges underway for leaders in higher education. The challenges are congruent with the top-ten IT issues identified by EDUCAUSE between 2005 and 2010. In this study 17 items were identified and ranked by the online interview participants. The items were: budgeting, instructional delivery, collaborative workspace, strategic business planning, IT management, management procurement services, customer services & support, distributed IT, leading projects, teaching & learning, research & scholarship, negotiation skills, business processes & operations, integrated information systems, adaptive, building relationships across the university community, and centralizing IT. The Likert-scale was used with five parts: (1) highly important, (2) important, (3) neither important nor unimportant, (4) unimportant, and (5) highly unimportant.

Table 15 below provides the rankings of the different items by Higher Education Executives and the CIOs in Higher Education. The rankings provided information on the areas of importance that contributes to the hiring or success of CIOs in higher education. The online survey participants were asked to rank the factors critical to the CIO position from highly important to not highly important. The goal was to capture the expectations
of the position from the higher education leader and the CIOs themselves. This was to
provide detailed information on how the two leaders understand the position. The factors
were based on general knowledge from the pilot study and literature reviewed. The
numbers in the table represent the rankings of each factor by the CIOs and higher
education leaders.
Table 15.

Rankings of Important Factors By Executive Leaders in Higher Education & CIOs

<table>
<thead>
<tr>
<th>Factors</th>
<th>Higher ED Executives Ranking (Highly Important)</th>
<th>Higher ED Executives Ranking (Important)</th>
<th>Higher ED Executives Ranking (Neutral)</th>
<th>CIOs Ranking (Highly Important)</th>
<th>CIOs Ranking (Important)</th>
<th>CIOs Ranking (Neither)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeting</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Instructional Delivery</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Collaborative Workspace</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Strategic Business Planning</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>IT Management</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Management Procurement Services</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Customer Services &amp; Support</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Distributed IT</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Leading Projects</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Teaching &amp; Learning</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Research &amp; Scholarship</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Negotiation Skills</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Business Processes &amp; Operations</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Integrated Information Systems</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Adaptive</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Building Relationships Across the University Community</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Centralizing IT</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>
The CIOs and Higher Education executives ranked “Building Relationships Across the University Community” higher, while strategic business planning followed on the second position. Table 14 and Table 15 provide an insight of how the two leaders view the position. From the data collected CIOs need to have critical personal competency to be hired and survive in institutions of higher learning. AAUCIO (2010) cited IT management, strategic planning, communication, and leadership as critical factors for an individual to be successful in higher education. With scarce resources CIOs will have to align IT initiatives with the institution mission and strategic plan to improve IT operations as well as managing cost. Studying the CIO Position Requirement

Constructs there were lots of expectations with no clarity once on the job. The CIOs were expected to be strategic leaders but there is no meaning on what it means to provide strategic leadership. From the interviews of executive leaders it was evident that they needed a well-rounded person with multiple skills and experience. Some of the experiences and skills those hiring CIOs are looking for:

Strong technical background, understand the business, understand the organization, understand business processes and how new technologies can impact business processes.

Business Skills, well rounded person, someone who understands higher education or is able to quickly learn the ropes in higher education, technical expertise, governance, flexible & adaptive.

Wide range of experience in the technical field, higher education experience on different levels, strong technical experience in public and private sector.

Good communicator, establishes priorities, and develop processes that determine priorities, and understand when to let go.

Have a diverse background in terms of being able to understand business processes and being able to understand how to develop technology platforms that can meet a variety of different constituent needs.
From my perspective, and you have to understand that I think that it’s a blend of skills. My belief is that the person ought to be technically inclined or certainly understand all of the technology and how it works together as a tool to support faculty, staff, and students.

From Table 1 the CIO position is critical to the present and future of higher education institutions. The researcher then extracted the top 5 ranked factors from Table 14 by the higher education leaders. The goal was to further compare and contrast what the two groups think of the position. There was no difference in their top five ranking factors: building relationships, strategic planning, negotiation, customer service and support, and improving institution business processes and operations. In the CIO section there were a lot of ties compared to the other group. In the CIOs third ranking the following factors shared the spot: Instructional Delivery, Research & Scholarship, Business Processes & Operations, Integrated Information Systems and Adaptive, while on the fourth ranking the following factors shared the spot: Budgeting, Management Procurement Services, Distributed IT, Leading Projects, Teaching & Learning, Negotiation Skills, and Centralizing IT. In the higher education executives (presidents, provosts, CFOs) there were just five highly ranked factors with no ties. This could be attributed to the fact the higher education executives (presidents, provosts, CFOs) were looking for specific areas to make sure the CIO covers them. From the researchers’ interpretation the ties could be attributed to the specificity of the job on the ground as the executive leaders might be only concerned with administrative matters from where they sit. Table 16 displays the top five ranked factors from the online survey.
Table 16.

<table>
<thead>
<tr>
<th>Top Ranked Factors from Online Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Education Executives</td>
</tr>
<tr>
<td>Building Relationships Across the University Community</td>
</tr>
<tr>
<td>Strategic Business Planning</td>
</tr>
<tr>
<td>Customer Services &amp; Support</td>
</tr>
<tr>
<td>Business Processes &amp; Operations</td>
</tr>
</tbody>
</table>

4.2.2 Non-Parametric Statistics Testing

The Kruskal-Wallis test was used to test equality of the two group means on the 17 attributes as displayed in Table 17. There was a lot of consistency between the CIOs and the Higher Education Executives. For CIOs to be on the same page with other executives
is very important to avoid any ambiguous expectations. From the CHECS report and data collected by the researcher the IMTs and CIOs results were congruent (Brown, 2009).

These could be attributed to the fact that the position requirements are broad enough to reach out to a wide pool of candidates with multiple personalities, skills, and experiences.

According to CHECS 2009 report “it is good to see the IMT and their CIOs on the same page from a prioritization perspective” (Brown, 2009, 34).

Table 17.

Mean Equality from the Factors Ranks

<table>
<thead>
<tr>
<th></th>
<th>HEDEx</th>
<th>N</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDGT</td>
<td>HigherEdExecutives</td>
<td>9</td>
<td>7.33</td>
</tr>
<tr>
<td></td>
<td>CIOs</td>
<td>6</td>
<td>9.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>HigherEdExecutives</td>
<td>9</td>
<td>7.78</td>
</tr>
<tr>
<td></td>
<td>CIOs</td>
<td>6</td>
<td>8.33</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>CW</td>
<td>HigherEdExecutives</td>
<td>9</td>
<td>7.11</td>
</tr>
<tr>
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<td>CIOs</td>
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<td>9.33</td>
</tr>
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<td>Total</td>
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<td></td>
</tr>
<tr>
<td>SBP</td>
<td>HigherEdExecutives</td>
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<td>8.33</td>
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<td></td>
<td>CIOs</td>
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<td>7.50</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<tr>
<td>ITM</td>
<td>HigherEdExecutives</td>
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<td>7.67</td>
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<td></td>
<td>CIOs</td>
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<td></td>
<td>Total</td>
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<tr>
<td>MPS</td>
<td>HigherEdExecutives</td>
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<td>8.44</td>
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<tr>
<td></td>
<td>CIOs</td>
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<td>7.33</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
### Table 17 (Continued)

<table>
<thead>
<tr>
<th></th>
<th>HigherEdExecutives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSS</td>
<td></td>
<td>9</td>
<td>8.94</td>
</tr>
<tr>
<td></td>
<td>CIOs</td>
<td>6</td>
<td>6.58</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>DIT</td>
<td>HigherEdExecutives</td>
<td>9</td>
<td>7.83</td>
</tr>
<tr>
<td></td>
<td>CIOs</td>
<td>6</td>
<td>8.25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>LP</td>
<td>HigherEdExecutives</td>
<td>9</td>
<td>7.56</td>
</tr>
<tr>
<td></td>
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In Table 17 the mean equality for CIOs and Higher Education Executives’ view of activities associated with the position. In most categories the two executives agreed, as
the mean difference was not so significant. The mean differences were significant in the following category: Integrated Information System, Adaptive, and Centralize IT. CIOs thought those three categories were important in their daily operations. The following activities were ranked highly by both parties: Building Relationships across the University Community, Strategic Business Planning, and Customer Service Support. The ANOVA test was used too to test the equality of the means to make sure that the views of the position by CIOs and other higher education executives are the same. Table 18 provides more information on the mean equality between the two groups.

Table 18.

ANOVA Test

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Table 198. (continued)

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</table>

After examining the mean equality the researcher decided to engage the Cronbach alpha test. The Cronbach Alpha was used to test the validity and reliability of the online survey interview. In this case the Cronbach Alpha is 0.759, which is an accepted number as long as it is above 0.7 and not much higher than 0.9 (Nunnaly, 1978).
Coefficient shows a high degree of consistency among the items meaning the intercorrelations among the items is high.

Table 20.

<table>
<thead>
<tr>
<th>Cronbach's Alpha Based on Standardized Items</th>
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In this chapter the researcher examined the documents and the survey results to learn about the evolving IT executive position in higher education. The researcher was guided by the three specific questions: What are the skills and experiences of CIOs employed in higher education? How do leaders in higher education view the role of CIOs? What are the expectations of the leaders in higher education of these individuals? As the researcher delved into the documents it became clear that the following groups were marginalized: women, and minority ethnic groups. During the analysis it became clear that white males dominated the CIO position. There was gender imbalance and underrepresentation of minority groups. The CIOs are made up of whites at 91.3% and minority groups at 8.7%, specifically the majority of the CIOs were white males at 72.4%. The gender gap was at 48.2%: female CIOs (25.9%) and male CIOs (74.1%). The information on gender and race was not represented in the CIO position requirements constructs. In Chapter V the researcher learned about what the CIOs and other executive administrators understand about the position.
CHAPTER V WHAT THE CIOS AND OTHERS UNDERSTAND

In this chapter the researcher begin to learn what CIOs and other Executives in Higher Education perceive about the CIO position in higher education environment. The evolving role of the higher education IT executive is very complex as it supports the entire university technology initiatives, thus giving CIOs “broad responsibility and demanding unprecedented flexibility” (Lang et al., 2009, p. 1). Mech (1997) commented about academic management as an “ambiguous and highly intuitive process” (p. 282). CIOs have to forge a productive relationship with all stakeholders as they continue to advance technology prowess. In their advancement of technology CIOs need to be sensitive to the institution’s needs and continuing to build trust is the key with campus wide constituencies. According to Schaffhauser (2011) realizing that you are a “university officer first and head of specific division second” is important (p. 30). The key themes found from the telephone interviews, face-to-face interviews, online interviews, and during documents analysis were as follows: communication, building relationships, strategic planning, negotiation skills, human centric computing, and funding IT. According to Lang et al. (2009),

Once upon a time, the CIO may have had primarily to respond to administrative systems and the network, maybe research computing. However, the CIO now also has to be concerned about the LMS [learning management system] as a critical institutional system; safety and facilities systems—everything from building alarms to climate management—many of which now run on the campus IP network; research compliance issues, such as changes in IRB [institutional review board] systems, clinical trials systems, nuclear materials tracking systems, et cetera—all based on external requirements imposed on the university from regulators, and all of which have significant technology components.... Now, all major IT systems and functions seem to be considered mission-critical, with 24 x 7 uptime assumed. The tremendous increase in the application of IT across the
The institution has spread the CIO and IT organization’s reach broadly across the institution as well.

The position has shifted from simply administering IT functional units to a more strategic administrative position. With all the expectations and responsibilities in the position Mintzberg (1980) offers ten managerial roles that all individuals in managerial roles perform: “figurehead, leader, liaison, monitor, disseminator, spokesperson, entrepreneur, disturbance handler, resource allocator, and negotiator (p. 284). Those coming to the CIO position have to embrace role theory, as a vehicle to gain insight in an institution and be able to predict the future direction of an institution (Mech, 1997). In embracing role theory CIOs could examine the functions and responsibilities of the position in academe today. According to Wolverton et al. (2000), “the fundamental proposition of the roles theory is that behaviors within contexts (roles) are associated with persons who shares a common identity (in positions) and who are aware of their roles (by expectations)” (p. 2). As the core mission of the university and functional units are heavily dependent on information technology the CIO position is spread across the institution so there is consequences of roles in such complex social system. From the researcher’s interpretation the CIOs performance is dependent on the institution environment and their skills, characteristics, and experience. If there is any conflict between the institution and the CIO personality then the institution suffers, thus those aspiring to be CIOs need to understand their role well and have a plan of how they will be able to apply their experience in an ambiguous higher education environment.
Establishing a clear relationship with all the constituencies is key. In the next section the researcher look at the skills and experience necessary in such a highly complex position.

