MOOC LEARNING AND IMPACT ON PUBLIC HIGHER EDUCATION

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Abstract

Massive Open Online Courses (MOOCs), a new unique open learning style, are made possible by recent developments in gamification, increased bandwidth, mobile devices, and technology. This has allowed the creation of self-mediated learning, which combines these technological developments to allow individuals to experience high-bandwidth applications and simulations online. With the 2013 credit recommendation made by the American Council on Education (ACE), MOOCs are now primed to have great impact on traditional higher education business practices. While various open learning initiatives have been around for decades, the growth, availability, and popularity of MOOCs are poised to impact public higher education academic models. The MOOC courses benefit from the rising dissatisfaction in the cost and value of a higher education degree creating a watershed moment for higher education. While much is being learned about MOOCs and their capabilities, this research seeks to understand how higher education technology leaders decide when an academic technology, such as MOOCs are ready to be implemented on campus. This qualitative inductive research seeks to understand, through narrative inquiry, how a senior higher education technology leader makes decisions in a rapidly evolving cyber and academic landscape where they must execute on institutional strategic plans that reference technology broadly. This research seeks to understand how senior technology leaders work in and with their institutions to decide whether to take a proactive or reactive stance to a new technology using the recent MOOC as a fixed point.

Keywords: Massive Open Online Courses, MOOC, online education, online courses, Chief Information Officers, CIOs, Diffusion of Innovation,
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I would like to thank my parents George and Mary Claffey. My positionality is a reflection of growing up in an environment which included a pre-school teacher and a college professor. It provided an environment in which one was free to fail, while encouraging higher-level aspirations.

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I would like to thank the graduates of my home institution, Charter Oak State College. Each year, at commencement, these students served as a reminder that work, children, blizzards, and family sickness are not barriers to adults going back to school, but rather obstacles to be overcome. They have been a constant reminder and example that you can “find a way” to complete your academic journey.

It is fitting that I write some of these pages while attending the EDUCAUSE national conference. This conference didn’t just provide a venue to create relationships with peers who are working on the next great academic or technology project but rather to inspire, learn and share with each other our challenges and beliefs about how technology can be used to help provide a stronger, more efficient, more engaging, more affordable, product in the higher education space. National organizations like EDUCAUSE, and regional organizations such as NERCOMP, create an intersection of academic and technology professionals which serve to unite both bodies under a common cause.
Thank you to my research participants. Senior leaders provided amazing experience, life-stories, and coming of age tales. From battle scars, to victory dances, they provided unfiltered thoughts and opinions which made this narrative inquiry successful. It is clear that as information technology will be one of the principle transformative forces of the 21st century, we as senior leaders must leverage our positions and be transformative agents of change.
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Chapter 1: Statement of Research Problem

Higher Education is in an unprecedented time of change. Through the beginning of the 21st century, academia’s business model saw very little change in the method of instructional and degree delivery. The creation and growth of the internet created a new class of products and services which served to breakdown traditional geographic consumer boundaries. Today, shifts in consumerization, in concert with growing student dissatisfaction with the high cost of higher education, have created an opportunity to disrupt the educational ecosystem. Massive Open Online Courses, with their free student value proposition and open educational philosophy threaten to disrupt higher education by inserting a low-cost alternative for demonstrating knowledge. Wadsworth (2012) reviewed increases in cost and inflation and noted that national goods and services increased 115% while college tuition increased 498%. MOOCs, with their free student value proposition and open educational philosophy threaten to disrupt higher education by inserting a low-cost alternative for demonstrating and obtaining knowledge. MOOC courses benefit from the rising dissatisfaction with the cost and value of a higher education. Seeking to remain competitive in their industry and with their students, should higher education technology leaders adopt MOOCs? Does this technology, which self-proclaims to disrupt the traditional norms of higher education, fulfill its promise? The purpose of this research is to understand the impact and changes education institutions are experiencing related to shifts in curriculum, credentials, and awareness of MOOC learning.

Evidence Justifying the Research Problem

Given the recent emergence of MOOCs, there are limited peer-reviewed research articles on the subject. The objective of this research is to better understand a technology leader’s perspective and views relative to choices when adopting a particular academic technology. This
dissertation gathered supporting research to determine the status of higher education and the impact of a disruptive force like MOOCs might have as a stimulus to change higher education norms.

Additionally, the impact of MOOCs on students is largely unknown which represents a gap in research data that needs to be filled. Current data suggests that more than 60% of those who enroll in Week One do not persist beyond Week Three. Nobody knows the verdict for MOOCs. Even the co-founder of Coursera, one of the largest players in the MOOC world, can’t predict this technology’s future. He states, “I think there’s a tremendous value to what we’re doing, and we just haven’t decided yet how to make it pay for itself (Hyman, 2012, p. 20).

Today, many institutions are looking at MOOCs trying to determine if they are in line with their academic goals. Given the degree of difference between teaching 20 person, instructor-led courses and 100,000 person, self-mediated courses, many institutions are struggling with the cultural, technological, faculty, and support requirements that the MOOC environment presents (de Waard, 2012). This research seeks to understand how senior technology leaders work in and with their institutions to decide whether to take a proactive or reactive stance to a new technology using the recent MOOC as a fixed point.

Discussion to Audience

This research views MOOCs from the view of the Senior Most and Information Technology Leader (SMITL) who is often the Chief Information Officer (CIO). This research is designed to fill a gap identified during the literature review on campus technology leaders’ reactions and actions relative to the innovation of MOOC learning and the adoption of technology with a limited defined value proposition.
Trow (2007) stated that higher education is undergoing a transformation from a mass model to a universal model, designed to broaden higher education’s reach. Universal education makes an academic product available to anyone, often through distance learning enabled technology, allowing students in other countries to consume an academic course (Trow, 1974). MOOCs may provide this global reach although empirical data on the effectiveness of MOOC learning is still emerging and not fully documented. There is limited research on the attitude, context, and innovation requirements of MOOC learning at a campus leadership level. An additional goal of this research is to promote the ability of higher education institutions to understand and foster their own local innovation programs.

**Significance of Problem**

In 2011, a new pedagogical model called Massive Open Online Courses (MOOCs) appeared in higher education. Offering student’s premium certificates at no cost, the MOOCs model attracted millions of student’s in the first year. While much is unknown about this new style of online learning, millions of students are logging in and enrolling in these first-generation courses causing some higher education administrators to modify their institutional strategic plans to adapt to the changing environment.

Is higher education at an economic and academic crossroads where MOOCs might provide the stimulus to change higher education? Are we looking at the beginning of a disruption in how higher education is conducted or a new synergy between unique learning partners? Will the free value proposition of MOOC learning appeal to students seeking to reduce their tuition costs or prove they are capable of producing sophisticated work offered up by institutions such as MIT?
Higher education is in an unprecedented time of change. Through the beginning of the 21st century, academia’s business model was relatively stable. Today, shifts in consumerization, in concert with growing student dissatisfaction in the high cost of higher education, have created an opportunity to disrupt the educational ecosystem. Massive Open Online Courses, with their free student value proposition and open educational philosophy threaten to disrupt higher education by inserting a low-cost alternative for demonstrating knowledge. The purpose of this research is to understand the impact, strategic plans, and changes that higher education institutions are experiencing relative to shifts in curriculum, credentials, and awareness of MOOC learning.

The Babson Survey Research Group’s 2010-11 annual survey of more than 2,500 colleges and universities found that over 6.1 million students took at least one online course during the fall 2010 term (Allen & Seaman, 2011). While distance education enabled learning to occur anywhere and anytime, allowing colleges and universities to grow without new plant and equipment costs, this growth may have destructive consequences. Just as direct Internet purchasing created disintermediation between the buyer, the middleman, and the manufacturer, higher education’s product is also being “shopped” by students. Most students are now concerned with the cost of their degree and with the potential of being in financial aid repayment for 20 years. In 2010, Moody’s Investor Service issued an outlook for higher education stating that uncertainty of enrollment and tuition revenue are placing significant financial stress on institutions (Moody’s Investors Services, 2010). An additional challenge is that public universities continue to be dependent on shrinking state subsidies. The result of diminishing revenue places greater pressure on the institutions to increase tuition and provide academic services and programs that generate revenue.
Institutions must have strategy and resources different from their current on-ground and on-line offerings to harness the power of self-mediated MOOC learning. The value-proposition for MOOCs is unknown. The consumer demand and profitability of this new medium is also unknown. Institutions are faced with a choice of developing a course that might compete with existing offerings or developing an entirely new subject area. The majority of MOOCs have no tuition or fees yet place a large upfront requirement for instructional design and support which will force institutions to determine if it is strategically appropriate. As evidenced in a 2012 interview, the co-founder of Coursera, one of the largest players in the MOOC world, doesn’t know the future. He stated, “I think there’s a tremendous value to what we’re doing, and we just haven’t decided yet how to make it pay for itself” (Hyman, 2012, p. 20).

Positionality Statement

MOOCs have the potential to greatly impact higher education business models. The literature review, provided in the next chapter, will examine how this impact has been measured thus far and will also point to gaps that this research will attempt to address. It will review how higher education distance learning evolved and how technology innovations are adopted across higher education.

While higher education is not adverse to change, we must recognize that our system today still measures seat-time. Success in online learning requires not just the tools but a forward thinking culture and support system. For any new academic experience to be successful it requires structural and procedural changes to occur (Mitchell, 2009).

I am a reflection of the experiences and environments I grew up in. I am a late Generation X individual who grew up as a digital native. Born to parents who were both educators, one in pre-school and one in a university environment, I was exposed to the
intellectual and physical stimulation of the university environment at a very early age. While my upbringing and culture clearly valued formal education, it allowed me an appreciation and application of “life-long learning,” which wasn’t necessarily centered in academia. It also exposed me to empathetic thinking and values commonplace in young children’s education. It fostered an environment where it was safe to take risks and fail publically without fear of negative response.

I was fortunate to join a growing and entrepreneurial Charter Oak State College as the IT Director in the Division of Information Technology in 1999. Charter Oak, located in New Britain, Connecticut, was designed as a “non-traditional” college in 1973 and was defined as a credit aggregator, accepting a student’s existing accredited coursework from numerous sources. Charter Oak always took advantage of alternative academic credit sources which often provided credit for non-traditional or experiential knowledge including examinations through the College Level Exam Program (CLEP) or Defense Activity for Non-Traditional Education Support (DANTES). Charter Oak and its sister organization, the Connecticut Distance Learning Consortium (CTDLC), an organization designed to help P-20 institutions move into distance education, began the development of a state-wide incubator for online education in 1999 shortly after I was hired. Through my position as Chief Information Officer (CIO) for both organizations, I began to see and understand how online education was transforming the educational industry, how change in higher education occurred or was stifled, and how institutions and their leadership reacted to unknown shifts in their environment. Charter Oak and the CTDLC both grew exponentially over the past decade, often at rates of growth greater than 100% compounded annually. As an executive of the organization, I experienced first-hand the
success, growing pains, scale points, academic and business changes that needed to occur, or didn’t occur soon enough, which impacted the organization’s overall health.

Through my position as CIO with the CTDLC, an eLearning service provider, I am exposed to over 230+ schools, colleges, and university leaders as they continue to evaluate the growing presence and impact of information technology on college campuses to serve on-ground, hybrid, and fully online students. I am a public advocate for the use of technology as an agent of change and it was the business model of the college, not the technology, which ignited my interest. This research into innovation and academic technology fits well with my professional interest and involvement in rapidly evolving technology used to solve business challenges.

Through a qualitative narrative research study, I hope to engage SMITLs to determine both how new MOOC technology is being evaluated, how it was developed or mainstreamed, and how the decision was made to implement it or not.

**Purpose Statement and Research Questions**

Compared to traditional higher education, MOOCs provide content, a credential of learning, and experience at a very low cost. This model potentially disrupts or augments the higher education business model and value proposition but many institutions are slow to adopt MOOCs and MOOC content into the existing campus environment. The purpose of this research is to understand the thoughts and viewpoints of campus technology leaders around the adoption of academic technology and MOOCs. Specifically, this research seeks to understand the process by which SMITLs evaluate an academic technology, including MOOCs for campus adoption and
the strategic impact and changes that their higher education institution technology leaders will confront as a result of the decision to adopt, not-adopt, or pilot an academic technology.

**Research Questions**

How are the Senior Most Information Technology (SMITLs), as technology and higher education leaders, at five public higher education institutions in the Northeast United States, adapting or perceiving they will need to adapt to the evolving MOOC movement?

**Research Hypothesis One: Qualitative**

MOOC learning, leveraging a no-cost student value proposition, may provide a substitute form of education assessment and demonstration of knowledge for a large audience which will have some impact on higher education’s traditional credit growth. To remain competitive, institutions will begin to determine how to integrate certificates of MOOC learning into their prior learning acceptance models.

**Null Hypothesis One: Qualitative**

While providing an opportunity for students to increase their learning and knowledge acquisition, MOOC learning and MOOC completion certificates are no different than current non-academic credentials such as corporate certifications. The higher education industry recognizes alternative forms of prior learning experience demonstration such as DANTES and CLEP exams which MOOC learners can use to demonstrate knowledge in an academic context.

**Research Sub-question One: Qualitative**

How has the SMITL evaluated the potential use, construction, or integration of MOOCs into the campus?
Research Sub-Question Two: Qualitative

How is the college or university responding to the MOOC momentum?

Research Sub-Question Three: Qualitative

How are MOOCs impacting the college or university student recruitment, retention, or remediation strategy?

Research Sub-Question Four: Qualitative

How is innovative technology enabling the ability for change and been evaluated on campus?

Theoretical Framework

I will use a general inductive approach while leveraging the diffusion of innovations (Rogers, 1995) framework. An inductive approach will develop a theory from empirical observation and identify patterns through the qualitative research (Harrison, 2001). Strauss and Corbin (1998) state, “The researcher begins with an area of study and allows the theory to emerge from the data” (p. 12). This research will establish links between the experiences produced through the research and the data analysis (Thomas, 2006). The researcher interest and emersion in the research topic helps motivate research interest and values (Habermas, 1972). The experience is often evaluated as it relates to phenomena, which in this research will be MOOC learning, and the problem of practice to be investigated is inquiry-based, seeking to understand the problem of use and adoption. Through a qualitative assessment, the researcher can construct a complex view of how campus leaders feel and work within the system of higher education. My potential research participants have lived through various changes in the delivery of higher education and I believe my dissertation research questions help organize various
thoughts about the future of higher education, how academic technologies are evaluated, and how MOOCs have been evaluated for campus adoption. Through my research, I will seek to honor each individual research participant’s values and experiences while creating a common narrative about the emergence and adoption of MOOCs in the higher education ecosystem.

This approach will allow the researcher to evaluate multiple individuals across a construct to determine if patterns emerge. Given the rapidly evolving nature of MOOC courses and platform, MOOC development or maturity, relative to the point in time of the research, is important to determining the factors that contributed to campus leaders’ perspectives.

**Limitations**

At the time of the development of this research the American Council on Education determined that they would award credit through assessment for MOOC learning. This forced a change in the initial problem of practice which questioned, if MOOCs could become credit bearing. The change also created the metamorphosis of the topic to include impacts, as MOOC learning may now have an ability to compete with traditional credit bearing courses.

The largest limitation on this research is the application of MOOC learning in higher education from a student perspective. Traditional institutional enrollments allow for quantitative and qualitative feedback of dropouts and stop outs within existing institutional retention systems. New mechanisms and automated processes will need to be developed to deal with the same problems scaling to over 100,000 students per class. As of this time, there are not a significant number of studies, research, or literature demonstrating the impact of MOOC learning and learners on higher education.
Future studies of MOOC learning should evaluate longitudinally, how students who have leveraged MOOC and credit bearing assessments operate as they move into traditional credit-bearing college campuses. Additional research should determine if the selection of MOOCs shift a first time, fulltime student to change their bias on enrolling in online or hybrid undergraduate or graduate education programs. A final research topic should include studies on effects of MOOC learners’ graduation and persistence rates after transferring MOOC credit into a college/university.

**Innovations**

The term *innovation integration* has multiple meanings. Innovation can refer to the cultural change of integrating a new concept or mindset into the culture. It can also refer to creating technological integration between current systems and new systems to support ubiquitous or unencumbered access. Whitworth (2012) identifies innovations as large or “grand” as opposed to small process or procedural changes. These large-scale changes and implementations often require a major planning effort and justification of expenditure (Hannan & Silver, 2000). Similarly, Belmonte & Murray (1993) categorize large changes and innovations as paradigm shifts, as small changes are often simply revisions of an existing process or strategy. Grand innovations have an ability to create a departure from current practice and produce the most substantive changes (Gooley & Towers, 1996). The process of adopting an innovation often involves expenditure. For grand innovations, this may mean a large expenditure that requires a bid process (Whitworth, 2012).

This research will also use the diffusion of innovations (Rogers, 1995) theory, which evaluates how an innovation progresses through a social system. I will use the diffusion of innovation theory to examine the conditions of the environment, the context of that environment,
and the attitudes toward experimentation and innovation with the staff, faculty, and institution (Thille, 2013, p. 35). Rogers categorizes innovations as optional, collective, authoritative, or contingent. Most grand innovations are either collective, with the choice being made by members of a system operating as a group, or authoritative, with the choice to adopt or reject the innovation being made by individuals who possess power, status, or technical expertise (Rogers, 2003).

Diffusion is the process in which an innovation is communicated through social systems. In the social world, each member has an ability to impact their own conscious innovation decisions. Diffusion of Innovations theory serves as a measure to explain how and how fast new ideas and technology spread through cultures. Rogers (2003) stated that each person will follow a five-step process for the evaluation, adoption, or rejection of an innovation. These steps involve assessing the following:

1. Relative advantage—“the degree to which an innovation is perceived as better than the idea it supersedes” (Rogers, 2003, p. 15).
2. Compatibility—“the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters” (Rogers, 2003, p. 15).
3. Complexity—“the degree to which an innovation is perceived as difficult to understand and use” (Rogers, 2003, p. 16).
4. Trialability—“the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2003, p. 16).
5. Observability—“the degree to which the results of an innovation are visible to others” (Rogers, 2003, p. 16).
Rogers (1995) offered two styles of social systems. The *heterophilous* system encourages change from an accepted practice and the *homophilous* system aligns to the existing system. Homophilous systems are typically less innovative because the leaders are less interested in deviating from the accepted and standard norms (Rogers, 1995, p. 288). Diffusion of Innovation theory depends greatly on the decisions made by other members of the social system. Members also adopt an innovation because they believe it will create an advantage (Rogers, 1995). Higher education often bases accreditation, scholarly work, prestige and cultural norms involving peer rankings and groups. MOOCs, born out of schools such as Stanford and MIT, provide credibility, brand, awareness, and value to a product being provided for free. Trow (2007) identified three models of transformation styles in higher education institutions: universal, mass, and elite. Public institutions, with their limited funding models, will struggle to replicate the elite MOOC pioneer model and must determine if they will provide MOOCs, accept MOOCs, or ignore the growing trend of MOOC learning.

The research questions are shaped by the ability of the qualitative approach to focus on the experience of those researched (McConnell-Henry, Chapman, & Francis, 2009). The research sample includes campus leaders, defined as individuals who are an institution’s most Senior Most Information Technology Leader (SMITL) of public higher education institutions in the Northeast United States. In addition to interviews, I will also use the literature review and external empirical data to help provide and align research findings as they begin to emerge.
Chapter 2: Literature Review

Introduction

Georgetown University Provost Robert Groves blogged on the Georgetown website, “The ability of massive open online courses to deliver exactly the same experience simultaneously to thousands and thousands of students breaks the mold of traditional university education. We can all see their potential to increase access to education and reduce the costs of education” (Groves, 2012). While today’s web-based multi-modal online educational opportunities are gaining popularity, the roots of distance learning are based on educational theories from the 17th century.