5.1 Skills and Experiences: Research Question 1

The researcher learned about the skills and experiences needed from those aspiring to be CIOs in higher education. AAU institutions served as the data collection sites. The researcher interviewed eight individuals who were willing to participate in the study. The eight individuals comprised of: one President, two Provosts, one Chief Finance Office, and four Chief Information Officers. Unfortunately there were no other interviews to conduct so the researcher proceeded with the study. The researcher utilized data collected from the open-ended questions in the survey. The additional data provided context for the study. Using the interviews, online survey, field notes and the analysis of related documents the researcher proceeded to learn about the skills, expectations, experience, and how others view the position. Learning from the AAU CIOs:

I actually think there are three skills that a CIO needs. I think they need to be good communicators. It’s critical in their capacity, to be able to communicate to the broader community about technology issues. Secondly, they need to be able to establish priorities and to develop processes that determine priorities, because obviously, on university campuses, there’s high demand for technology and the CIO is continuously being asked to allocate resources to support a variety of different functions. And then the third area is one where I would say they need to also be able to understand when to let go. There are many times where centralization and leveraging of the technology platforms are in the best interest of the university as a whole, but there are also times where allowing people to sort of go their own way, also makes sense. And so I think they have to have that capacity as well.

Expertise in Information Technology (Higher education), including ERP's, Networking and Infrastructure, Security, Telecommunications, Web Development, Help Desk Management experience. Must be able to understand and manage complex software licensing and contractual agreements.
...have knowledge of systems and information technology; skills in managing projects, people, resources, and systems; ability to prioritize needs and balance available resources. CIOs have to be good managers to balance all the competing demands in higher education.

Patience, kindness, value diversity, develop leaders throughout organization, think strategic, be creative, demand excellence as the standard but allow for normal growth. Really understand your campus culture and work within it to accomplish what is possible. Value colleagues. Do not keep staff with character issues; they will ruin your organization. Character cannot be taught.

During the interview the CIO put emphasis on good communication, establishment of priorities, development of processes to determine priorities, as well as understanding when to let go is critical. There were multiple emerging concepts in this section which were not addressed in the literature: understanding when to let go, patience, kindness, valuing diversity, developing leaders throughout the organization, excellence as the standard measure in the CIO activities, valuing of colleagues, and character. From the CIO assertion by patience implied letting the due process go without being interrupted as is valued in higher education. Being humane and valuing colleagues input in their daily management and leadership activities add value to the functional units. Technology has become vital on campuses so having an effective team in place is important. There is a great need for empowerment by developing leaders within. As the researcher observed earlier most CIOs have spent years in higher education before assuming the executive IT role.

Empowering and developing leaders within would encourage those aspiring to be CIOs in the future as their contribution to the institution is valued and appreciated. Due to the complexity of the position regardless of extraordinary talent CIOs cannot effectively
handle all their responsibilities without trusting the people below them to function as part of the CIO cabinet. From the researcher’s perception the CIO depends on their IT unit team for strategic support. For CIOs to build solid relationship based on honest communication and trust is critical to their success in the position. Vice President and CIO at Carnegie Mellon University, Joel Smith said, “I provide leadership on the organization’s cultural and quality of life issues and concerns” (Regenstein, 2007, p. 45).

The culture and quality of life is very important. One CIO said,

Deliver what you say you will deliver and deliver it when you say you will. I think it is about the passion you have for what you do. When I wake up every morning, I thank God for the opportunity I have and the ability presented to me to make a difference. Then I go do IT!

Delivering on the promise and on the time is critical in the position so that stakeholders would take their word seriously. The emerging concepts patience, kindness, valuing colleagues and character subscribe to the notion of spiritual leadership, which incorporate vision, hope/faith, and altruistic love (Fry, 2003). The theory of leadership embraces the empowerment of colleagues in a team environment as well as at the individual level (Fry, 2003). Holistic leaders are important in a complex and ambiguous environment. Valuing diversity is another important concept emerged during the interviews and in document analysis.

The researcher continued to narrate the story of the CIOs in higher education by looking at building relationships another important factor to be considered by CIOs in their position. Technology implementation cost millions of dollars so gaining trust and integrity from the various stakeholders CIOs need to be connected with the campus.

Stakeholders have to buy-in in any projects being implement as proceeding with projects
that are not improved by various constituencies could be detrimental to the CIO and the university constituencies’ relationship. In academic environment building good relationships is emphasized and significantly valued (Mech, 1997). During the interviews higher education executives gave their perspectives:

Coordination and communication on campus is critical so students, faculty and staff have the information and resources to use information resources in their learning and jobs.

Knowledge of systems and information technology; skills in managing projects, people, resources, and systems; ability to prioritize needs and balance available resources. CIOs have to be good managers to balance all the competing demands in higher education.

an understanding of the academic enterprise

From the data it is evident how valuable being able to coordinate and communicate is, as well as technical know-how, management, setting priorities, and understanding higher education. It also emerged the reference of academic environment as academic enterprise a term commonly used in the corporate world. The reference to higher education as an enterprise signifies the culture shift in higher education. Executive leaders are confronted with situations that require them to stay connected to the institution community so that they remain focus to deliver the right technology. So, regardless of direction or culture being adopted in higher education the soft skills and experiences are very important is building relationships, working and engaging stakeholders. CIOs are to use their interpersonal skills to cooperate and consult with all relevant units especially faculty members who perform the institution’s primary work. CIOs will have to be everything to all people as in higher education there is no formal authority to exercise. Its a collegial environment full of expectations thus the skills and
experiences acquired throughout the years coming in handy in building mutual
understanding with all constituencies. Now, looking at the required number of years of
experience beyond earning an advanced degree come to play in developing solid
interpersonal, management, and communication skills. Lang, Lea, Orr, Rowe, Smith,
Suess, & Voss, (2009, p.6) added a voice:

[Aspiring CIOs] need to see the value in developing professional networks and
increasing communication. This is how you move into management. This is the
skill you have to learn along the way to get into management.

So far the researcher learned about the importance of technical expertise as well
as non-technical skills of which the researcher would refer to those as soft skills:
strategic, communication skills, interpersonal skills, management skills, consultant skills,
negotiation skills, as well as understanding higher education. Developing such skills
takes experience in different work environment and working with all kinds of people.
From what the researcher learned, CHECS report claimed, “CIOs without advanced
degree in some institution types are a rarity. Possessing four attributes – Technical
Knowledge, Business Knowledge, Communication Skills, and Political Savvy –
continued to be important to the CIO” (Brown, 2009, p. 8). The interviews and literature
confirm these attributes as key to the CIO position (McGee, 2008; Brown, 2009;
Wailgum, 2009; Nash, 2009). In summary the higher education executives and CIOs
cited soft skills as critical skills in higher education.

Table 20 provides a summary of data collected from the interviews of the higher
education executives together with the CIOs. Those aspiring to be CIOs need to
understand the various constituencies in higher education as “communication occurs
within the IT department, with other departments, with customers, students, alumni, peers, governing boards, and a myriad of other people” (Brown, 2009, p. 34). An AAU CIO advised those aspiring to be CIOs in higher education:

Know your institution and its needs; communicate in all directions - with your supervisors and their peers, with faculty and students, with the employees in IT, and with vendors and other outside constituencies.

In the researchers point of view the CIOs in higher education should develop a complex leadership perspectives with a clear understanding of what the institutions needs are, and how they can be supported through innovative technological means. Having a clear understanding of the institutions and users needs enable the CIOs to develop clear roadmaps to optimize the universities’ operations. Thus, creating value through efficient, robust, and agile processes.
Table 20.

<table>
<thead>
<tr>
<th>Interview</th>
<th>Position</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>President</td>
<td>Technically savvy, business savvy, managing others, people skills, strategic thinker, ability to communicate</td>
</tr>
<tr>
<td>2</td>
<td>Provost</td>
<td>Strong technical background, understand the business, understand the organization, understand business processes and how new technologies can impact business processes, needs to be able to work with his or her president, with the board, with other colleagues at the executive level and several levels down, explain technology in plain English</td>
</tr>
<tr>
<td>3</td>
<td>Provost</td>
<td>Business Skills, well rounded person, someone who understands higher education or is able to quickly learn the ropes in higher education, technical expertise, governance, flexible &amp; adaptive</td>
</tr>
<tr>
<td>4</td>
<td>CFO</td>
<td>Good communicator, establish priorities, and develop processes that determine priorities, and understand when to let go</td>
</tr>
<tr>
<td>5</td>
<td>CIO</td>
<td>Good communicators, listeners, problem solvers, and be able to collaborate and understand technology</td>
</tr>
<tr>
<td>6</td>
<td>CIO</td>
<td>Strong technical background, understanding higher education business, understand the institution organization, understand business processes, and explain value of technology</td>
</tr>
<tr>
<td>7</td>
<td>CIO</td>
<td>Gathering requirements or needs and communicating with people all the time, business analyst skills</td>
</tr>
<tr>
<td>8</td>
<td>CIO</td>
<td>Governance, Manage IT, and Building Organization</td>
</tr>
</tbody>
</table>

Technical and business skills were other attributes cited over and over by different executives. The executives explained that they are not looking for network engineers, programmers, or database programmers, but CIOs need to be competent in all technical areas. According to an AAU provost the importance of technical competence depends on
the type of institution and the current IT projects initiated. Brown (2009) cited that “regardless of the IT-organization size, the CIO has to posses and maintain a level of technical knowledge that makes him or her an expert on the technology that can help the organization reach its goals” (p. 35). An AAU Provost insight,

From my perspective, and you have to understand that I think that it’s a blend of skills. My belief is that the person ought to be technically inclined or certainly understand all of the technology and how it works together as a tool to support faculty, staff, and students.

Consequently, the Provost viewed the CIO as a blended person with both technical and higher education skills that understood the focus of higher education: faculty, staff and students. Basically, the CIO should converse on different technologies or have a working knowledge of emerging technologies. CIOs offered different advice during the interviews to those aspirants on how to stay informed on new technologies:

Engaging in collaborative efforts with your peers at other institutions will afford you long-term success.

Stay in the dialogue occurring in the industry between developers, educators, CIOs and technical company CEOs.

There’s never enough hours in the day, because a CIO has to understand the technologies that are out there, has to understand his or her own institution and where they sit on the broad spectrum of the use of technology. They have to understand their users and what students, and faculty and staff, want and need. They need to understand how to put all those puzzle pieces together, and still keep the old systems up and going till you get the new ones in. It’s a huge, sort of vicious cycle.

Beyond technology they must have a good understanding of how the institution functions as it is key in the decision making process. This applies across industries;

higher education or corporate world.
An AAU CIO stated that like any other executives CIOs need to learn the organizational structure and adapt accordingly:

CIO’s really need to understand the business. I don’t care if it’s in higher education, or manufacturing, or book selling, or whatever. It doesn’t matter your organization. You really need to understand the organization and the work that all of the different people do. How do they use technology in their jobs? Understanding the functional side of the house, understanding how to do work breakdown structures to understand business processes and how new technologies can impact business processes and make things more efficient and effective is extremely important. Those are skills you don’t necessarily learn in computer science class.

Understanding the business of the institution and committing to all functional units to make things more robust and efficient is important. Thus CIOs need to be attentive of what is going in the IT world so that they continuously bring new innovative ideas on adopting new emerging technologies. Those skills cannot be learned in the engineering school. The challenge to those with solid technical background is to develop soft skills or solid non-technical skills so that they are able to meets all users needs.

Beyond the skills and relationships with the various stakeholders in higher education CIOs need to build good rapport with the president, board members, as well as other executives. To achieve this it takes “trust and honesty with your counterpart” (Schaffhauser, 2011, p. 30). A provost from an AAU institution added:

CIO really needs to be able to work with his or her president, with the board, with other colleagues at the executive level and several levels down, as well as be able to manage their team through thick and thin, because we all know how difficult IT can be. It’s a very difficult job. So they really have to have – I guess the third piece is really those people skills.