Since its inception, distance learning has taken many forms through many mediums. Throughout its growth and development, distance learning consistently provided access to educational opportunities to those who could not reach such opportunities through traditional means. Today distance learning means much more than the delivery of academic “seat time” through a different mode. Online education includes supplemental learning, incumbent-worker education, and continuing education; students from pre-school through the doctoral level engage in online education. While the Internet is full of information, online learning supports life-long learners through sound pedagogical design, accessibility, and portability (Park, 2011). Distance education was a building block of the educational ecosystem providing educational opportunity and advancement across distance and advancing education one student at a time.

While distance education provided a new delivery format and accessibility, it was an initiative that ported existing on-ground courses into a different medium. Students in the online sections of a course continued to operate in traditional sized classes, with similar assignments to their on-ground peers. Twenty first century education is shaped by new technological factors.
New technologies such as social media, mobile devices, high bandwidth, and mobile broadband connections offer new opportunities for online learning. Specifically, these emerging and interconnecting technologies and systems created the opportunity for process transformation in higher education (de Waard, 2012). In 2008, McNeely and Wolverton discussed the impact technology could have on 21st century learning based on changes and developments in economics, culture, and technology, questioning the preservation of previous models of learning. The combination of advances in technology and a growing sophistication in online pedagogy led to the creation of new ways of building, designing, and teaching online classes (McAuley, Stewart, Siemens, & Cormier, 2010).

Online education, with its limited physical plant and equipment costs, and limited geographic boundaries, has often been seen as a revenue generator for higher education administrators. Revenue positive programs are needed more than ever as higher education institutions are under intense fiscal pressure. In 2010, Moody’s Investor Service issued an outlook for higher education stating that uncertainty of enrollments and tuition revenue are creating significant financial stress on institutions (Moody’s Investors Service, 2010). An additional challenge is that public universities continue to be dependent on shrinking state subsidies. The result of diminishing revenue places greater pressure on the institutions to increase tuition and provide academic services and programs that are revenue generating. As colleges contemplate new ways to restructure their revenue generating operations, MOOCs threaten to push against the institution’s plans with a free business value proposition for students. Through their model, MOOCs may reduce the amount of credit a student will consume from end institutions because the student has substituted MOOC knowledge for traditional credit. In other cases, it is possible that the MOOC providers, through their low-cost or no-cost open courses,
attract and otherwise reduce potential college applicants. Conversely, if a campus determines MOOCs may fit into their current academic catalog of services, the fiscal investment associated with building a high-quality learning units create a significant barrier of entry.

This literature review will detail the history of online education, the impact of 21st century educational products such as MOOCs, and the fiscal challenges higher education will face as both suppliers and consumers of MOOC credentials. This review will evaluate how the MOOC movement may parallel the 1990s online learning movement where many institutions began transforming their business practices to new teaching and learning models. It will review the challenges to institutions as both recipients of MOOC learners and as creators of MOOC courses. It will also discuss the cultural, financial, and academic challenges an institution must overcome to be successful in this new arena.

Central to the research is the question, in today’s global education environment, how are United States higher education institutions reacting and adapting to the evolving MOOC environment? The objective of this literature review is to gather supporting research to determine if higher education is at an economic and academic crossroads where MOOCs might provide the pressure required to change elements of higher education. The research will demonstrate that higher education is in an economic bubble where increased consumerization brought forward by the Internet and new offerings such as MOOCs will have radical impacts on traditional higher education institutions. Despite their “free cost” to students, institutions must invest significant physical, technology, and faculty resources into establishing and running a MOOC. Given this unique value proposition, institutions should explore both how open learning is impacting higher education as an industry as well as how higher education institutions are supporting the open learning movement (Vanderlinde, 2010).
Background

A MOOC is a gathering of learning participants, or people willing to jointly exchange information and collaboratively enhance their knowledge (de Waard, 2012). MOOC pioneer George Siemens states, “Learning is now happening through communities of practice, personal networks, and through completion of work-related tasks ... know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)” (Siemens, 2005, p. 4). Nobody knows the verdict for MOOCs. It is possible that they are similar to the satellite telecourses that moved across higher education through much of the 1980s and mid-90s and disappeared with the emergence of more effective online asynchronous courses. It's also possible they represent a transformative engine and they may become a force similar to what online learning became in the late 90s with regards to pushing institutions’ boundaries.

In traditional online learning, many experts argued that it was the combination of technology, academic experts, navigation, communication, collaboration, and learning management that combined to create an appropriate online product (Dennen & Wieland, 2007). In many ways, MOOC offerings combine aspects of academia, technology, and a culture of access to information to build their own unique community. According to Olapiriyakul & Scher (2006), "Content design and development includes the use of technology in pedagogy to support the average student learning” (p. 298). Further demonstrating the recent perceived value of MOOCs, IBM conducted a 2012 worldwide poll of over 1700 CEOs to capture executive views on emerging trends. Ginni Rometty, IBM CEO stated,

“This year, they identified the overflow of data and information as one of the most important issues influencing their strategic business decisions” (Galagan, 2012, p. 34).
In addition to higher education, corporations are looking at MOOCs as one of the tools they can use to help disseminate and differentiate education to their constituents (Galagan, 2012).

While distance learning was seen as a major shift for traditional brick-and-mortar faculty, an important aspect was the faculty and institution’s ability to shift their culture to this new dynamic medium. Early online learning held a lot of promise but required significant investment in technology, training, pedagogy and business practices to leverage. Success in online learning requires not just the tools but a forward thinking culture and support system. For any new academic experience to be successful it requires structural and procedural changes to occur (Mitchell, 2009). As MOOCs develop they will likely follow the path of their online course counterparts, which proved to have ripple effects across higher education institutions, creating both intentional and unintentional changes and transforming the values and beliefs of the higher education industry (Mitchell, 2009).

**Distance Education from the 17th to 21st Century**

“It would be most desirable for the school to be a place in which the child should really live, and get a life-experience in which he should delight and find meaning for its own sake” (Dewey, 1915, p. 70). John Dewey advocated for strong teachers and a curriculum that stimulates and engages learners. Rather than the traditional print textbook, which might be used for 10 or 15 years in middle and high-schools, the world of online learning allows teachers to inject real world events, occupations, and experiences into their classrooms. The Internet and distance learning provide an opportunity for classroom instructors to digitally connect via pictures, video, and voice to experts in the field, providing an exciting and stimulating resource to amplify topics and inspire a new generation of learners.
In this regard, the development and design of online education provides an endless series of opportunities that certain cultures and geographic regions might not traditionally have available. For example, the non-profit and fully online Kahn Academy provides self-paced adaptive educational courses. This resource initially engages children with simple or rudimentary discipline-based problems and automatically increases the level of the learning as the child progresses. Students can persist far beyond their current grade level as their experience and understanding of a subject increases.

Students who are limited by geographic boundaries leverage distance learning to provide the main source for educational opportunities and future development. Regardless of the medium through which distance education is delivered, all distance education can be categorized as synchronous or asynchronous. Between 1994 and the present, broadband or “high-bandwidth” connections, which support full frame video and full color representation, have become prevalent. A combination of money from the federal government as well as infrastructure upgrades by major telecom companies dramatically increased broadband accessibility. In 2009 alone, the Obama administration dedicated 7.2 billion dollars from a federal stimulus program to deliver broadband to underserved groups (Allen & Seaman, 2011). On June 30, 2012, the Internet World Stats group published their annual Internet penetration findings, showing that 78.6% of North America had Internet capabilities with 56.1% having regular Internet connectivity (Internet World Stats, 2012).

**Pedagogy.** The traditional classroom lecture came about hundreds of years ago. It was a time when only one person had the book and he was the professor whose role was to stand at the front of the hall and read the book (Weissmann, 2012). Today, distance education is delivered in flexible online learning formats. While it is flexible and learner centric, online learning requires
learners to regularly login and persist with their classwork and assignments. Just as institutions struggled to convert their “sage on the stage” instruction into pedagogically sound online learning courses, some students struggle to maintain their engagement and persistence when not in a face-to-face classroom.

In contrast to typical classrooms or even traditional online courses, MOOCs leverage a unique pedagogical model. Typical MOOC lectures tend to be 10-15 minutes in length. Rather than a single 3 hour lecture one would find in a typical classroom, MOOCs tend to leverage significant peer learner engagement to help drive learning. MOOCs benefit from having little date and time barriers and are generally accomplishment or competency based. This allows multiple ways for a learner to master a topic by allowing users to advance in a self-paced manner after the competency is achieved.

**Learning Management Systems.** Learning Management Systems (LMS) serve as a centralized conduit for interaction between the instructor and the student as well as a clearing house for documents, discussions, assignments, and assessments. While their primary goal is to be a one-stop location for educational resources, their real power comes in providing learner analytics which help correlate student behavior, such as time reading a lecture or reviewing discussion postings, and students’ successful completion of the course. Like the educational product they support, online learning systems have become more sophisticated and can now adapt to a learner’s learning style and provide warnings of potential academic pitfalls. A Babson Survey Research Group 2011 report stated that more than two-thirds of college and university instructors said they believe that students currently learn less in online courses than they do in the classroom; other findings suggest that their estimation of online education quality stands to
rise as the technology improves and more professors get firsthand experience with the medium (Ruth, 2012).

As higher education is evolving, so are the technology products it uses. On July 1st, 2013 Blackboard Inc. announced a free option for professors or institutions who wanted to run a MOOC course hosted on the Blackboard Learn platform (Young, 2013). Katie Blot, President of education services at Blackboard stated, "As schools better define how they want to experiment with MOOCs, it's becoming clear that the best platform is usually the one they already have. Through our new platform, we are enabling schools to bridge their enterprise LMS and their MOOC platform in key areas such as content and social learning spaces” (Schaffhauser, 2013). In similar fashion, Desire 2 Learn and Canvas, both software providers and competitors with Blackboard in the P-20 online learning software industry, announced they also had built MOOC-like support to their core and ancillary products to support institutions and individual instructors developing massive online courses (Winston, 2013).

Distance Education in 2014-2015

Today, online opportunities are rich at traditional brick and mortar institutions. The number of students enrolling in one or more online courses has increased at rates far in excess of the growth of overall higher education enrollments (Allen & Seaman, 2013). Schools leverage LMS as their digital classroom and use them to design and support learning achievement. LMS are central hubs for student and professor interaction. Students’ first-time experience with online learning isn’t in college but often in middle or high-school. Idaho, Alabama, Florida, and Michigan were the most recent states to join a movement which require students to take at least one online course in order to graduate from high school (Pence, 2012).
Beyond extending their mode of delivery for traditional brick and mortar schools, online education has helped drive previously unmet and unrealized demand providing anywhere, anytime accessibility regardless of time zone or geography. Learners from different countries can collaborate, communicate, and contemplate learning challenges in the same class. Colleges and universities have constructed international programs that allow remote students to take the first two years of coursework in their home country before traveling to the United States to complete their education.

Online education should not be painted as purely successful. In many ways, online learning can accelerate failure for the learner and the institution. Recent history is ripe with examples of institutions that grew their online learning programs too big and too quickly, often at the cost of rigor, quality, and instruction. Babson Survey Research Group’s 2011 report stated that more than two-thirds of instructors said they believe that students currently learn less in online courses than they do in the classroom, other findings suggest that their estimation of online education quality stands to rise as the technology improves and more professors get firsthand experience with the medium (Allen & Seaman, 2010). In addition, regional accreditors, who police this new online territory without well-defined rules, challenged these programs.

**Crossroads of Technology, Brand, and Economy**

With the growth and development of K-12 and universities becoming more digitally aware, today’s students are growing up in a electronically connected world as digital natives. Many 4 year-old children can operate an iPad device and possess the knowledge to use the Internet to find information. Students’ educational opportunities are not limited to reading text in a print book. Education is multi-modal combining video, animations, text, speech, and
languages into a single pane of glass interface. Mobility, the extension of the Internet and information access on mobile devices, furthers Dewey’s principle that students learn not just in school but at home and work. Today’s online systems have transitioned to support a culture of life-long learning in a knowledge generation.

**Higher Education Consumerism: Impact Today and Tomorrow**

Is this new medium and style of teaching a benefit to higher education or is it a watershed moment where students push back against traditional costs of higher education? Thomas K. Lindsay, director of the Center for Higher Education at the Texas Public Policy Foundation, pointed to a study released by Bain & Company that concluded that “one third of the nation's colleges and universities are financially unsustainable. Expanding online classes is key to keeping costs down” (Mangan, 2012, para. 20). The online expansion of MOOCs, with a free value proposition for students, shifts this equation creating the potential for MOOCs to serve as substitute for either on-ground or online programs.

While distance education enabled learning to occur anywhere and anytime, allowing colleges and universities to grow without new plant and equipment costs, this growth may have destructive consequences. Colleges are no longer limited to a local sphere of recruiting, but rather through online education, they can provide their product internationally at no increased cost through online learning. The result of the rapid proliferation of online courses, brands, and entire universities has had a global impact on both growth and competition for schools, colleges, and universities.

Ambient Insight, a market research firm, predicts that in 2015 more than 25 million post-secondary students in the United States will be taking courses online in comparison to a significant decrease in students taking courses at a physical campus (Pence, 2012). “The impact
of technology and networks on our lives, culture and society continues to increase. The very fact that you can take this course from anywhere in the world requires a technological infrastructure that was designed, engineered, and builds over the past 60 years. To function in an information-centric world, we need to understand the workings of network technology” (Severance, 2013, para. 3).

**Unbundling the Degree.** The impacts of a MOOC certificate providing an alternate demonstration of a competency should not be undervalued. “It would unbundle the degree,” predicts Dan LeClair, executive vice president and chief operating officer of AACSB International, The Association to Advance Collegiate Schools of Business. "Students could take courses from different professors from anywhere and, if they're successful, get a certificate that companies can use to validate their performance in the class” (Grossman, 2013, para 6).

**Cost of Higher Education.** Higher education institutions are under intense fiscal pressure. In 2010, Moody’s Investor Service issued an outlook for higher education stating that uncertainty of enrollment and tuition revenue are placing significant financial stress on institutions (Moody’s Investors Service, 2010). An additional challenge is that public universities continue to be dependent on shrinking state subsidies. The result of diminishing revenue places greater pressure on the institutions to increase tuition and provide academic services and programs that generate revenue. Grapevine study, conducted by the State Higher Education Executive Officers, reported that 41 states cut their 2011-2012 fiscal years spending for higher education and a third of the states reported double-digit decreases (Palmer, 2012). Ronald Ehrenberg (2006) stated,

public higher education has been buffeted by a perfect storm, in which state appropriations have failed to keep pace with per student expenditures in private higher
education because of economic recession, the priorities placed on alternative uses of state tax revenues (such as elementary and secondary education, Medicaid, welfare, and criminal justice), and efforts to reduce income and sales tax rates. (p. 47)

In his 2011 essay, “Disrupting College,” Clayton Christensen stated, Disruptive innovation is the process by which a sector that has previously served only a limited few because its products and services were complicated, expensive, and inaccessible, is transformed into one whose products and services are simple, affordable, and convenient and serves many no matter their wealth or expertise. (p. 2)

Christensen stated higher education leaders’ assumptions about students, growth, and the role of 21st century educators as written in our mission and vision statements may be incorrect (Alvesson, 2011).

In the wake of fiscally challenged colleges, new online for-profit institutions emerged. These institutions, usually led by teams of former executives from large successful for-profit online institutions, set their goals high, planning and preparing to enroll 50,000+ students in less than 5 years. With the rise of these for-profit, large, online institutions, questions arise as to the quality and rigor of the curriculum. The “bar,” defining quality and accountability and access to Title IV federal dollars is set through regional accreditors. One of the nation’s growth leaders, from 2005 to 2010, enrollment at Ashford University grew more than 7800% from 968 students in 2005 to 77,179 students in 2010 (United States Securities and Exchange Commission, 2010). Despite this large increase in enrollment, the retention rate, defined as students who register in fall and return the following fall was only 36% in 2009 and the overall graduation rate was 22% (National Center for Education Statistics, 2013).
Questions have arisen as to an accreditor’s ability to keep up with the rapid pace of 21st century, for-profit, mega-online institutions. The traditional higher education accreditation, which involves five year visits and volunteer peer-review site teams are often ill-equipped to deal with the complex, multi-faceted organization and operation of big-business for-profit institutions. Using the success of institutions such as the University of Phoenix, DeVry University, and the University of Maryland University College as examples, we can see that the big business of higher education remains dominated by a small but growing number of primarily online schools. Former Iowa Senator Tom Harkin, who conducted an inquiry into for-profit colleges. The inquiry report stated,

(This inquiry) continues to confirm the need for greater oversight of rapidly growing for-profit colleges that receive billions of dollars in taxpayer subsidies. It reveals the same troubling pattern of for-profit colleges' taking advantage of students and taxpayers that has been uncovered in my investigation. (Field, 2011, para. 6)

These schools operate with different motives and incentives. They are reshaping the higher education industry and one must ask if they are a small group of outliers or the new normal of education. Senator Harkin described the for-profit higher education business similar to the housing crisis. “The difference between the subprime and this is at least in the subprime, you could walk away from your home,” Mr. Harkin said. “These students with these debts can’t walk away from them” (Lewin, 2011, para. 24). As MOOCs develop, they will likely follow the path of their online course counterparts, which proved to have ripple effects across the institution, creating both intentional and unintentional changes that had the potential to transform organizational values and beliefs (Mitchell, 2009).
Institutions that are seeing dwindling enrollments or increasing budget pressures may be more aware of environmental entrants such as MOOCs. As colleges contemplate new ways to restructure their revenue generating operations, MOOCs threaten to compete with the institution’s traditional 3-credit course plans with a free business value proposition for students. Through their model, MOOCs may reduce the amount of credit a student will consume from end institutions because the student has substituted MOOC knowledge for traditional credit. In other cases, it is possible that MOOC providers, through their low-cost or no-cost open courses, attract and otherwise reduce potential college applicants. Conversely, if a campus determines MOOCs may fit into their current academic catalog of services, the fiscal investment associated with building high-quality learning units may create a significant barrier to entry.

**Massive Open Online Courses**

MOOCs, a new unique open learning style, were made possible by recent developments in technology, open learning resources, and a world-wide outlook of education as an industry. A MOOC is a gathering of learning participants or people willing to jointly exchange information and collaborate to enhance their knowledge (de Waard, 2012). MOOC pioneer George Siemens stated, “Learning is now happening through communities of practice, personal networks, and through completion of work-related tasks ... know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)” (Siemens, 2005, p. 4).

The MOOC creation lifecycle draws parallels from how institutions migrated to online courses in the late 1990s. Institutions must have strategy and resources different from their current on-ground and on-line offerings to harness the power of self-mediated learning. Given the relative immaturity of the market, institutions face the choice of developing a course that might compete with existing offerings or developing courses for an entirely new subject area.
The free student value-proposition and the large upfront requirement for instructional design will force institutions to determine if it is strategically appropriate. Even if resources are aligned, research has shown that a campus culture of innovation must foster the creation, development, and launch of MOOC courses and their complementary non-traditional processes. All this must be done while institutions struggle with the economic downturn that is creating a fiscal crisis on their campuses.

MOOC learning can draw many parallels from the online learning transformation that higher education experienced in the late 1990s and early 2000s. Regina Mitchell examined an institution’s cultural shifts in a qualitative study and detailed how the faculty led a culture of innovation. Mitchell detailed specific items such as faculty development, administrator training, and environmental support as driving factors in the early success of L.E. Community College’s online learning initiative (Pseudonym). One faculty member stated,

I think this is the future of education . . . Our students no longer have nine-to-five jobs. They don’t have the opportunity to be in one place at one time any longer. That’s just the way our society is, and we have to change with that society.