The relationship between the CIO and the executive boardroom is very important, as the executives are the ones who have access to the monetary resources. Understanding
what the president and provost office needs is crucial as the president is the head of the institution and the provost is in charge of the core mission of the institution. People skill is another emerging significant finding as it supports the researcher’s earlier interpretation of the data on the importance of developing soft skills. Even in the earlier findings on Chapter IV building relationships across campus ranked top of all the factors associated with the CIO position. In the researchers observation establishing good rapport across campus could enable CIOs to access current information so that they make well-informed decisions on projects to be initiated. So far we have learned that CIOs need to be good communicators, have good people skills, know when to let go, understand higher education as an enterprise, establish priorities, as well as building institutional processes. According to AAU CIO, CIOs need to be good communicators, listeners, problem solvers, and be able to collaborate and understand technology. Listening and problem solving skills are emerging skills from the study participant. Developing good listening could be critical as CIOs move around campus and listening to the conversation going on in various constituencies. As they learn of the IT related issues around campus, long-term solutions should be provided so that such issues do not come up again. Now, the researcher entertains what CIOs think what kind of positions those aspiring to be CIOs should have:

I look at the business analyst meeting with customers and translating business requirements into technology. I think those kind of people are mini CIOs. I think that kind of a job where you are gathering requirements and communicating with people all the time. That is an ideal job or CIO training ground so to speak.

They have to be able to explain technology in plain English for those people who don’t get it, and not be arrogant about technology and its use. I have some pretty strong feelings about that. I’ve actually lectured about it myself.
The AAU CIO brought a new emerging theme of translating business requirements into technology blueprint. Earlier the researcher learned about the CIOs ability to listen and communicate, this is when those skills come to play. Being able to translate those business requirements into plain English then communicate all to other executives is critical as well as vice-versa communicates the blueprint to the design and development team is key.

For CIOs it is important that they are exposed to institutional wide issues and the data showed it was important that people in these positions hold positions outside the niche first (Schaffhauser, 2011). Thus, developing “empathy for all areas early on and repeatedly” (Schaffhauser, 2011, p. 30). CIOs have to be open-minded, adaptive, and build users driven IT department and be able to sell technology to IT governance committee as it is a representation of multiple campus constituencies (Schaffhauser, 2011). The researcher decided to engage with the EDUCAUSE findings of the CIO position. EDUCAUSE is “a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology”\(^1\). From Lang et al. (2009) cited the following skills and capabilities as key to the CIO position (p. 4).

1. The ability to develop and maintain a strategic perspective that grounds IT in the institutional mission and strategic objective.

2. Communication and outreach capabilities that enable the CIO to frame IT issues clearly, concisely, and in terms relevant to the institution as a whole.

The ability to collaborate effectively to leverage shared needs and resources within and beyond the institution, and thus maximize IT’s value in advancing higher education.

Operational management skills

A broad understanding of IT policy and regulatory, compliance, and legal issues.

In EDUCAUSE the emerging issues beyond the research participants provided are: outreach capabilities, IT policy and regulatory, compliance, and legal issues (Lang et al., 2009). Earlier on the researcher observed the calling on building campus wide relationships, which is in agreement with outreach capabilities. The CIOs needs to be able to engage with other executive leaders at strategic level so that IT could be brought as a vehicle to strengthen the university mission and objectives. Listening skills come to play as they pay attention to what other executives are saying and what matters to them and their units. With that kind of information from the different units CIOs could build cases for IT investments and connect all the dots regarding the role of information technology to the success of the institution. As CIOs role grow there will be a lot of operational issues, which can be very complex and unique to an institution. The emergence of IT policy and regulations could prove to be critical as CIOs are expected to have good understanding of regulations as the Federal Communication Commission pass them. These regulations will be translated into policies. The emerging role of the CIO from the findings is that of knowledge resource. As the researcher continues to learn about different aspects of the position, the experience needed in the CIO position is addressed by the Higher Education Executives interviewed:
I think they have to have a broad understanding of technology, and what technology can do, but I also think that they have to have a diversity of background in terms of being able to understand business processes and being able to understand how to develop technology platforms that can meet a variety of different constituent needs. So proficiency is important, but also having a strong business acumen also critical from my perspective.

To be very honest, at the time I moved back to the academics, I believed that I had brought the IT team here at our university through a number of gateways or milestones and that the team was ready to have someone with more technical expertise than I had, someone who had really worked in the business. The person that I helped recruit here had been a programmer, had been a database administrator, and had been a project manager and head managed IT teams both in higher education as well as for a large public company. He had public and private experience, and really understood the higher education environment. It just so happens that his minor in college was English Literature, so he knows how to write. He knows how to talk. He has those people skills, where he can work with others to accomplish their goals through IT. He’s really great in front of a group. He’s really great in small groups, trying to explain technology to people and really working through. So he had a stronger technology background, which our institution was ready for, as well as those good, soft people skills and the knowledge of higher education.

…having gone through the ranks of higher education and have an understanding of what are the challenges of managing IT in higher education

…understanding higher education at every level is key, to have worked in university of comparable size as a manager of some sort…if you look at the position it has gained a lot of visibility because we all depend on IT systems to perform our jobs.

Well I think there’s a definite advantage to being a faculty member and coming up through the ranks of promotion and tenure. Having taught in the classroom and worked on research and publication, that’s the way to really understand our business. Uh, we have CIO’s that were not former professors, but as you know in university being a professor is an important part of the debate sometimes.

From the researcher’s interpretation those aspiring to be CIOs need to have a broad understanding of technology, its capabilities, understanding business processes, business acumen, as well as experience in higher education. The CIO’s characteristics and the institution’s business strategy should align to avoid conflicts with competencies.
The type of CIO to be hired by an institution is dependent on what the institution needs at that point. As the executive stated earlier that their university needed somebody technical to take the institution to another level. The researcher continues to chronicle in Table 20 the type of experience needed to be hired as CIO in an institution of higher learning. Coming through the ranks as a professor teaching, researching, and publishing is an added advantage to work in an executive level position in higher education. From the researchers interpretation solid experience in higher education together with creativity and good people skills could prove to be critical in navigating the academe. The experience in higher education could make people believe that the CIO subscribe to due process popular in higher education thus the aspirant being looked as a scholar or someone committed to the academic and research mission of the institution.
Table 21.

Experiences from Interview Participants

<table>
<thead>
<tr>
<th>Interview</th>
<th>Position</th>
<th>Professional Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>President</td>
<td>University work experience of comparable size</td>
</tr>
<tr>
<td>2</td>
<td>Provost</td>
<td>Higher education experience</td>
</tr>
<tr>
<td>3</td>
<td>Provost</td>
<td>Wide range of experience in the technical field, higher education experience on different levels, strong technical experience in public and private sector</td>
</tr>
<tr>
<td>4</td>
<td>CFO</td>
<td>Have a diverse background in terms of being able to understand business processes and being able to understand how to develop technology platforms that can meet a variety of different constituent needs. Strong business acumen is critical</td>
</tr>
<tr>
<td>5</td>
<td>CIO</td>
<td>Business analyst type meeting with customers and translating business requirements into technology</td>
</tr>
<tr>
<td>6</td>
<td>CIO</td>
<td>Have experience in higher education</td>
</tr>
<tr>
<td>7</td>
<td>CIO</td>
<td>Senior IT professional with experience in large-scale project management and be conversant in finance, and policy</td>
</tr>
<tr>
<td>8</td>
<td>CIO</td>
<td>Faculty member go through the ranks in higher education</td>
</tr>
</tbody>
</table>

CIOs have to understand the institution functions, missions, and priorities of the institution. These leaders have to see the big picture and make sure their priorities and investments are inline with the priorities of the institution. It is vital for those aspiring to be CIOs to have opportunities “early in their careers to develop an enterprise view of the institution; the learning curve is too steep for someone to develop that perspective late in their career” (Lang et al., 2009, p. 5). The research has pointed to the skills, experience, and education that those aspiring to be CIOs in higher education should have and those already in the position could learn about the necessary adjustments they need to make in
their work areas. Even at some 25 years of existence the position is still at its infancy stage compared to the positions of their colleagues in the boardroom (Brown, 2009). In the next section the researcher looked at how other executives in higher education view the position.

5.2 Leaders’ Perspectives: Research Question 2

Having learned about the skills and experience needed from those aspiring to be CIOs; the researcher shifts to how other executives in higher education view the position. The researcher highlights some of the comments that came from AAU institution executives:

If you go back and look at the history of technology on university campuses, it used to be only in the prerogative of individual departments or individual faculty, but over time, because of the development of large business bay systems, because of the proliferation of data, and the risks associated with having large data warehouses, university CIO’s have had to take on a much more extensive role in managing the technology, and managing the data that is maintained on these platforms, because of the risks that they represent to the university, but also because of the risks they represent to the individuals. I would argue that the Chief Information Officer is no different than the Vice President for Human Resources, or the Vice President for Facilities, in terms of being a major steward of a university resource that is critical to the operations and needs of the community in a broader sense.

Just as good architects produce houses that are far more than the sum of their parts, good IT architectures leverage common standards and consistent strategies to produce more agile, cost-effective IT solutions…I don’t expect that process to be easy, but I do think that with the right set of guiding principles—such as a transparent and open, deliberative process—it is possible to be successful.

I think a lot of what institutions are facing is just the cost of IT. IT costs a lot of money. It costs a lot of money to buy, to put in and implement, and to maintain over time. So, being able to do all that mathematics, and really being able to sell the projects to get the investment…
I spent a lot of time looking at budget, working through the numbers, working with the CFO to ensure that the choices we were making in IT could be funded and maintained over time by the institution. So I think the whole funding conundrum is critical…

With the size and scope of this university, we are seeking a strategic leader to help us advance our technology efforts in support of our world-class teaching, research and administration… coordinates a wide array of technology initiatives…

There are a lot of issues being raised in as far as how other executives view the position. The IT departments should not be at all cost centers even though cutting-edge education, research, and administration is dependent on IT advancement. From the data it is evident that the role of the CIO is viewed as a major steward of the university resources. The CIOs are to manage IT and the data because data is critical to the university as well as individuals who are part of the institution. One of the executives argued that the position is no different to that of Vice President for Human Resources, or the Vice President for Facilities, in terms of being a major steward of a university resource that is critical to the operations and needs of the community in a broader sense. The CIOs are expected to have a wealth of experience in technology implementation and transforming the organization to bolster cutting-edge research as well as instructional delivery. The researcher also learned from the data that CIOs are expected to formulate innovative and realistic vision for IT to provide functional units with cost effective IT solutions.

In the eyes of the researcher those individuals aspiring to be CIOs will have to seek mentoring to strengthen their capacity so that they function at a strategic level. The demands of the position are very complex yet attainable with the right skills development, experience, mentorship, and training. Those who are getting ready to retire
could also share their wisdom by availing themselves as mentors and advisers to individuals and various CIOs forums or organizations.

With all the training, experience, mentorship and skills it is imperative that the CIOs “understand technology in the context of the university mission” (Lang et al., 2009, p. 5). Being able to communicate from different perspectives is key so that all constituencies have an understanding of the value of IT investment and the cabinet members can buy in. According to Lang et al. (2009), “we should be preparing future CIOs under the assumption that they will be sitting at the cabinet table, and therefore think about what it means to be at the cabinet table” (p. 5). An AAU CIO observed that, the role of the CIO in leadership is being escalated to the executive suite…

From the researchers perspective, as the position is being escalated to the executive suite, those in the position and those aspirants have to dynamically connect with the institutional business and information technology. In the boardroom it is important that they help all stakeholders within the institution understand the value received than the funding being allocated on various IT projects. In a unique and complex environment IT professionals need to have a good understanding of the overall institution business enterprise and speak the language of all the constituencies.

Understanding the unique and complex culture of higher education is important so that navigating the environment would not be so difficult. Such exposure enables those in the position to make necessary adjustments according to the needs of the institution. Those aspiring to be CIOs coming through the ranks in higher education could help them develop an overall institutional view earlier on in their careers and once in the position would understand the importance of creating opportunities for IT professionals to further
develop their skills (Lang et al., 2009). Developing such skills earlier on is key as “the learning curve is too steep for someone to develop that perspective late in their career” (Lang et al., 2009, p. 5). The researcher in Table 22 provides the summary of how other executives view of the position.
Table 22.

Higher Education Executives View of the Position from Interviews

<table>
<thead>
<tr>
<th>Interview</th>
<th>Position</th>
<th>Role of CIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>President</td>
<td>Leaders with extraordinary effects on the followers, the environment, and the social system as the position impacts all constituencies on campus, IT oversight committee, awareness of future trends in IT</td>
</tr>
<tr>
<td>2</td>
<td>Provost</td>
<td>Computing infrastructure, compliance, IT management, risk management, IT strategic planning</td>
</tr>
<tr>
<td>3</td>
<td>Provost</td>
<td>CIO has to understand the technologies that are out there, has to understand his or her own institution and where they sit on the broad spectrum of the use of technology. They have to understand IT users need. They need to understand how to put all those puzzle pieces together, and still keep the old systems running</td>
</tr>
<tr>
<td>4</td>
<td>CFO</td>
<td>Because of the development of large business bay systems, because of the perforation of data, and the risks associated with having large data warehouses, university CIO’s have had to take on a much more extensive role in managing the technology, managing the data, and managing Risks</td>
</tr>
<tr>
<td>5</td>
<td>CIO</td>
<td>It is an interesting job. Understanding the mission, communicating, understanding the business that we are in and what we are supposed to be doing. Governance is so important to a CIO’s success and there is a lot of people who say they don’t have time for it or it’s too hard or it doesn’t work.</td>
</tr>
<tr>
<td>6</td>
<td>CIO</td>
<td>IT strategic planning align with university objectives and mission, and keep all technology units running</td>
</tr>
<tr>
<td>7</td>
<td>CIO</td>
<td>Change agent, IT visionary, IT strategic planning, support instructional delivery, and research</td>
</tr>
<tr>
<td>8</td>
<td>CIO</td>
<td>Be able to manage IT and keep in touch with all IT users campus wide to determine their needs. Be a change agent</td>
</tr>
</tbody>
</table>
From Table 22 the researcher learned that the position demands an individual with multidimensional views so that right decisions can be made with limited data. The key is for the CIOs to be visionaries with strong leadership skills so that institutions realize value-on-their-investments. Bringing the right technology to enhance users’ satisfaction and transform business operations of the institution can be a differentiation factor of the institution. The only way to know is through collaborative efforts with stakeholders across campus making sure that technology meets various needs of the institution.

Such activities are critical to the institution success as CIOs “learn how to work together with other people to understand how things work and how to work with other people that we’ve never worked with before [are critical skills]” (Lang et al., 2009, p. 5).

The position is viewed beyond the walls of the IT department. Another emerging theme in this section was that CIOs may be viewed as change agents. Change agents are associated with transformational leadership style and sometimes labeled as Chief Transformational Officers (Bass & Avolio, 1992; Shamir et al., 1993; Bass, 1998; Avolio & Gibbons, 1998). Chief Transformational Officers are suppose to be operationally and strategically sound with excellent negotiation skills (McGee, 2008; Brown, 2009; Wailgum, 2009; Nash, 2009). Transformational leaders are characterized as follows: build relationships with followers, have high ethical and moral standards, motivate, inspire, empower, and exhibit charismatic behavior (Bass & Avolio, 1992; Shamir et al., 1993; Bass, 1998).

Governance was another emerging theme in this section, which is the popular form concept in higher education. The American Association of University Professors
(AAUP), the American Council on Education (ACE), and the Association of Governing Boards of Universities and Colleges (AGB) formulated the institutional governance statement, which is well cited in higher education. The institutional governance statement provides “clarification of the respective roles of governing boards, faculty, and administration” (American Association of University Professors, 2006, p. 135). The statement basically advocates for an inclusive decision making process even as colleges and universities are becoming less autonomous. Birnbaum (2003) described the term “governance” as a system that gives structures and processes to academic institution for “organizational control and influence” (p. 2). The emerging themes provided the researcher with new viewpoints on the CIO position.

With the higher education environment continuing to evolve and technology continuing to condition the higher education environment the CIO role is becoming less of a technologist and more of an institution strategist and change agent. Even after landing the CIO position it is important that they continue to adapt and acquire a new set of skills to meet the institution’s needs. The cabinet in an institution of higher education views the position as key to transforming IT from being cost centers to a strategic driver. In the last five years IT funding has been the top issue in higher education (Maltz et al., 2005; Dewey et al., 2006; Camp et al., 2007; Allison et al., 2008; Agee et al., 2009; Ingerman et al., 2010). The poor communication of value on IT investments prevents faculty, staff, students, and other executives from elevating the value of IT. The Milne (2010) claim, “shifting the strategies for IT executive communication is one key success factor needed to rebuild confidence” (p. 2). CIOs need to provide value measures so that
the campus-wide community has a yardstick to perform their own evaluations. One CIO said:

“Over the past three years my role has broadened.... I don’t just worry about IT, I worry about things around the entire campus.... Now I focus more on teaching and learning because my institution is not focused on research as much. My focus has shifted towards doing technology work that is aligned with the mission of my university.... The new focus is technology for advancing the mission of the institution rather than technology for the sake of technology” (Lang et al.,2009, p. 2).

As the researcher continues to engage with the relevant documents and interviews decided to learn from the Campus Technology magazine by borrowing the findings by Schaffhauser (2011) in an article titled “Setting up a CFO Trust Fund” (p. 28).

Schaffhauser (2011) cited the following factors as “The CIO needs from the CFO” and “The CFO needs from the CIO” to ensure a successful relationship between CFO and CIO (p. 30):

The CIO needs from the CFO (Schaffhauser, 2011, p. 30):

1. High-level understanding of core technologies and underlying complexities to set realistic expectations and discuss strategic options
2. Assistance in gaining buy-in for technology that meets strategic objectives, to assure wide adoption
3. Help in managing expectations, especially for projects that address long-term objectives
4. Approval of funding for proposed solutions, as well as documented analysis of service improvements, investment returned, etc
5. Acceptance as a strategic business partner and collaborator
The CFO needs from the CIO (Schaffhauser, 2011, p. 30):

1. An institutional perspective that directs technology decisions toward strategic priorities
2. A complete analysis of new initiatives that encompasses costs, ROI, return on value, options, issues, and potential pitfalls
3. A proactive approach to communications with others in the institution and use of governance structures to gain consensus
4. Realistic assessment of current IT skills and steps to filling the skills gap
5. A business and entrepreneurial mentality

From Schaffhauser (2011) findings it is evident that the relationship between the two executives is imperative. Building those relationships and communicating on decisions being made in the IT department is important. In any institution the CFO is the steward for all finances so CIOs needs to be communicative on any IT strategic plan and the plan should be backed by realistic return on value or assessment. Having learned about how other executives and CIOs themselves view the role of the position in the next section the researcher look at what is expected from CIOs.

5.3 What CIO’s Should Expect: Research Question 3

The research chronicles the expectations of the leaders in higher education of these individuals as they perform their duties. AAU CIOs assertions said, Real CIO who really know how to be effective has to figure it out and see it all together, whether it’s research systems, or networking, or teaching in classroom, security and policy. I think the most effective CIO’s will have some ability to work and hire quality people in all of those areas. I think that CIO’s who have
become too close to networking or too close to administrative assistance those tend to have a difficult time.

Expect to work 65-80 hours per week if you expect to do a good job. Expect criticism and little praise. Hire and build strong people and develop strong leadership within your organization. Expect to devote a lot of time to relationship building, leadership development, and healthy environment. Exercise.

Embrace ambiguity. Choose higher education because you think education can make a difference.

The position requirements are too broad which can complicate the expectations of those aspiring to the position. In previous sections the researcher learned how the CIO coordinates events throughout and beyond the boundaries of an institution. As the position experiences institutional ascension CIOs are to constantly evolve with the university needs. The position came to being as concerns came up of the disconnection between the institutional needs and information technology implementation widened. From having the skills and experience come the expectations of the CIOs, which are demanding beyond IT management. More time must be devoted to relationships building, leadership development, and cultivating a healthy environment. Lastly embracing ambiguity is another expectation as there is no formula to follow in the position. From a CIO’s advice take the job if you believe that education can make a difference.

Brown (2004) cited the position as the “classic IT support provider” so the expectation is that it is the CIO’s responsibility to respond to departmental needs (p. 30). For them to navigate such a unique and complex environment the CIOs need to be in shape: mentally, physically, and spiritually. The CIOs are to maintain a robust IT environment so that the institutions they work in achieve competitive advantage. One seasoned AAU CIO claimed that,
Few higher education institutions have ever consciously decided how IT governance is actually going to work…I think one of the key points to get sorted out is who makes the decisions. I think the second thing with the CIO is being strong enough to be able to influence the conversation at the university. For example, I suspect if you ask any faculty member or student if they think that big paper text books are the wave of the future or they think that E-readers and digital content or more likely to grow over the next three years, I think that you would get a pretty strong answer that most people think that a lot of course materials will go digital. Maybe not all at once, but over the next three years a lot of that is going to happen. So now look around, who’s going to lead that, how is that being led? At…we are very pumped about doing that and been advised for the past 18 months so my colleagues be it the provost or dean or others are really not that worried about it because they know that our shop is out leading that. At many other institutions CIO’s are frankly asleep at the wheel there’s just not any room to shape or influence; if they are just waiting for someone to tell them what needs to be done or its being done by some school or some department that’s a bad decision…

In cases whereby an institution has not decided on IT governance it is the CIOs business to make sure there is a strategic plan in place to guide their IT initiatives. As the CIO said waiting for somebody else to do it or sanction it could be a bad decision.

Engaging faculty, students, and staff in social dialogue on their IT needs would be of great value as all the projects initiated would be backed by the university community. The position is demanding movers and shakers who have moved away from simply administering hardware and software. These would be individuals on a life long learning track and committed to a career as CIOs. The individuals have to continuously learn from all constituencies. Interviewed higher education executives continue to offer some advice:

I think that paying attention to your customer, listening – I’ll give you a very simple example. I have a lot of background in the Baldrige quality area. I worked in the Baldrige as a state examiner when I lived in the South Central Region, and as an examiner here in Southwestern Region, and then at the national level for the National Malcom Baldrige Quality Award process for a couple of years as well.
You know, that listening to your customer, understanding what they’re telling you, and then acting on it for continuous improvement is key.

Work with all constituencies across campus identifying the best way to provide efficient IT solutions…mapping users need to IT capabilities…have to be able to manage contracts and keep up with federal and state legislation so that the institution is in compliance at all times.

Serve as highly visible technology educator, respond to educational initiatives…provide excellent services to students and faculty and be fluent in higher education language.

CIO’s have had to take on a much more extensive role in managing the technology, and managing the data, steward of a university resources, information systems applications running, operability of the assurance that information systems work the way it’s supposed to work, and the reliability will be in the 99.99% area, transformative IT projects to add value to a institution

In this case the CIOs need to continuously listen and understand what the stakeholders are saying is important. The direction of IT investments could be driven by facts as the CIO continues to improve the institution functional units and establish long-term goals for information systems. Thus making sure that the information system infrastructure and services are in sync to meet institutional needs. CIOs should position themselves well in an institution and be effective communicators, accountable for their performance, establish strong teams, translate IT issues and needs into institution business value, build trust across campus, as well as have sound business practices (Quish, 2007). The expectation is that they have high-level knowledge and skills in IT and university wide functional areas. Those aspiring to be CIOs need to have multi-dimensional skills in order to survive in higher education.
Table 23. Expectations of the CIOs from Interviews

<table>
<thead>
<tr>
<th>Interview</th>
<th>Position</th>
<th>Expectations of CIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>President</td>
<td>IT resources management, making sure IT environment is secure, IT centralization, making sure information system is always up and running, bring new technologies to improve university business processes, instructional delivery is very important for eLearning, integrated information systems</td>
</tr>
<tr>
<td>2</td>
<td>Provost</td>
<td>Provide strategy and technical directions, secure student information systems, technology to enhance teaching and research, secure network environment</td>
</tr>
<tr>
<td>3</td>
<td>Provost</td>
<td>Understand IT users and what students, and faculty and staff, want and need, innovative use of technology in the classroom, improve institution competitive advantage in their business processes, secure network environment</td>
</tr>
<tr>
<td>4</td>
<td>CFO</td>
<td>CIO’s have had to take on a much more extensive role in managing the technology, and managing the data and ensure the university that the technology is working like it is suppose to.</td>
</tr>
<tr>
<td>5</td>
<td>CIO</td>
<td>Change agent, technology to add value to the institution mission and business, secure computing environment, secure network environment</td>
</tr>
<tr>
<td>6</td>
<td>CIO</td>
<td>IT strategic planning, IT governance, IT as an agent for change, agility and innovation, secure network environment</td>
</tr>
<tr>
<td>7</td>
<td>CIO</td>
<td>IT governance, efficient IT organization, systems always up and running, secure network environment, IT investment decisions</td>
</tr>
<tr>
<td>8</td>
<td>CIO</td>
<td>IT governance, managing IT, making a case for money, making a case for consolidation, influence conversation, secure network environment, make decisions</td>
</tr>
</tbody>
</table>

Executive leadership in higher education sighted opportunities in leveraging technology to drive the core mission of the university. This can be achieved through incremental improvements on the institution business operations. Mead and Shoemaker
(2007) cited two competencies essential to CIO alignment: “strategy and governance” (p. 31). With Mead and Shoemaker (2007) and Table 23 the buzzwords are strategy and governance. The expectations demand that the CIO is exposed to education and experience that “promotes specific strategic, analytical governance, and human-factor management” (Mead & Shoemaker, 2007, p. 31). The position portfolio demands a highly integrated experience involving business and technical preparation (Mead & Shoemaker, 2007). From AAUCIO:

Getting the finance right, and getting the authority right in IT governance is key.