(Mitchell, 2009, p. 90)

The transition to online learning was not a one-time shift, but rather the continuation of a culture of innovation. Research has shown that a qualitative inquiry is a good instrument to ascertain the microscopic details of the social and cultural aspects important in the institution’s cultural shift (Agee, 2009). Qualitative research in online learning shows that culture shifted to embrace traditional online learning driving the success of those initiatives (Agee, 2009).

**MOOC Costs.** A recent agreement provided to the *The Chronicle of Higher Education* shows MIT’s edX offering universities a MOOC development rate of $250,000 per course
leveraging the edX pedagogical, instructional design, and technical experts in the creation and planning of a single course (Chronicle for Higher Education, 2013, February 13). This suggests that MOOCs are expensive to create, maintain, and require different sets of resources and strategies relative to their traditional online peers. Their “free” nature leaves little in the name of value proposition. Today, public four-year universities, especially those who are not Research I institutions, are struggling financially. The economic downturn of 2010, in combination with rising tuition costs as well as a need for students to enter the workforce to support their financially struggling families has reduced enrollments. A 2011 article surveyed incoming potential freshmen stating, “One group of non-enrollees (27.6%) reports forgoing college because the economic barriers are too high – either because of college affordability or family financial responsibility” (Bozick & DeLuca, 2011, p. 1249). The pressure to reduce tuition, in conjunction with the increases in campus costs, has created an ecosystem that is difficult to sustain. In this vein, if an institution chooses to invest in building MOOCs, they must do so with a strategic plan to leverage this investment to increase enrollments and consumption of credit bearing and revenue generating activities. The largest costs associated with MOOC creation is the requirement for intellectual property or content that can be shared openly and freely to massive audiences.

**MOOC Creation: 1973 Copyright Meets 21st Century Learning**

While the number of enrolled MOOC students as well as their successes and massive dropout ratios are prevalent in the news, what is not as headline grabbing are MOOC copyright concerns. MOOC course development can range from $10,000 to $400,000 per course. Today, many on-ground and online instructors work in protected environments through physical brick and mortar rooms or learning management logins (Dejong, 2013). On ground and traditional
online courses, with their physical or password protected “classroom doors,” provide little visibility of copyright violations if they do occur (Schwartz, 2013).

While the U.S. Copyright Act allows for classroom use of third-party material without permission, these guidelines do not apply to MOOCs. The MOOC transport, often one of three or four prominent organizations, has for-profit or non-profit status, which also impacts the “fair use” of material (Copyright Clearance Center, n.d.). As MOOCs expand internationally, there are also questions about how U.S. Copyright will work in international courses. Very little precedent exists specific to MOOCs and copyright, although inspection of copyrights in traditional online learning and higher education provide indicators of the challenges facing schools wishing to develop MOOCs.

**MOOCs and Copyright.** MOOCs represent democratization of learning and with the spotlight on the success and failure of students and learning outcomes, MOOC copyright concerns are far less prevalent in the news. They are open access allowing anyone to take a course in partnership with competency-based curriculum; they are positioned to disrupt higher education (Schwartz, 2013).

With the rise of open course borrowing from open material, how do faculty who construct MOOCs and traditional professors who wish to incorporate MOOC content do so with regard to appropriate copyright use? Instructors cannot merely copy and paste graphics into their course but rather, the graphics must be integral to the lesson. Instructors at the MOOC creation point must deliberately examine each piece of MOOC property in their course and determine if they own it or do they hold a copyright. This can have trickle down effects and potentially include substantive material embedded in a video. Further complicating the MOOC dilemma, often faculty who created the intellectual property provided that content in the format of books to
a publisher. Scholars must be careful not to import or reconstitute content that they may have ultimately generated, which is now under the copyright of the book publisher.

The use of copyright materials in a MOOC often involves a lengthy request process. The Association of Research Libraries (ARL) published a report on MOOCs and libraries indicating that many local libraries report significant delays or ultimately no permission to use copyright works in MOOC learning. This compares to the relatively easier permission gathering done for traditional online and on-ground “closed” courses (Association of Research Libraries, 2012). Ultimately, permissions may be denied.

As just noted, and further complicating the MOOC dilemma, faculty who have created intellectual property may have provided that content in the format of books to a publisher. They must be careful not to import or reconstitute content they have ceded to the copyright of the book publisher. Yet, some publishers see this as an opportunity. The MOOC “Think Again: How to Reason and Argue” co-taught by UNC-CH philosophy professor Ram Neta and Duke University ethics professor Walter Sinnott-Armstrong enrolled over 180,000 students worldwide for free. As Ram Neta discussed, “It’s a way of providing college-level education to students who wouldn’t otherwise be able to afford it around the world” (Fowler, 2013, para. 6). Due to success and number of registrations, Elsevier sold every single copy of the required book in every language, reported Agarwal. The result is that publishers are becoming very interested in supporting MOOC ventures.

MOOCs and copyright issues are further complicated because the two main MOOC providers have different business models, which impact fair-use and copyright concerns. Coursera is a for-profit company backed by venture capitalists. While edX, under the auspices of MIT and Harvard, is a non-profit funded by investments made by the parent universities
(Gwynne, 2013). Additionally, MOOC providers like Coursera or edX establish umbrella copyrights over all of the materials contained within their courses.

In Drawing the Blueprint as We Build, Lauren Fowler (2013) of the Duke University Library discussed Duke’s experience in leveraging the Coursera platform. She wrote,

“...content from popular culture is integral to the instruction for specific courses, for example, for a line-by-line rhetorical analysis of a newspaper editorial or to highlight video processing mistakes in a high-grossing Hollywood film. Therefore, Duke's guidelines do not prohibit instructors from using designated types of content. We do ask them, however, to consider carefully if the specific material is essential to the pedagogy of the course, or if a public domain or Creative Commons-licensed alternative might serve their purposes equally well” (para. 5).

Institutions need to calculate the cost of managing licenses, permissions, and tracking how content is used as well as how are modifications to the content being managed. If research universities want to protect their scholarly communities, they must find efficiencies (Schwartz, 2013). While the U.S. Copyright Act allows for classroom use of third-party material without permission, these guidelines don’t appear to apply to MOOCs. There are also questions about how U.S. Copyright will work in international courses.

While MOOCs might allow institutions to decouple the high cost of education by bracketing it with lower or free MOOC courses, institutions have significant costs in developing these “free resources.” Similar to free “open source” software that was prevalent in the 2000s, institutions learned that there are hard costs to maintaining free resources. The initial success of MOOCs is staggering but comes with caveats. Complicating the MOOC landscape is the mix of for-profit and non-profit organizations providing the “transport” for MOOC learning.
Institutions like Coursera and edX continue to dominate the fragile market place. The use of copyright materials often involves a lengthy request process. Ultimately, permissions may be denied. Instructors should have a blend of images, content, and source information to allow for easy substituting of content if needed. There is an absence of a legal framework for institutions. Providing assistance, creative commons licenses, and Open Educational Resources (OER) content provide a foundation for MOOCs. By design, these 21st century resources are intended to support the dissemination and often repurposing or redevelopment of academic intellectual contributions for the greater good. Additionally, on higher education campuses, research librarians continue to be a resource and guardian of copyright rules and liabilities. Research librarians often serve as the defacto copyright experts on a college campus.

**Diffusing Innovations**

The term *innovation integration* has multiple meanings. Innovation can refer to the cultural change of integrating a new concept or mindset into the culture. It can also refer to creating technological integration between current systems and new systems to support ubiquitous or unencumbered access. Rogers’s diffusion of innovations theory first appeared in the book *Diffusion of Innovations* in 1962; the fifth edition of this publication appeared in 2003. The theory sought to determine how technology moves from inception to implementation (Rogers, 2003). Rogers (2003) discovered that a group’s ability to consume the innovation can have a dramatic impact on how it is perceived and on the rate of adoption. He also categorized innovations as optional, collective, authoritative, or contingent. In Rogers (2003) model, optional decisions are made independently, collective decisions made by many within the same social context, authoritative decision made by members who hold power, and contingent decisions often follow previously similar decisions or a decision process.
Whitworth (2012) identifies innovations as large or “grand” as opposed to small process or procedural changes. These large-scale changes and implementations often require a major planning effort and justification of expenditure (Hannan & Silver, 2000). Similarly, Belmonte & Murray (1993) categorize large changes and innovations as paradigm shifts, as small changes are often simply revisions of an existing process or strategy. Grand innovations have an ability to create a departure from current practice and produce the most substantive changes (Gooley & Towers, 1996). The process of adopting an innovation often involves expenditure. For grand innovations, this may mean a large expenditure that requires a bid process (Whitworth, 2012).

**Higher-Education Specific Innovations**

Innovation has roots firmly planted in higher education. Higher education institutions help to educate, empower, and produce individuals who create the future through innovation, yet higher education itself is often resistant to change (Enarson, 1960). In 1960, Enarson identified that new knowledge, operationalized in higher education in the form of course and catalog growth, was responsible for much of the entrenchment of higher education (Enarson, 1960). Marshall (2007) noted that higher education is now influenced by multiple drivers, including globalization and eLearning that have forced senior higher-education administrators to increase the pace at which change is led and managed. In the higher education industry, the concept of “change” is almost always connected to the requirement to “innovate” (Hannan and Silver, 2000). Yet the larger and the more mature an institution is, the harder a change will be to make (Mintzberg, 1987). A survey of 238 colleges and universities in the United States revealed that library and computing innovations are adopted twice as quickly as classroom innovations (Getz, Siegfried, & Anderson, 1997). An institution’s ability to innovate is often linked to risk-taking,
experimentation, and creativity, which are often not found in higher education institutions (Wildavsky, Kelly, & Carey, 2011).