Uh, making the case for money…uh making the case for money. I think making the case for authority and consolidation; there are favorable economics in consolidating IT that politics in universities often favor things being done at the edge. Making a case for money and making a case for authority are two of the greatest challenges right now.

Listen for understanding and needs, build relationships with all constituencies on campus; serve all customers (students, faculty and staff) with commitment and passion; and lead, don’t be afraid to take some risk.

From Quish (2007) observation “the best kind of CIO is a survivor” (p. 3). For CIOs to meet the expectations they have to build formidable IT teams to meet the demands and expectations of the university community. The researcher observed from Table 23, online survey, and documents analyzed that CIOs need to be in the forefront initiating programs, driving agility, cultivating campus wide business relationships, strategic thinking, building great teams, managing IT risk, managing IT resources, and continuous learning. From those who hires CIOs the researcher learned some of the attributes they value which: people skills, knowing when to let go, going through the ranks as faculty, making a case for money, and making a case for authority. All the
attributes cited by the higher education executives requires CIOs to build trust with all stakeholders, and maintain a positive and fluid relationship with them. Kellen (2007) stressed that CIOs should possess deeper technical understanding “whether it is through the CIO herself or through her team. Those IT executives without some core of deeper technical understanding frequently feel handicapped in assessing situations and shaping the course of action” (p. 7). Vince Kellen, Vice-President of Information Systems and Faculty member at DePaul University identified nine concepts from the literature that CIOs should master: “governance, communication, collaboration, understanding, influence, relationship building, self awareness, social skill, and service” (Kellen, 2007, p. 9). These concepts are consistent with the researchers’ findings on the skills and expectations of the CIO position. From the researchers perspective with all the expectations and requirements of the position it will take more than training and reading.

Those aspiring to be CIOs regardless of their academic background, race, and gender they will need mentorship and practice to prepare for the complex position.

The three data collection methods provided the researcher with different layers. In documents the researcher learnt about the specific position requirements, educational background, and professional experience needed from those who would like to occupy the position. The researcher then performed analysis on the following documents to learn about the CIOs within the AAU institutions: biographies, newspapers, university websites, and magazines. In those documents the researcher was able to gather information about the CIOs educational background, their experience in higher education, the number of years spent in higher education prior to becoming CIOs, average number
of years in the position, race and ethnic distribution, gender distribution, as well as their paths to the position. Then the researcher performed analysis on the results from the online survey whereby the researcher learned about the various factors that are important in the position. From the online survey results the researcher learned about the five key factors in the position: building relationships, strategic planning, customer service and support, negotiation skills, and business processes and operations. Finally the researcher conducted interviews to learn about the skills and experiences, views about the position, and expectations from those aspiring to be CIOs. The researcher then engaged the position requirements constructs with the findings from the documents, interviews, and survey.

The position requirement constructs specify that CIOs should posses a graduate degree with years of experience in a management role and in higher education. During the documents analysis the CIOs educational background was represented as follows: Doctorate (29.3%), MS/MA (44.9%), BA/BS (25.9%). The average years of experience prior to the position were as follows: Doctorate (19 years), MS/MA (16 years), BA/BS (16 years). The executives who participated in the interviews were in agreement that a CIO should have a graduate degree with a minimum of ten years of experience in management. In fact some CIOs and other executives felt that the person to assume the position should have a terminal degree and have higher education experience. Their believe was that the person need to come through the professorship ranks so that they are fully aware of the due process in higher education and understand governance.
The CIO is expected to possess exceptional organizational strategic, business, technical, people, and interpersonal skills to be able to lead in higher education. From the online survey the researcher learned that the CIO must have strong technical skills, well rounded person, business skills, good communication skills, knowing when to let go, higher education experience, governance, flexible, adaptive and understand the organization. The interviewees emphasized good communication, establishment of priorities, development of processes to determine priorities, as well as understanding when to let go is critical as some of the important skills one must have. The interviewees also cited being able to coordinate as well as technical know-how, management, setting priorities, and understanding higher education. The data from the three different sources supports each other. The challenge for those aspiring to be CIOs would be to meet the expectations of the campus community’s needs. Kellen (2007) advise that those who want to be CIOs need to be able to “build a strong team within IT that can meet and exceed internal and external expectations” (p. 10). That means there must be a structure in place and a team that is able to provide the much needed service. Shamir et al. (1993) suggestion of charismatic and motivational leadership is not enough for this position. The CIOs are to be adaptive with resilient IT plans so that campus community supports their efforts. As long as the campus community is satisfied then the IT department is meeting their expectations.

In the position constructs CIOs are responsible for developing, implementing, and supporting policies, practices, and technology investment strategies in support of the University’s academic mission. From the online survey customer service and support
ranked number two to show the importance of implementing systems and services that benefits the institution. During the interviews the executives and the CIOs emphasized the importance of communicating in all directions. Communicating in both directions gives the CIO access to information that would benefit their office as the make decisions on IT investments. Those decisions would be driven by the needs of the faculty, students, staff, and administration. The CIOs are also expected to deliver secured high quality and cost-effective IT services. The only way to learn about the type of services being delivered by IT is to be engaged on the ground. Staying connected with constituencies would be an added advantage to the CIOs as they formulate policies.

The CIO is expected to be an institution-wide information systems leader, technology advocate, and the steward of the institution information technology resources supporting teaching, research, student-life, and administrative initiatives. From the researchers observation universities are searching for transformational leaders and change agents. These are individuals to improve University’s use of technology resources supporting teaching, learning, research, service and administrative units. One CIO emphasize that aspirants need to understand the organization and the work that all of the different people do within the institution. Again the only way to understand the organization is through building relationships across campus. As CIOs build rapport they will get to know what technology is being used and how people use it. It is also important that the CIO have a good understanding of the functional side of the institution so that IT departments continue to deploy robust business processes. Those skills cannot be learned in class thus CIOs need to practical in their day-to-day work.
Another position requirement construct is that CIOs need to be catalyst for a unified campus-wide IT community. The unified systems does not come cheap as they require human resources to implement and millions of dollars to purchase. For the university to have integrated systems CIOs have to make the case for money, thus building relationships with all constituencies is key, serving those constituencies with commitment and passion would make life easier for CIOs as they make case for IT funding. People have to trust them first before listening to them about spending millions of dollars on a system. This is when CIO could explain the value to be added by the technology, as they are aware of the needs of the university community. CIOs also have to make sure that any IT investment being made is in line with the university mission and its strategic goals. From the researchers perspective the position requirement constructs do not address some of the issues that came up during the documents analysis: gender, race, and those people with disabilities.

This chapter provided the researcher with valuable insight on the skills, experience, role, and expectations of the CIO position. The researcher learned that the following skills were critical in the position: coordination, communication, technical know-how, management, setting priorities, and understanding higher education. It emerged that the culture of higher education was evolving as sometimes the executives referred to the institution of higher learning as an education enterprise. There were other skills that emerged throughout the chapter such as strategic skills, consultation skills, negotiation skills, as well as governance. The literature and the interview participants spoke to about the importance of the relationship between the CIO and the executive
boardroom. People skill was another emerging significant finding together with the ability to translate business requirements into technology blueprint. The researcher also learned about the importance of the following attributes: outreach capabilities, IT policy and regulatory, compliance, and legal issues. The researcher went on to engage the findings with the position requirement constructs provide in Table 1.
CHAPTER V FINDINGS, CONCLUSIONS & RECOMMENDATIONS

This is a study of the evolving role of the chief information officers in higher education learning from the CIOs themselves as well as Executives in Higher Education. The goal of the study was to uncover the skills and experience, expectations from higher education executives, as well as the higher education executive’s view of the position. The researcher adopted the Burke-Litwin organizational model (Burke, 2002) as a metaphor to understand the distributed institution of higher learning environment. The Burke-Litwin model provides a framework to reflect on various organizational and environmental dimensions to diagnose an organization and manage organizational change (Burke & Litwin, 1992; Burke, 2002). In this chapter the researcher provide the discussion of the findings, conclusions, and recommendations for future research.

6.1 Discussion of the Findings

This was a qualitative study that used three qualitative data collection techniques: documents analysis, online interviews, as well as telephone interviews. The participants came from institutions affiliated with the Association of American Universities. The participants comprised of CIOs, Presidents, Provosts, CFOs, and Search Committee Chairs. The documents provided multiple perspectives, realities and meanings as the researcher built explanations from the themes in the data. The strengths of documents were that they provided multiple truths on how the participants understand themselves in their world, how the position is understood, and the position requirements. Documents provided the researcher with information that could not be observed Patton (2002). The
information might have taken place before a formal study was conducted and “interchanges to which the evaluator would not be otherwise be privy” (Patton, 2002, p. 293).

The strength of an online interview was that it enabled the researcher to learn about emerging themes on the position: knowing when to let go, people skills, making a case for money, making a case for authority, IT governance, and being a change agent. The online interview survey was also used to measure the various views and opinions from the CIOs and other administrators. The in-depth interviews allowed participants in the study to give their thoughts on the phenomena. That’s how the CIOs provided details of their work experience and the meanings associated with their experience as CIOs in higher education. The researcher also learned from other higher education executives about the role of the CIOs and expectations on those occupying the position in higher education. There were three specific questions used in the study to increase the understanding of who could be hired in the CIO position in higher education.

1. What are the skills and experiences of CIOs employed in higher education?

   The CIOs need to have people skills, good communication skills, and interpersonal skills. They are developing professional networks and should build good relationships with the campus community. The possession of an advanced degree is key as well as the four attributes “technical knowledge, business knowledge, communication skills, and political skills” (Brown, 2009, p. 8). Team development is another most important skill so that the IT department is well positioned within the institution. CIOs are to be good institutional strategist as the
university is looking up to them to bring new integrative and dynamic information systems. From Table 20 CIOs are to be technically savvy, business savvy, well rounded individuals, good listeners, understand higher education, as well as good organization builders. Basically, CIOs need to be able to transform IT value into institution information to be communicated in the boardroom and the campus at-large. Failure to communicate with the campus community, building rapport, as well as managing risks and every contingencies of IT operation could lead to poor performance. These individuals are to continuously learn and maintain a reasonable level of technical knowledge so that they help the institution to reach its goal.

2. How do leaders in higher education view the role of CIOs?

The CIO position is viewed in the executive boardroom as the strategic business position in the IT functional unit. The position brings a different layer of management in the boardroom, as they are to bring the right technology on campus to enhance functional units, research, and teaching. The CIOs are to manage their budgets and communicate value of every IT investment being made. The expectation is that CIOs have multidimensional measures of their IT units so that the campus community has a yardstick to perform their own evaluation. The campus community findings should be inline with the values being communicated by the CIO to avoid any misunderstanding. It is their responsibility to keep up with what is going on in their departments and be able to justify every IT investment all the time. Leaders in higher education are looking for: measurable
value for IT in the university, well managed IT, technology that delivers effective and efficient services, be accountable for information systems performance, and ensure sound IT policies.

3. What are the expectations of the leaders in higher education of these individuals?

CIOs are to provide both business and technical directions in an institution of higher learning. The expectations is that they deliver information to users, set priorities for IT project initiatives, evaluating, and improving the functional units through robust and secured information systems. They are to improve instructional delivery, information delivery, and translate IT issues into institutional needs. Leaders expect CIOs to bridge the gap between IT and the institution business operation. The CIOs are to manage IT resources, make sure information system is always up and running, manage data, IT governance, influence IT value conversation, and sometimes make tough decisions. There is also a demand that CIOs get the finances right, build strong IT teams as well as getting the authority right in IT governance.

The study examined the evolution of the information technology executive position in higher education with the objective of detailing the skills, experience, and expectations from higher education executives of these individuals. The evolution of the position emanated from the growing responsibilities of the position as learned from the
requirements, view of the role, and the expectations of the position from other higher education executives. Since there is no clear path to obtain the position, in this study, the researcher sought to answer the question of how individuals become CIOs in higher education. In order to address the research questions an inductive analysis was used to analyze the data coded from the documents, interviews and online surveys. The key themes found from the study were as follows: communication, building relationships, IT strategic management, IT governance, people skills, knowing when to let go, being flexible or adaptive, and budgeting. The themes were found from the three sources of the researcher’s data collection methods employed. From the findings there was congruence on the skills, experience, roles, views, and expectations of the position. The congruence signifies an important factor in the executive-level of academic institutions understanding of the position. The engagement of executive-level search firms and consulting groups in the hiring process does not make those decision makers passive in their final choice.

Based on the position requirements, the skills and experience requirements, expectations, and the role the position play the researcher recommends the following strategies to those who are aspiring to be CIOs:

1. Finding mentors who are in the position already and learn from them about the position intricacies

2. Higher education experience is very important in the position

3. Attend CIOs training institutes, join CIO forums and organizations

4. A business-oriented graduate degree to develop strategic thinking skills, team building skills, interpersonal skills, and management skills
5. An analyst position with deeper insight into technology would be an added advantage

6. Need to be politically savvy

The recommendations were based on the interpretations by the data as the CIO position has grew due to the modern university that needs information systems that could handle overwhelming data, integrated functional units, and support the mission of the university. The findings of the research support the fact that Chief Information Officer should possess skills necessary to motivate and build people’s confidence in technology (Brown, 2006; Zastrocky & Schlier, 2000). During the interview the researcher learned about the importance of people skills and valuing all voices from different university constituencies. There is a great need for people who could balance their roles and make sure that they meet the campus community expectations. President emeritus of Cornell University said there is a great need for responsible, effective, and individuals who can balance governance, leadership, and management (Rhodes, 2001). The CIOs who have been on the position for years emphasized the importance of building relationships and learning about the needs of the university community. From the research there was reinforcement on strategic planning, spending time in different campus constituencies, managing resources, and always communicating the value of technology.

Governance was also emphasized in the findings, as there is no room for domination and social control in academia. From Marcuse’s (1964) perspective domination disqualify a freer and happier mode of human existence. The culture in higher education could be looked as a large complex system as portrayed in Burke-Litwin
model. From the three data collection technique there was an agreement on having experience in higher education. From the documents analysis, online survey, and interviews it became evident that minimum of ten years working in higher education was important. Some of the participants in the interviews went on to say CIOs need to come through the professorate ranks in order to understand the culture of higher education.

AAU CIO during an interview said,

Well I think there’s a definite advantage to being a faculty member and growing up through the ranks of promotion and tenure. Having taught in the classroom and worked on research and publications, that’s the way to really understand our business as you know in university being a professor is an important part of the debate sometimes.

Having gone through the ranks of professorate and researching could be an added advantage to those aspiring to be CIOs, as they will be exposed in the various cultures that exist in higher education. Bergquist and Kenneth (2008) identify six cultures that exist in higher education: managerial, developmental, advocacy, virtual, collegial and tangible culture. Having spent years in higher education those individuals aspiring for the position would have been exposed to those various cultures, thus would hit the road running. Technological rationality would not be accepted in higher education. Marcuse (1964) viewed technological imperatives as a way to colonize everyday life and failing to recognize the importance of freedom and individuality (Marcuse, 1964). There is a due process in higher education, which could be very structural, and there are no rules imposed, as higher education is an open social system whereby people debate and critic each other.
To successfully navigate the higher education environment individuals need to be strategic, adaptive, and open to criticism. With the growing of new robust technology those in position of authority could not impose to the university community as that could be viewed as an effort to sabotage the process in decision-making. For example the emerging and growing Web 2.0 technologies have a lot of capabilities and could add value to the campus community. The campus community might not understand the value to be added by the Web 2.0 technologies; in that case the CIO should be all over the place as an IT evangelist educating the campus stakeholders on the new tools.

CIOs still perform the roles cited by Brown (2004): business partner, classic IT support provider, contract oversight, integrator, informaticist and IT strategist, and IT educator. As the researcher mentioned earlier the CIO position has grown and in addition to six roles identified by Brown (2004), the CIOs have more roles. The new roles are IT managers, risk managers, resources managers, IT evangelists, chief transformational officers, motivational speakers, budget managers, and systems and financial analysts. With all the new roles the CIO position is experiencing evolution, thus from the researchers perspective the individuals aspiring to this position need to posses both transactional and transformational leadership skills. The CIOs are expected to manage, organize, influence, connect, have high ethical and moral standards, motivate, inspire, empower, and create value (Bass & Avolio, 1992; Bass, 1998; Avolio & Gibbons, 1998; Dvir et al., 2002). In the aspirants quest to ascend to the position they need to be well versed on modern organizational theories that could be their leadership framework as they promote inclusive decision-making process, collective participation, trust and
mutual confidence between followers and leaders, as well as maintaining open
communication on different levels of an organization instead of focusing on higher
authority (Shepherd, 1956; Rogers, 1995; Valente and Rogers 1995; Valente 1995). Valente and Rogers (1995) observation was social contacts, social interaction, and interpersonal communication are very important influences on social change.

6.2 Conclusions

With the advancement of technology and the core mission of the university increasingly dependent on information technology, with no specific IT management model for higher education, the CIO position has grown beyond the limits of being a chief technology officer. Table 1 provided clear expectations of what universities are looking for in a CIO. Chief Technology Officers (CTOs) are known for their technical expertise, while CIOs from the researcher’s observation have to be politically savvy, business savvy, as well as technologically savvy. As an innovative and transformational position being politically savvy, business savvy, as well as technologically savvy there will be no boundaries in an evolving environment. In 2004 Brown described the role through six roles in higher education: business partner, classic IT support provider, contract oversight, integrator, Informaticist and IT strategist, and IT educator (Brown, 2004). In this research CIOs continue to play the roles in addition to project management, stewards for university resources, policy developer, compliance officer, transformational officer, and advocate for technology. In the study the researcher drew the following conclusions:

1. Coming through the ranks in higher education is critical
2. An earned graduate degrees accompanied by 10 plus years in management is essential

3. Experience in IT management in higher education and corporation is important

4. Blend of both technical and business skills is important

5. The MBA degree dominated the CIOs’ field of study

6. There is gender imbalance in the position

7. Minority groups are under-represented in the position

The researcher elaborate on the conclusions to provide more details on their repercussion. From the researcher’s observation those aspiring to be CIOs need to acquainted with the four frames that examine leadership in colleges and universities (Bolman & Deal, 2008). The frames provide a useful paradigm to examine the uniqueness and complexity of the higher education environment. From Woodsworth (1987) study to the current study the position has grew and shifted from hardware and software configuration and management to a more strategic management focus. The focus is on internal and external environment as there are forces shaping IT from both spheres. The need for charismatic leaders has increase to respond in both environment (Burns, 1978; Bass, 1985). As the CIOs govern they should make decisions that are not of self-interest, all decisions should to be made should be based on the due process with great regard to the institutional core values (Birnbaum, 2004).

The CIOs and Higher Education Executives agreed that CIOs need to build relationships across campus as their role encompasses the needs of the campus community with increasing responsibilities. From the researchers perspective they are
supposed to be leaders in execution, with broad understanding of IT management, IT policy and regulation, compliance, security issues, and be conversant in finance and law. Plutocracy has no room as it challenges the very foundation of the institution of higher learning in advancing academic freedom (West, 2002). It is important that the CIO is data driven and users’ need driven, thus building relationships and listening to all voices is important. The researcher’s claim is supported by the following tables: Table 15, Table 20, Table 21, Table 22, and Table 23 in Chapter IV. The researcher concludes that CIOs need to aggressively and effectively build relationships throughout the campus community. These relationships should offer value and empowerment to all the information systems users. CIOs are to understanding when to let go, be patient, kind, value diversity, develop leaders throughout the organization, value their colleagues, and have character.

The data collected is congruent with historical facts about women being underrepresented in the Chief Information Officer position. In the AAU institutions there were only 15 out of 58 CIOs, which is equivalent to 26%, while CHECS report accounted 24% of female CIOs in higher education (Brown, 2009). Brown and McClure (2010) reported that 23% of the CIOs in higher education were female. According to Brown & McClure (2010) “our studies show that the percentage of female higher education CIOs has declined” (p. 1). Even though the CIO position gender imbalance in higher education has not been so significant compare to the corporate world, there is a cause of concern “nearly 50 percent of the current CIOs in higher education plan to retire within the next decade…Planned retirements of female CIOs significantly outnumber those of male
colleagues in the six- to 15-year time frame” (Brown & McClure, 2010, p. 2). A strong supply of well-trained and mentored female technology leaders is needed to replace those who are planning to retire in the next decade. Since the literature claims that a lot of aspiring CIOs lack proper training and mentoring to perform well in the position. The researcher believes that those currently in the position need to be guided by social cognitive career theory (SCCT) and social learning theory (SLT). The reason being a complex and dynamic position with no clear career path means those aspiring to be CIOs need to go through a career development process fitting the CIO roles in Table 4.

According to Brown & McClure (2010) in the younger classes of technology leaders there were proportionally more males specifically white males. From the researcher’s perspective this situation needs an urgent attention to avoid an exodus of female and minority CIOs in higher education and the corporate world. An equal platform should be provided to women to demonstrate their intellectual prowess. This can be done through mentorship and training from current and past CIOs genuinely willing to contribute to women empowerment in the IT executive suite.

The researcher observed that balanced governance, leadership, and management are the important attributes of the CIO in higher education. There is no need for bureaucratization of higher education and the avoidance of genuine forces of progressive social change (Marcuse, 1964). Institutions of higher education value governance, thus proper balance on all three attributes is key to avoid the following: poor communication, poor project funding priorities, poor IT strategic planning, as well as poor decision making. The universities expect CIOs to provide IT strategic planning, technical
directions, IT resources management, change management, support instructional delivery, research, and data integrity, security, and reliability.

The researcher found that CIOs must be able to influence the campus community, but in a very complex environment of higher learning there is consequences of how power is utilized (Bennis, 1959). Adopting a blended leadership style that support collective decision-making is key based on sound relationships across the university. The literature provides details on standards for participatory decision-making process (AAUP Statement, 1966; AAUP Statement, 1990). Leaders could learn from the diffusion of innovation theory on how ideas, information, and practices spread within and between diverse communities as governance demands that all voices be heard (Rogers, 1988; Valente & Davis, 1999). There is no room for dominance as such behavior could suppress the open and democratic process in decision-making (West, 2002). Basically, leaders are not to lose touch with the core values of the institution they must transform their organizations beyond the traditionally centralized, standardized, and bureaucratic (Moxley, 2000).

For CIOs to successful govern in higher education they need to understand organizations as living organism that grows and adapts to societal changes (Mackie, 2009). The changes could be coming from within the organization or outside so CIOs need to interact with both environments in their day-to-day operation. There is no absolute voice in higher education so autocratic approach or benevolent autocracy has not room as they do not support a social system. The participatory approach values all constituencies and is policy-driven, thus suiting the higher education environment. The
CIOs must be both transformational and transactional as they govern in higher education. Both leadership styles bring some good characteristics as transformational leaders never leave an environment the way they found it, while transactional leaders believe in gradual and evolitional change (Senge et al., 1994).