The type of institution can also help dictate one’s disposition when evaluating the need to innovate. Trow (2007) identified three models of higher education which can be used to help provide a macro context relevant to the type of institution evaluating innovation and the industry position: elite, mass, and universal. Public higher education is typically associated with the mass-access model, which looks to prepare students for a broad range of roles (Trow, 2007). Substantive and therefore innovation-based changes in public-sector higher education are fundamentally different from those made by private-sector institutions (Husig & Mann, 2010). The greater diversity of stakeholders and organizational dynamics within public-sector institutions creates more bureaucratic design, which often impacts the management of innovation based changes (Husig & Mann, 2010). The challenge of change in higher education is less about innovation itself than about the need to sustain the execution of change and then maintain changes as technology continues to evolve (Taylor, 2001).

**Successful Integration Lessons.** Innovation in higher education has traditionally been developed as a practice, researched or implemented by individual educators. Innovative ideas or works often served as research papers or conference presentations through the format of scholarly work. As higher education as an industry seeks to reduce its costs, frequent innovation efforts are migrating from the individual faculty member and are becoming institutionally driven often tied to creating performance or enhancing productivity. The result has been the migration of innovation from an individual educator or researcher at a micro-level to an institutional innovation guided through a centralized process (Hannan & Silver, 2000). This change in the catalyst and outcomes from an individual to an institutional engine requires a different alignment
of resources and support. For any new academic experience to be successful, structural and procedural changes must occur (Mitchell, 2009). Research on top-down and bottom-up changes in higher education suggests that a key factor of the effectiveness of a change which occurs within the existing process has been the commitment to change in a resource shortage environment (Husig & Mann, 2010).

**Technology Integration.** Intel co-founder Gordon Moore described a trend regarding computer hardware, stating that the number of integrated circuits, commonly understood as “computing power,” would double every 18 months. Moore’s Law predicted the development and growth of a computer generation (Moore, 1965). Andrew Grove, another Intel expert, predicts an “inflection point,” or time when every organization must confront a huge change (Grove, 2010). Our society is predicted to witness an increasing level of technological change as time goes on. This is exemplified by the fact that our world has seen 20,000 years of technology eclipsed in the last 100 calendar years (Kurzweil, 2005, p. 50).

Leaders and followers of technology-based innovative change must understand the social systems and structures of the impacted innovation area. Technology is becoming more consumer-oriented and ubiquitous. Technology costs continue to decrease, and the consumerization of technology continues to increase. For innovation to be successful, a technology infrastructure must be in place to support it. Specifically, technology issues must be resolved prior to the deployment of an innovation launch (Samarawickrema & Stacey, 2007). In addition, to facilitate success, leaders must be aware of technology contexts, manage resources effectively, and understand the efficacy of technology products (Persichitte, 2013). This understanding helps to establish buy-in and promote a cultural and mindset change (Watson & Watson, 2013). In the development of specialized technology for classrooms, buildings, or
institutions specifically, the innovation will be bound by the predetermined parameters. A technology innovation must be portable across multiple platforms to encourage the greatest degree of adoption and development (Adam, 2003).

**Culture.** In addition to having technological availability, university culture and current capabilities serve as principle constraints on innovation and are major determining factors in the ability to create organizational change (Marshall, 2011). Innovations is adopted because it is believed it will create an advantage (Rogers, 1995). Diffusion of innovation theory depends greatly on the decisions made and the social system which supports them. Nichols (2008) in his study of the adoption of e-learning technologies in higher education notes that an institution must develop a culture that is ready to support innovation.

Higher education is typically a risk-adverse organization often basing its status on factors such as accreditation, scholarly work, and peer rankings. Innovation can risk prestige, change cultural norms, and impact peer rankings. Without strong leadership, technologies will not successfully enable change and just reinforce the current culture and identity. Innovation requires a culture in which employees can challenge the traditional norms in a safe environment free from repercussions, where different individuals can collaborate, where individuals are empowered to be creative and try new things, and where mistakes are encouraged (Boyep, 2013). An organizational-level change must push beyond a technology and pedagogy aspect and evaluate the needs of leadership and cultural sub-systems, which must be reorganized (Marshall, 2011).

**Communication.** Successful innovations are communicated via multiple channels, ideally involving repetition of their benefits, in both interpersonal and intrapersonal settings (Rogers, 2003). Rogers also stated that interpersonal communication, largely through face-to-
face or small group meetings, is the most effective platform for persuading individuals to experiment with an innovation (Rogers, 2003). Rogers determined that “opinion leaders,” those individuals who are generally early adopters, provide a system of shadow support, often helping to shape the opinions of others (2003, p. 26). These individuals are key in the influence, cultural change, and overall perception of a change on campus.

In situations in which consumers are not aware of how to use a technological innovation, that innovation’s benefits will be significantly marginalized. Shea, McCall, and Ozdogru (2006) determined that faculty, student, and staff awareness of a technological innovation had a dramatic impact on the adoption and subsequent effectiveness of the innovation. Nichols (2008) found that institutions that perpetuated successful innovations systematized the activity in concert with accompanying policies. The communication of project goals, status reports, delays, successes, and failures is also important to continuing the culture of change, to onboarding new participants, and to maintaining a positive tone for the change (Persichitte, 2013).

**Support and Training.** Innovations occur when there are incentives to innovate (Wildavsky et al., 2011). Successful higher education innovations share some key characteristics. One of the most important elements of successful innovation implementations is the integration of staff and faculty into the development of the process (Henderson & Dancy, 2008). A second characteristic of successful innovation is the creation of multiple layers of support. These support frameworks must include communication, support groups, evangelization, and communities of practice (Smith, 2012). Backing from senior management, in concert with an understanding that innovation and development of the existing culture and practice will require change, are critical to the support of innovation (Smith, 2012).
Johnson, Wisniewski, Kuhlemeyer, Isaacs, and Krzykowski (2012) found that faculty are often anxious about change and thus tend to resist it. Instructional technologists are the principle institutional champions for creating paradigm shifts in circumstances involving a traditional instruction approach (Watson & Watson, 2013). While this support may take the form of helping to redesign a learning experience digitally, much of the short-term and early value provided by the instructional technologist is in supporting and sustaining the culture of change needed to shift to a learner-centered approach (Watson & Watson, 2013). Duffy and Reigeluth (2010) asserted that to take full value of an innovation, an institution must transform itself from an organization for learning to a learning organization. In this process, instructional technologists can serve as pedagogical architects to better learning.

Academic and educational technologists are best-placed to help implement and sustain innovative technology-based change (Watson & Watson, 2013). Berryhill and Durrington (2009) identified the principle criteria for increasing and influencing support for a technology change as the “training and support for faculty methods of leveraging the technology of teaching” (p. 42). Johnson et al. (2012) found that a “bootcamp”-style training experience can be the most effective method by which to bring about substantive changes in teaching and learning.

**MOOCs and the Birth of an Innovative Disruption**

Higher education institutions are fiscally polarized, trying to determine how much to teach and how to increase teaching and learning with a diminishing amount of revenue. As Clay Shirky states in *Napster, Udacity and the Academy*, the music industry was disrupted by entrants like Napster and iTunes (Shirky, 2012). Napster and iTunes success was that it provided an mp3 format of the same song but that the quality was less. Music companies stood by idly as consumer preference began shifting and eventually the entire industry was disrupted by this
lower cost, lower quality product which hit a sweet spot for the consumer. The industry failed not because they didn’t see the format change, but because they assumed that the consumers would continue to want to purchase combined CDs together instead of the discrete tracks. The Internet disrupted many traditional business models. Leveraging many themes from the Napster and iTunes disruption, MOOCs are not trying to compete head-on with collegiate degrees, rather they are offering an alternative credential or product at an exceptionally low price.

The genesis of MOOCs, through elite institutions’ academic courses, created a bar that is so high that many universities cannot reach it without significant investments. Capitalism in the open learning environment should not be underplayed. Institutions rich with content, like MIT, gave this content away for free, a right they have as the owner of the elite product. For example, MIT leveraged their status, brand, and reputation, allowing them to position themselves for $60 million dollars in venture capital to startup their “edX” MOOC program.

The initial success of MOOCs is staggering but comes with caveats. For example, over 150,000 students signed up for MIT’s inaugural Circuit and Analysis MOOC. The combination of MIT’s prestige, the opportunity to learn from renowned professor Anant Agarwal, and a free course were strong incentives. “Of the original population of 150,000 - 5,800 passed the final exam and 7,157 earned enough credits overall to pass the course and receive the MIT Certificate of Completion” (Frank, 2012, p. 28). Similarly, the artificial intelligence (AI) course developed and conducted by Stanford faculty Sebastian Thrun and Peter Norvig in fall 2011, attracted approximately 160,000 registered students by its launch in October 2011. Approximately 23,000 students completed the 10-week course (Martin, 2012, p. 26).

The limited evidence of a business plan, in concert with the dominance of elite institutions as authors, combine with dwindling campus budgets to challenge institutions to
invest significant resources in the development of MOOC learning. Even after the commitment to develop, the institution must develop a culture to accept and embrace the existence of this new avenue for non-traditional education.

Higher education must shift to realize the value of MOOCs. It is clear by the substantive enrollment numbers that potential students or "consumers" of higher education are becoming more cost conscious. They are beginning to shop for education like a commodity product, seeking institutions that offer desirable amenities, schedules, fees, or formats. Increasing the challenges to traditional 4-year universities are increases in students who transfer through structured associate-to-baccalaureate articulation agreements. These institutions now provide only 2 years of credit for the 4-year student. Dewayne Matthews stated,

Even through the recent years of tight state budgets, many universities were able to maintain budgetary stability by turning to student tuition and fees to make up revenue shortfalls. But the money to pay for expansion of higher education's role in society, and to accommodate all those who would seek postsecondary education, is not there. (Matthews, 1998, p. 50)

In concert with a low-cost substitute product being provided by MOOCs, the expansion of prestigious brands such as Duke and MIT, and the consumerization of higher education course products, there continues to be pressure on higher education institutions to reduce their tuition costs. Price, format, and convenience form the value proposition for students to take a MOOC. Add to this already appealing quotient an ability to take a MOOC from a prestigious institution like Harvard or MIT and the product is may have mass international appeal as a demonstration of knowledge.
The year 2013 may very well be considered the year of the MOOC. The objective of this literature review is to gather supporting research to determine if higher education is at an economic and academic crossroads where a disruptive force like MOOCs might provide the stimulus to change higher education norms.