CIOs are expected to derive more value from existing technology and information assets by improving productivity while reducing costs. Thus it important that CIOs have an understanding of finance and communicate through different lenses as they explain value on an investment to support sustainable growth. This reduces uncertainty regarding an investment on an information system that supports the university objectives and mission.

From the study it is evident that the CIO position has no specific formal field of study as they came from various academic fields including business administration, psychology, information systems, engineering, computer science, history, literature, economics, education, and social sciences. This is also clear from Table 3 that the CIO position demand an interdisciplinary vocabulary thus the professional experience is important than the academic background. Schaffhauser (2011) provides a comprehensive list of what CFOs need from CIOs: institutional perspective in IT investment, complete analysis of new initiatives, proactive approach in communication, innovative approach for competitive advantage, as well as availability of IT human resources for implementation purpose. This is to make sure that all IT investment decisions support the institutions’ strategic priorities and is supported by the governance structures for consensus purposes.
Higher education experience was highly valued in this role as they work with faculty, students, alumni, staff, States board of regents, provosts, university board of trustees, donors, and presidents. Those aspiring to be CIOs needs to have an understanding of how higher education work especially the decision-making process. According to Schein (2004) the cultural phenomenon is important; “if we understand the dynamics of culture we will be less likely to be puzzled, irritated, and anxious when we encounter the unfamiliar and seemingly irrational behavior of people in organizations” (p. 10). As CIOs engage in an IT evangelical mission to promote technological initiatives that effectively transform both academic and administrative units they need to have a deeper understanding of higher education culture. The Burke-Litwin model (2002) depicts institutions of higher learning with a high degree of dependence but there is a high degree of local autonomy. CIOs need to use that model to view campuses as they develop information technology resources because it is important that technology resources are distributed throughout the various units within an institution. CIOs need to make sure that there is high degree of centralized coordination to attain maximum reliability and efficiency. Most AAU institutions have a significant research mission so growth and development of technology resources might depend on the support provided by the CIO office.

Even though the CIOs came from different camps with various experience the majority CIOs in AAU (94.8%) following the traditional path to the position compared to the nontraditional path followers (5.2%). From Chapter IV it is evident that most CIOs in AAU institutions followed the scholarly path in the traditional category. A scholar is
someone who has served as faculty then rose through the administrative ranks with increasing responsibility in their institution (Birnbaum & Umbach, 2001). The researcher concluded that the 5.2% were all strangers as they have no prior higher education experience (Birnbaum & Umbach, 2001). From the researchers perspective there is similarities to the career paths to be a CIO in higher education and president in college as studied by Birnbaum and Umbach (2001). Table 24 depicts the four career paths of CIOs in higher education.

Table 24.

<table>
<thead>
<tr>
<th>Higher Education</th>
<th>Higher Education</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholar</td>
<td>Spanner</td>
<td></td>
</tr>
<tr>
<td>Steward</td>
<td>Stranger</td>
<td></td>
</tr>
<tr>
<td>Higher Education</td>
<td>Higher Education</td>
<td>Industry</td>
</tr>
</tbody>
</table>
Scholar is defined as someone who has served as faculty then rose through the administrative ranks with increasing responsibility in their institution (Birnbaum & Umbach, 2001). An example of a biographical sketch of a scholar someone who came through the ranks until they occupied the CIO position:

**Qualifications:** Ph.D. in Information Systems, MBA, and Bachelor of Science in Business Management

**Position:** Chief Information Officer

**Experience:** Nationally recognized and respected higher education technology leader and a professor of Information Systems. Taught executive programs for corporate and MBA audiences across the globe. Has published extensively in research journals for IT in higher education and recipient of numerous awards and grants.

Stewards never taught but have years of experience working in a higher education environment or their two prior positions were in higher education (Birnbaum & Umbach, 2001).

**Qualifications:** Doctorate in Educational Research Methodology, Master of Science in Counseling and Educational Psychology, and a Bachelor of Arts degree in psychology.

**Position:** Chief Information Officer

**Experience:** Associate dean for information technology and chief information officer for the Faculty of Arts and Sciences. Prior to that, served as director of Academic Computing and director of Social Science Computing. Led efforts to integrate IT services and planning with research, instructional, student life and IT facilities and resources.
Spanners maintain a significant commitment to higher education and other organizations (Birnbaum & Umbach, 2001).

**Qualifications:** Bachelor of Arts

**Position:** Chief Information Officer

**Experience:** A senior manager with 30 years of strategic planning, information technology, and administrative leadership experience. Served as an Assistant Secretary for Information Technology and CIO for the Commonwealth of an East Coast state. Prior to that, served as Assistant Provost and Executive Director for Information Systems.

Oversaw the construction of a University’s telephone and data communications network, then was appointed as an assistant provost and executive director for information systems.

Strangers come from nonacademic related positions and have no prior experience in higher education (Birnbaum & Umbach, 2001).

**Qualifications:** Master of Business Administration degree and a Bachelor of Science degree in mathematics with minors in business administration and chemistry.

**Position:** Chief Information Officer

**Experience:** Has more than 20 years of information technology experience in the private sector, and is the former Group Vice President and Chief Technology Officer for a Mid-West company. The Vice President and Chief Technology Officer was responsible for enterprise architecture, enterprise application development, and infrastructure management. Also led an enterprise risk management team. Has financial services
experience, which includes information technology leadership roles in consulting, application development and support for another Mid-West company.

Those aspiring to be CIOs have to determine how technology can provide the most value to an institution as “higher education’s investment in IT has achieved both unprecedented scale and breadth” (Goldstein, Katz & Olson, 2003, p. 14). As the position evolve it is evident that the position will continue to change as the university community demand more advanced and sophisticated computational applications. The IT value forum identified four fundamental challenges in IT investment conversations: “defining value, confronting what is required to realize value, structuring the IT value discussion, as well as measuring and communicating value” (Goldstein, Katz & Olson, 2003, p. 14). Levine (2000) provides a comprehensive list of challenges to be faced by leaders in higher education. According to Levine (2000) higher education was going to experience transforming forces emanating from “shifting demographics, new technologies, the entrance of commercial organizations into higher education, the changing relationships between colleges and the federal and state governments, and the move from an industrial to an information society” (p. 1). The need for transformational CIOs is inevitable as the IT investments decision requires broader participation and shared accountability.

Working very close with those leaders in functional areas is key as they know exactly how new IT investment could enhance their functional areas. It is important that CIOs maintain the equilibrium between IT investments and the core mission of the university. The mean differences were significant in the following category: Integrated Information System, Adaptive, and Centralize IT. These could be attributed to the fact that some of
the executives thought the integration of systems is already taking place in most universities so it is no longer a priority as those projects are ready to be rolled out. With the changes in state funding and growing of technology on campus CIOs are already adapting to the environment. Centralizing IT has been a big debate in most universities so the significance could be attribute to that institutions have already done it or in the process of doing it.

6.3 The Implications of Gender and Ethnic Imbalances

Gender and ethnic imbalance in executive positions dominated by white males create a less conducive environment for women and ethnic minorities. This has practical implications in terms of career progression, attrition rates, institutional culture, creativity, and brand identity. The IT executives have a certain level of institutional authority and exert considerable amount of power over hiring, promotion, and compensation. The domination of white males in the CIO position could affect the selection process thus the position could be viewed as unwelcoming. In order to bridge the gap and diversify the IT executive positions in higher education there is a need for occupational gender and ethnic minorities integration. The rise of women and ethnic minorities in the CIO position could produce new forms leadership and management styles. The groups could have access to various trainings and educational opportunities leading the minority groups’ career advancement opportunities and subsequently have access to macro policy decisions on information technology in higher education.
Participation of women and ethnic minority groups in information technology executive positions is a crucial determinant in understanding ethnic differences instead of being invisible. This could change the dynamics of relevant activities taking place outside workplace typically in male-dominated setting environments. Women and ethnic minorities could expand their networks outside their departmental teams and formal settings. The expansion of their networks is vital to institutional growth, diversity ratio, social sensitivity, and cultural capital. These groups given the opportunities in the CIO position could lead to mentorship, visibility, and opportunities to grow. Advancement upward through hierarchies is normally realized in informal settings specifically in a male dominated sociocultural domain. Not participating in those informal settings could impede career progress.

6.4 Higher Education CIO Curriculum

There is a great need to design a program targeting IT executives in higher education because the current programs offered by Carnegie Mellon University, and Evanta the Leadership Network are focusing more towards technology executives who have been selected to assume significant management responsibilities in public sector, private industry, and non-profit organizations\(^2\). Having interviewed university presidents, provosts, CFOs, and CIOs as well as researched the culture of institutions of higher learning it would be ideal to offer a curriculum designed specifically for


technology executives and managers in higher education. The higher education
technology executives and managers curriculum should take an interdisciplinary
approach to leading and managing in higher education from human development,
technology implementation, education and technology, organizational and governance,
institutional research and planning, data driven decision making, policy and management,
politics and issues in higher education, as well as cultural influence in higher education.
This curriculum would provide participants with an opportunity to gain in-depth
theoretical knowledge and understanding of the higher education environment.

6.5 The Internal and External Faces of the CIO Position

Leading and managing in higher education environment can be very complex as
higher education exists as a community of scholars with different expectations and goals
to accomplish from an institution level to departmental, center, college and individual
level. Internally the CIO is suppose to lead, manage and be a part of the executive
members orchestra providing technology and services to transform communication,
collaboration, teaching, learning, and improve day-to-day operation of functional units.
As leaders they are expected to influence, empower, transform, ensure sense of
continuity, have great regard of the institution core values, and act as change agents.
According to Bennis (1959) there must be a dynamic relationship with all the
communities within the institution. A new CIO who came through the professorate ranks
would be more credible in a higher education environment as they are looked at as
scholars dedicated to the development and dissemination of knowledge. As managers
they are expected to organize, direct, manage information resources, and advance the use of technology by the community of scholars to increase academic programs value.

The CIOs are to stay connected with various external stakeholders, as they want the institution to grow, offer agility, and create real value through technology advancement. External the CIO needs to be politically savvy, and be able to build relationships with ease. They are to participate in various higher education committees at state and federal level to formulate information technology policies. The expectation is that they play a major role in determining how technology can be used to implement institution strategy. The CIOs are intermediary between the institution and the main external influencer on technology policies, compliance policies, and procurement policies. They are in constant contact nationally on information-technology efforts: technology assessment, planning, and developing architecture standards. They are to give internal and external stakeholders confidence in the strategic direction as the institution adopt new technologies to improve research, teaching, and day-to-day operations. From the researcher’s point of view CIOs need to be internally focused, while their external role remain secondary. The future generation of CIOs will need to be politically savvy than being technically savvy thus need good knowledge of higher education, people skills, as well as excellent leadership and management skills.

6.6 Recommendations for Future Research

The study should be replicated at other institutions of higher education organizations covering a wide spectrum of colleges and universities as this study focused primarily on the Association of American Universities. Further, research should be done
through the different types of higher education institutions as classified by the Carnegie Foundation for the Advancement of Teaching (2010). These additional studies may confirm themes explored in this study are applicable other institutions of higher education. Further qualitative research can be directed to the processes employed by search firms and consulting groups in their development of the pool of prospective candidates.
REFERENCES


Barber, R. L. (2002). Chief information officer: Job and organization design in the community college. University of Oregon. (UMI No. AAT 3061931)


Schaffer, C. (2004). The formal educational and career experiences perceived to be important for the success of a CIO in higher education. The University of Toledo. (UMI No. AAT 3126108).


APPENDIX A: DATA COLLECTION QUESTIONS

Qualitative Questions

1. What are the critical skills or the kind professional experience do you think a Chief Information Officer needs to have in order to be successful in higher education? Why?

2. What types of education or academic credentials do you recommend Chief Information Officers should have in order to successful administer their duties in higher education? Why?

3. What would be the best advice(s) for future Chief Information Officers in Higher Education or expertise do you think Chief Information Officers need to have to become successful in higher-education? Why?

4. What are some of the forces that are shaping the role of Chief Information Officers in higher education?

5. What are the levels of decision-making that Chief Information Officer have for academic computing services, administrative systems, library automation, and telecommunications?

6. What is the career path to the position?

7. What does a strategic CIO look like?

8. What are the intricate institutional dynamics in the higher education environment that has resulted in the elevation of the CIO’s position?