There are many practitioners and administrators in higher education who question the value of MOOCs, as demonstrated in the 2012 Gallup poll of 889 college and university presidents (Jaschik, 2013). Their reality, one of incremental change and growth, predicts that 21st century higher education will look much like 19th century higher education with students coming to the brick and mortar campus to hear scholars speak. The perspective of “world view” seen is helpful in painting the larger picture of the disruption this research project and accompanying dissertation seeks to demonstrate. In comparison to traditional brick and mortar higher education, MOOCs challenge the learner to self-organize content based on his or her learning style. The MOOCs themselves often allow students to adopt a constructivist pedagogy from which learners are free to pick and choose from a series of calendar events, lectures, online documents, experiments and group activities.

In 2009, the Sloan National Commission on Online Learning published a report regarding faculty voices and online education. The report showed that institutions were not adequately supporting their instructors, and more than 70% of all instructors felt that online learning outcomes were inferior to similar on ground peers. (Sloan National Commission on Online Learning, 2009). The report also demonstrated that veteran professors, those teaching for more than 20 years, are teaching online at rates far below their less experienced colleagues (Sloan National Commission on Online Learning, 2009). This combination of factors creates and perpetuates the impact of educators who have limited perspective and are missing the rise,
power, and opportunity that massively open learning represents. Conversely, institutions that are seeing dwindling enrollments or increasing budget pressures may be more aware of the environmental entrants such as MOOCs. Their own “participant” reality of dwindling reserve funds and negative budgets may push them to reconsider their institutional beliefs.

**Extraction of Data and Synthesis**

On February 7th, 2013, the American Council on Education (ACE) endorsed five MOOCs for credit. The courses endorsed included, "Introduction to Genetics and Evolution" and "Bioelectricity: A Quantitative Approach," authored by Duke University. Two courses were authored by the University of California at Irvine are "Pre-Calculus" and "Algebra,” The final course “Calculus: Single-Variable” comes from the University of Pennsylvania. While the council’s endorsement does not guarantee that a school must accept the MOOC learning for credit, many schools use ACE as a guideline for credit worthiness. Andrew Ng, a co-founder of Coursera where the courses are provided states, “For students to receive credit, even if that credit is sponsored by a different institution—that's a big step.” ACE received funds from the Bill and Melinda Gates Foundation to study how MOOC learning can improve access and completion (Kolowich, 2013, February 7).

All institutions struggle to maintain and improve student retention and persistence rates. There is increased awareness that online learning needs separate and unique involvement strategies to help increase student performance (Kruger-Ross & Waters 2013). While in a traditional online course, the student teacher one-on-one interaction can be very influential in maintaining and engaging the online student. Conversely, the MOOC environment operates in a self-mediated fashion, with the bulk of interaction coming broadly from professors or directly
from peers. It is unclear if the student and peer student engagement has a different impact on a student’s (and ultimate success) persistence throughout the course.

Additional trends in value proposition might be emerging based on a third MOOC offered by Coursera, “Think Again: How to Reason and Argue,” co-taught by UNC-CH philosophy professor Ram Neta and Duke University ethics professor Walter Sinnott-Armstrong. This course enrolled over 180,000 students worldwide for free. As Ram Neta discussed, “It’s a way of providing college-level education to students who wouldn’t otherwise be able to afford it around the world” (Fowler, 2013, January 27). Due to success and number of registrations, Elsevier sold every single copy of the required book in every language reported Agarwal. The result is that publishers are becoming very interested in supporting MOOC ventures.

Better evidence of MOOCs coming of age might be the action taken on February 8, 2013 by the Board of Governors of the University of North Carolina (UNC) system. They approved a new strategic plan which, aligning against their strategic goal of maximizing efficiencies and boosting degree attainment at UNC system universities, proposes that universities deliver one MOOC course every year for the next 5 years (University of North Carolina, 2013).

Judging from the efforts of Stanford and MIT, traditional brick and mortar educators and even online educators need to change their pedagogy when discussing the move to MOOC learning. The on-ground world is great for traditional “sage on the stage” types of lecture. This mode gets increasingly more difficult as one transitions to online or hybrid learning where the in-person face to face contact is diminished. (Reynard, 2007). A very formal and structured plan is required to move forward in the MOOC environment. “In many ways, the carefully crafted online lectures, peppered with probing questions that are auto-graded for correctness and then explained further, are indeed an improvement over a conventional lecture” (Martin, 2012, p. 27).
At its inception, the MOOC field was pioneered by elite schools who charged ahead without a defined value proposition. After hundreds of thousands of enrollments, the value proposition to schools is still unclear, but the effect of this new platform of self-mediated learning is beginning to determine how it is valued in higher education. MOOCs genesis, through the academic courses of elite institutions, created a bar that is so high that many universities cannot reach it without significant investments. Capitalism in the open learning environment should not be underplayed. Institutions rich with content like MIT chose to give this content away for free, a right they have as the owner of the elite product.

Given the recent development of MOOC learning, research is only beginning to be studied on this phenomenon’s effectiveness as well as student outcomes and success. Research is further hampered by the number of students who begin but do not persist in MOOC courses.

**Conclusion**

In conclusion, it is clear that the accreditation of MOOC learning by organizations such as the American Council of Education will have a dramatic impact on how MOOCs are treated academically. One could argue that MOOCs have a model similar to existing CLEP and DANTES tests, but the authorship and instruction by leading institutions such as MIT and Harvard University position them differently from the current portfolio of “alternate sources of credit.” Today’s most prominent MOOCs are authored and taught by leading institutions and subject matter experts. Leveraging their elite status and endowments, they are raising a bar which will not easily support laggards (a *Diffusion of Innovations* term) catching up.

Given the relative immaturity of the market, institutions are faced with a choice of developing a course that might compete with existing offerings, or developing an entirely new subject area. It has been demonstrated that the development of courses requires a lengthy
process of copyright permissions, content creation, and development which makes the costs to be a MOOC provider extensive. In combination, the free student value-proposition and the large upfront requirement for instructional design will force institutions to determine if MOOC development is strategically appropriate.

Even if resource alignment is established, research has shown that a campus culture of innovation must help foster the creation, development, and launch of MOOC courses and their complementary non-traditional processes. All this must be done while institutions struggle with the economic downturn that is already creating a fiscal crisis on campus. As colleges become more cost conscious, their ability to invest in leading edge technologies are limited by the increasing operational costs needed to maintain an older campus plant and equipment.

As open courses, MOOCs transcend traditional higher education boundaries, making online free content available to everyone from middle school students to lifelong learners. In addition to a broad age spectrum, their online format allows for instant internationalization of the product and university brand. While these courses do not offer credit-bearing credentials, they offer certificates of completion in a broad array of subject matters by prestigious institutions.

The largest limitation on this literature review is the scarcity of information about the application of MOOC learning in higher education from a student perspective. Traditional institutional enrollments allow for quantitative and qualitative feedback of dropouts and stop outs within existing institutional retention systems. New mechanisms and automated processes will need to be developed to deal with the same problems scaling to over 100,000 students per class. As of this time, there are not a significant number of studies, research, or literature demonstrating the impact of MOOC learning and learners on higher education. Overwhelming MOOC student drop-out rates will challenge any institutional strategic plan’s intention to construct MOOCs. The
impact of MOOCs on students is very much unknown which represents a gap in research data that must be filled. MOOCs have no enrollment requirements and anyone from a high school student to a senior citizen can enroll. Current data suggests that more than 60% of those who enroll in week one do not persist beyond week three.

The goal of this research is that it will formalize many of the recent changes that have occurred in this dynamic field and help to show how MOOCs will impact traditional credit enrollments. Specific to higher education administrators and educational practitioners, my research strategy is intended to demonstrate and substantiate the transformational effect of MOOC learning on the higher education industry. From this position, future research can be conducted on how the continued growth and development of MOOCs in broader and advanced topics might further disrupt or form a synergy with higher education. The second focus of my research strategy was intended to initiate a conversation about this emerging phenomenon among practitioners and higher education administrators.

This research is examines MOOCs from the viewpoint of the college and university administrator, with a goal of better understanding how MOOCs fit into the current higher education ecosystem, challenges created by this new form of alternative credit, and adaptation of the traditional university model relative to this growing product. While this research considers MOOCs from the perspective of the college administrator and MOOCs ability to disrupt the traditional higher education model, future studies of MOOC learning will need to evaluate longitudinally, how students who have leveraged MOOC and credit bearing competency exams operate as they move into traditional credit-bearing college programs. Additional research should determine if the selection of MOOCs impacts a first time, fulltime student’s decisions on enrolling in online or hybrid undergraduate or graduate education programs. In particular,
research should be conducted on MOOC’s effect on students, the transferability of credit, and the impact of this credit on the student’s degree granting school.
Chapter 3: Methodology

One of the principle goals of this research is to understand the process and actions that SMITLs use when evaluating a potential academic technology, including MOOCs, for adoption. I sought to engage with collegiate SMITLs to discuss how their institutions are shifting and evolving as these external, sometimes competitive forces are shifting. There are dynamics of research maturity that must be followed as I pursued the study. The researcher must be aware of the identities or multiple roles that they can bring as a researcher and understand how that may impact the research process (Machi & McEvoy, 2009). It is understandable that in a technology focused dissertation using a qualitative research method, it is possible for the researcher to bias the results. My aim was to consciously acknowledge those values through the use of reflexive journaling (Harrison, MacGibbon, & Morton, 2001). Reflexive journaling allowed the examination of my personal assumptions and goals helping to understand individual belief systems (Ahern as cited in Russell & Kelly, 2002). Reflexive journaling helped to create transparency in the research process (Ortlipp, 2008).