9. What do Presidents, and other members of the executive team expect from someone in the CIO position?
Quantitative (Survey) Questions (Presidents, Provosts, CFOs, HRO, Search Committee Chairs)

1. What is your current position?
2. To whom do your Chief Information Officers report?
3. What range best represents the total annual compensation for Chief Information Officers in your institution?
4. Which skill is most important in their role?
5. Which is least important in you’re their role?
6. On what activity do you think Chief Information Officers should spend the most amount of time?
7. On what activity do you think Chief Information Officers should spend the least amount of time?
8. Which business process CIOs should improve with Information Technology systems?
9. What is the biggest barrier to the effectiveness of CIO today?

Quantitative (Survey) Questions for Chief Information Officers

1. Gender
2. To whom do you report?
3. What range best represents your total annual compensation?
4. Which skill is most important in your role?
5. What is the least important in your role?
6. On what activity do you spend the most amount of time?
7. On what activity do you spend the least amount of time?

8. Which business process are you currently improving with IT?

9. What is the biggest barrier to your effectiveness today?
APPENDIX B: RESEARCH QUESTIONS DESIGN

<table>
<thead>
<tr>
<th>The general question:</th>
<th>What are the unique attributes of a strategic and adaptive Chief Information Officer with regard to leadership in higher education?</th>
</tr>
</thead>
</table>
| Specific Question 1: | **Relationship Theory**  
|                      | What is the right combination of skills or experience CIOs need in order to be successful in higher education? What is the standard career path to the position? How does a strategic CIO look like? |
|                      | 1. Which skill is most or least important in the role?  
|                      | 2. What are the critical skills or the kind professional experience do you think a Chief Information Officer needs to have in order to be successful in higher education? Why?  
|                      | 3. What would be the best advice(s) for future Chief Information Officers in Higher Education or expertise do you think Chief Information Officers need to have to become successful in higher-education? Why? |
| Specific Question 2: | **Shared Governance Situational Theory**  
|                      | Why the CIO position has become so important in higher education administration? What are the intricate institutional dynamics in higher education environment that has resulted in the elevation of the CIO’s position? |
|                      | 1. What are some of the forces that are shaping the role of Chief Information Officers in higher education?  
|                      | 2. Which business process CIOs should improve with Information Technology systems?  
|                      | 3. What is the biggest barrier to the effectiveness of CIO today? |
| Specific Question 3: | **Participative Theory**  
|                      | What is their role in decision-making and in the life of the institutions beyond IT leadership in the 21st century in higher education? |
|                      | 1. What are the levels of decision-making that Chief Information Officer have for academic computing services, administrative systems, library automation, and telecommunications?  
|                      | 2. Which business process are you currently improving with IT? |
| Specific Question 4: | **Behavioral Theory**  
|                      | Should the CIO position be approached from an IT perspective or business perspective? What is the expectation of the position? |
| Relationship Theory | 1. On what activity do you think Chief Information Officers should spend the most amount of time?  
2. Which business process CIOs should improve with Information Technology systems?  
3. On what activity do you spend the most or the least amount of time?  
4. What is the biggest barrier to be effectiveness today in the position? |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------|
| **Other Questions:** | **Transformational Theory**  
The questions address the Career Theory: Social Cognitive Career Theory (SCCT) and Social Learning Theory, Social Dominance Theory, Women’s Career Development Theory and Career Construction Theory |
| 10. Gender |  
11. What range best represents your total annual compensation?  
12. What is the biggest barrier to be effectiveness today in the position? |
# APPENDIX C: DATA COLLECTION AAU MEMBER INSTITUTIONS

<table>
<thead>
<tr>
<th>Association of American Universities (USA)</th>
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<tbody>
<tr>
<td>Brandeis University</td>
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<td>Brown University</td>
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<td>Caltech</td>
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<td>Carnegie Mellon University</td>
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<td>Cornell University</td>
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<td>CWRU</td>
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<td>Duke University</td>
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<td>Emory University</td>
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<td>Indiana University</td>
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<td>Harvard University</td>
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<tr>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Iowa State University</td>
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<tr>
<td>Johns Hopkins University</td>
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<tr>
<td>Massachusetts Institute of Technology</td>
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<td>Michigan State University</td>
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<td>New York University</td>
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<td>Northwestern University</td>
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<td>The Ohio State University</td>
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<tr>
<td>The Pennsylvania State University</td>
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<tr>
<td>Princeton University</td>
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<tr>
<td>Purdue University</td>
</tr>
<tr>
<td>Rice University</td>
</tr>
</tbody>
</table>
Title of Research: The Strategic and Adaptive Chief Information Officer in Higher Education

Researchers: Reuben S. Dlamini

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected.

Explanation of Study

The purpose of my letter is to request your participation in our research study survey and interview for the role of Chief Information Officers (CIO) in Higher Education. In the research, we are trying to understand the processes, strategies, and skills needed to be a successful CIO in higher education. The position has been steadily increasing over the past decade and is continuing to gain momentum. It is more visible and has moved away from a directorate position to being an executive position.

The study is an effort to understand the underlying reasons why institutions of higher education have been recruiting CIOs, and including them in their executive management team. The position is no longer solely focused on technical issues, but has influence on the institutions business strategies which clearly shows that the position is “experiencing organizational ascension.” Due to its complexity, the position does not succumb to the notion of one-size-fits-all organizations. Some of the CIOs have been superheroes in the corporate world, but struggle to cope with the complexities of higher education.

Our goal is to eventually develop a formal description of an institution of higher learning CIO. The position places them at the helm of innovation to transform and improve the day-to-day operations of the institution. They are expected to make critical decisions from IT policy to systems integration to technology investments. In our research, we will study their evolving role from a strategic and business point of view as there is an identity crisis in the position.

Thank you for agreeing to participate in the survey. Your input will be valuable to us in our efforts to identify and recommend some of the qualities or characteristics needed to be a successful CIO in higher education.

The survey link:
http://ohed.qualtrics.com/SE?SID=SV_d5sl7ONTX8r7gZ6

The data will be stored in electronic files that will be downloaded from the qualtrics website in the form of reports. There will be no identification information required to participate in the survey with the exception of identifying your current position within an institution of higher learning.

Sincerely,

Reuben S. Dlamini
Instruction Design and Technology, Ph.D. Student

Risks and Discomforts

“No risks or discomforts are anticipated”.

Benefits

Your input will be valuable to us in our efforts to identify and recommend some of the qualities or characteristics needed to be a successful CIO in higher education. You will not receive any benefits directly.

Confidentiality and Records

The records will be kept confidential for twenty-four months then the data will be destroyed.
The interview transcripts will be kept in the tapes and will be located in my office shelves whereby I am the only one who have access. Throughout the process neither real name nor fictitious names will be used in identifying the participants in the interview process, instead the following format will be followed SportingConference-4YearInstitutionOrCommunityCollege-Position-InterviewNumber e.g. MAC-4YearInstitution-Provost-01.

The survey data will be stored in electronic files that will be downloaded from the qualtrics website in the form of reports. There will be no identification information required for participants to take the survey with the exception of identifying their current position within an institution of higher learning.

**Compensation**

N/A
Contact Information

If you have any questions regarding this study, please contact Reuben S. Dlamini at (740) 541-0278 or at dlamini@ohio.edu.

If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.
Skills

…to be involved in multiple activities and if a CIO were spending MOST of their time on one activity they would certainly fail as a CIO. Security is critical for the importance of protecting privacy, preventing attacks on systems, and public relations. Coordination and communication on campus is critical so students, faculty and staff have the information and resources to use information resources in their learning and jobs.

Must have solid database management knowledge and reporting needs of Higher education. Communication, Leadership, Visionary skills are very key to success. Planning and Budgeting experience also important.

People skills, being able to communicate and build relations around campus. Good negotiation skills and keep up with technology. Have good listening skills to align your goals with goals of institution.

Good technical grounding. Solid domain expertise. Ability to embrace and thrive within complex and ambiguous organizational realities.

People skills, Business skills and Marketing skills.

…building trust across campus is key and must be technologically and business savvy as well as being proactive.

Skilled communicator, politically savvy without being political, visionary outlook, ability to build and lead effective IT team, tech savvy, be able to manage expectations, ability to think strategically to support business goals and objectives, and ability to understand business especially financials.

Good technical grounding. Solid domain expertise. Ability to embrace and thrive within complex and ambiguous organizational realities.

Understanding of university business, at least one core competency in IT including project management, leadership skills, team building skills, patience, thick skin.

Path to CIO position

I have spent nearly 20 years (since 1988) teaching and working on the Net. Beginning in 1993 I started working with University Administration. In 1995 I became the Dean of Academic Technology at a West Coast Institution and then
the CTO at a West Coast Institution in 2000 and now the CIO at a Midwest University since 2001.

Worked as a faculty member in a community college and due to frustrations with the Computer labs moved on to pursue a doctorate. One member of my committee became a provost and brought me to her school and created the CIO position and became the first CIO. Then left for Oregon also became the first CIO. Now I have been here for 11 year.

I was a Senior Engineering Consultant, working for a software engineering company, contracted to the University when the position became available.

I was appointed Interim CIO after successfully implementing PeopleSoft SA under budget and on time. After national search 3 years later, I was selected for permanent role.

During my career in business I became heavily involved with the design and implementation of several business applications. I eventually accepted a position within the IT organization and worked for some years as a Sr. business systems analyst. Over time I moved into roles of greater responsibilities i.e. manager, director and currently CIO.

Started as a computer operator and progressed through almost all jobs within IT.

30 years of progressive IT experience in manufacturing, distribution, retail, health care and higher education industries.

Education Background

BBA Accounting, MIS; MS in Administrative Leadership. Campus Budget Manager, Assistant Dean, Peoplesoft Project Manager, Deputy CIO

B.S. and MBA with emphasis in Computer Science

Computer Science and a Ph.D. in Information Science.

Business / accounting and I spent the first 25 years of my career working for large corporations.

BS
**Education Recommendation**

IT Background is a requirement, with at least 8-10 years of experience in Higher education. Advanced degree in Business is helpful. Advanced degree in academics/Higher education can also provide a solid path to this position.

Education is less important than experience. I believe any background can work under the right circumstances, and especially, that a technical background is neither necessary nor sufficient.

MBA, Masters in Public Administration, Masters level with business focus. Undergraduate technical degree is helpful.

I recommend 10-15 years of domain expertise with a PhD (or terminal) degree for servicing and supporting higher education

Technical graduate degree very helpful

A combination of technology and business.

**Advice to those Aspiring to be CIOs**

Align your goals with business of the university. Pay attention to where the money goes Manage university resources well and bring new technologies to improve teaching and research.

It's about the institutional mission. Every plan you implement, every technology you deploy, every decision you make should align with your institution mission. Engaging in collaborative efforts with your peers at other institutions will afford you long-term success.

Meeting Chancellor's Goals, Security Awareness, Voice/IP Expansion

Stay in the dialogue occurring in the industry between developers, educators, cio's and technical company ceo's.

Deliver what you say you will deliver and deliver it when you say you will. I think it is about the Passion you have for what you do. When I wake up every morning, I thank God for the opportunity I have and the ability presented to me to make a difference. Then I go do IT!

Dedication to teaching, research and learning, good listening and people skills. Communicate well
Embrace ambiguity. Learn the culture of the organizations you work with. Keep true to your own values. Know what you are good at and what you are not good at.

Time management, never being satisfied with the status quo and being open to where the next great idea may emerge from.

Being involved with the institution in more things than just technology.

Remember technology is an enabler, you must understand the business you're in and the challenges it faces first. Then and only then should you introduce technology to meet these needs.

**Initiatives**

Operationalize technical strategic plan, attend more CIO summits, facilitate the use of technology for instruction and business process management across the enterprise.

Implement technology to deliver online lessons Improve communication with our offshore campus in China, Middle East, Russia, and South Korea. Improve infrastructure

Enterprise Collaboration (email, calendar, messaging) Building a Research Computing infrastructure Developing a professional standards based requirements management practice

ERP upgrade, Network upgrade, Storage Infrastructure upgrade

Help my university generate incremental revenue and be more efficient, delight out customers – students, find a way to combine administrative units to serve multiple universities - shared services

Data Center Remediation Collaborative Software deployment ERP upgrade