Overview of Methodology

Compared to traditional higher education, Massive Open Online Courses (MOOC) provide content, a credential of learning, and an educational experience at a very low cost. This model potentially disrupts or augments the higher education business model and value proposition; many institutions are slow to adopt MOOCs and MOOC content into the existing campus environment. The purpose of this research is to understand the thoughts and viewpoints of senior campus technology leaders, represented in classes of early adopters, mainstream, and laggards on the strategic impact and changes that their higher education institutions will confront related to the national rise and growth of MOOC learning.
**Research Question**

How are the Senior Most Information Technology Leaders (SMITLs), as technology and higher education managers, at five public higher education institutions in the Northeast, adapting or perceiving they will need to adapt to the evolving MOOC movement?

**Sub-questions**

1. How has the SMITL evaluated the potential use, construction, or integration of MOOCs into the campus?
2. How is the college or university responding to the MOOC momentum?
3. How are MOOCs impacting the college or university student recruitment, retention, or remediation strategy?
4. How has innovative technology enabled the ability for change and been evaluated on campus?

Qualitative research is appropriate for this study because all colleges and universities are individually different but share similarities. All CIOs in higher education rose to their office with different journeys and backgrounds. My interview subjects have experienced various changes in the delivery of higher education, most recently traditional distance learning. The research questions of my dissertation help to organize the various thoughts about the future of higher education, the decoupling of education credit from experience, as well as cost disintermediation brought about by low cost competitors to traditional higher education pricing structures. Higher education is a model which often bases accreditation, scholarly work, prestige, and cultural norms on peer rankings and groups. Through qualitative research and individual interviews, I will be able to respect the individual values and experiences of each
college technology leader while stitching together a common narrative about the future of higher education as it relates to innovative academic technology.

The research was designed to explore the perspectives, decision processes, and engagement of campus technology leaders related to the use and adoption of MOOC materials. In a narrative study as a research method, Hannabuss (2000) states that storytelling can play a critical role in uncovering the knowledge needed to determine how an organization functions. The act of storytelling provides the researcher a natural perspective into the organizational culture and attributes of the participant being studied (Boyce, 1996). Specific to the narrative and qualitative construct, the problem of practice is inquiry based, seeking to understand the social or human aspect of the problem of use and adoption. Through the qualitative assessment, narrative research allows the researcher to attempt to construct a complex view of how technology leaders feel and work within. The use of this approach will lend itself to developing a rich and holistic picture of the drivers of innovation, the use of MOOC learning, and the adoption of this innovation on a college campus.

Role as Qualitative Researcher

The experiencing subject can be considered to be the person or self. This research evaluates the SMITL experience and behavior as it relates to MOOC adoption and technology innovation. The research also seeks to evaluate the conditions which foster experimentation. The narrative approach allows the researcher to evaluate multiple individuals across a construct such as innovation to see if patterns emerge. The research participants used in this study should be strong barometers of the pulse of academic technology adoption in higher education and have a unique perspective on the external forces or influences which support or inhibit the decisions to adopt academic technology.
Research Approach

Compared to traditional higher education, MOOCs provide content, a credential of learning, and experience at a very low cost. This online education based “open learning” model potentially disrupts or augments the higher education business model and value proposition, but many institutions are slow to adopt MOOCs and MOOC content into the existing campus environment. The purpose of this research is to develop a rich understanding of the thoughts and viewpoints of campus senior technology leaders with regard to how they understand, evaluate, and make decisions on technology innovation in higher education, as seen through their response to the development and evaluation of MOOC learning.

This research used the diffusion of innovation framework (Rogers, 1983). Creswell (2012) states that through the use of qualitative research, and specifically through and interview process, a researcher can empower participants providing a communication platform for the individuals’ unique voices and perspectives. This research method focuses on, “the story and evaluates the reliability, trustworthiness, and desirability of the message” (Boyce, 1996, p. 14). The design of this narrative inquiry is to understand how leadership, in concert with institutional culture, impacts the adoption and evaluation of innovative academic technology. There are many key theorists within the field of narrative inquiry. While there were others before him, narrative research in this study is most aligned to the theories of MacIntyre (1981), who stated that individuals are storytelling people and that we construct stories out of our lives. Gergen & Gergen (1988) state that a narrative is a way that allows individuals to make sense of their life. Furthering the original theory, Michael Connelly and Jean Clandinin (1990) who are perhaps seen as among the seminal authors, posited that educational experiences are best told through stories provided by those who lived these experiences.
Cresswell (2012) states that the personal experiences, culture, and the organizational and historical context of the research participants can be viewed through stories of the individual’s personal experience. Humans are storytelling organisms who, individually and collectively, lead storied lives. Thus, “the study of narrative is the study of the ways humans experience the world” (Connelly & Clandinin, 1990, p. 2). While a multiple-institution narrative study is difficult, researchers have found that a richness of data can be obtained through the adoption of multiple perspectives (McDonnell, Jones & Read, 2000). The interviews of multiple senior leaders across multiple institutions helped to construct a group identity and offer perspective and insight. Through the interview process, research participants shared stories about their lived experiences as SMITLs and how they have engaged in the evaluation of technology, with specific emphasis on the evaluation of the recent phenomenon MOOCs. SMITLs must make decisions to help shape and transform their institution as the higher education institution’s principal technologist. Conversations will be structured to help solicit the experiences of college technology leaders in understanding, leading, and adopting technology innovations.

The challenge stems from the amorphous state of the internet itself. Academic technology, such as MOOCs, are not static but rather based in part on the content author, the delivery system or MOOC engine provider, and the maturity of the product (1.0 vs. 2.0 vs. 3.0). Unlike printed books, which often place large changes into a new book, noted by edition number, internet objects are stateless and with little public facing “versioning,” making it difficult to see when they are updated.

The researcher interviewed multiple participants, each independently exploring their perspective and development, relative to the phenomenon (Yin, 1984). Through multiple qualitative sources, such as interviews, transcription, and transcription review accuracy and
validity were provided for the data (Casey, Houghton, Shaw, & Murphy, 2010). Data will be organized into an approach designed to show how MOOC learning is evaluated with a focus on factors which influence a technology leader’s decision making. The study is connected to the context of public higher education institutions which is a constant, allowing a picture of this phenomenon to be created within the sphere of public higher education colleges and universities. To analyze the stories which were shared, the narrative method identifies themes and evaluates connections between reasons, actions, and values (Boyce, 1996). The research focused on an interview and based accounts of how actions and decisions are made. This allowed the data and findings to identify possible markers for the evaluation, acceptance, or rejection of academic technology and MOOCs. This method was chosen because higher education is an industry which often bases accreditation, scholarly work, prestige and cultural norms on peer rankings and groups. MOOCs, initially developed by schools such as Stanford and MIT, provided credibility, brand, reputation, and awareness to a product helping to establish its value proposition. Public institutions, with their limited funding models, will struggle to replicate the elite MOOC pioneer model and must determine if they will become a provider of MOOCs, an acceptor of MOOCs or ignore the growing trend of MOOC learning. This model will synthesize research on educational innovation, providing clarity and a prediction on why innovations were adopted.

The inductive approach allowed the researcher to evaluate multiple individuals across a construct to determine if patterns emerge. This approach allowed the researcher to explore and understand the experiences which have led the participants to make choices on technological innovation. Through the data collection processes, the researcher respected each SMITLs
individual values and experiences while collecting data about the emergence and adoption of MOOCs in the higher education ecosystem.

Participants and Access

The purpose of this research is to understand the thoughts and viewpoints of campus technology leaders on the strategic impact and changes that their higher education institution will confront in relation to the national growth of MOOC learning and the adoption of academic technology. To research this case, I examined how the Chief Information Officers at five public higher education institutions in the Northeast are adapting to the evolving MOOC environment.

To achieve meaningful results, sampling should be purposeful (Patton, 2001; Creswell, 2013). This research uses criterion at an institutional level and homogeneous sampling at the individual level. Purposeful sampling allows for the discovery and understanding of insight by the researcher (Merriam, 2009). This sample was homogeneous as it represents institutional and technology leaders from within a vertical industry defined as higher education. Institutionally, all participants were from New England Association of Schools and Colleges (NEASC) regionally accredited schools or system offices. Charmaz (2006) identifies that studies which is aiming to describe a process within a specific group, may use a small study population size because the generalizations of the study design are modest.

Specific to the general inductive approach, the problem of practice was seen through a study of where the phenomenon, MOOCs, are evaluated by the potential academic leaders. Homogeneous sampling is appropriate when conducting research asking participants to share their thoughts and ideas (Patton, 2001). Within the context of this research, the close timing of interviews and the leader aspect ensured conformity with regard to regulations and the innovation. As an accredited public college or university SMITL, participants had similar
industry challenges and are governed and regulated by similar federal and state controls. The unique variable was the individual campus culture relative to the MOOC topic being studied.

SMITLs were recruited initially via e-mail, in-person, and by phone call invitation. The initial e-mail correspondence provided a brief description of the study as well as intended interview participant timeline and value of the research. Applications were accepted based on the potential participant’s willingness to be included in the research and their time availability with a preference for in-person interviews. Collectively, SMITLs were emailed leveraging a list constructed by following public school websites and IT department directories to collect names and contact information of the most senior IT leader, and then individual sending custom e-mail messages.

Through a qualitative assessment, narrative inquiry allows the researcher to construct a complex view of how campus leaders feel and work within the social system of higher education. In addition, the narrative inquiry allows the researcher to investigate campus leader perspectives in their current academic environment. This approach allows the researcher to evaluate multiple individuals across a construct to determine if patterns emerge.

Data Collection

The research sample will include Senior Most Information Technology Leaders (SMITL), defined as individuals holding the role of CIO, Vice President for Information Technology, or Executive Director for Technology. Data information was collected principally one-on-one interviews with both Administrative, Academic, and SMITL participants. This study required a limited amount of time for the participants and did not exceed two hours per participant. These interviews were designed to understand the participant’s past actions as well as relevant contexts to construct or develop their unique story (Merriam, 2009). The one-on-one
interviews are designed to capture first-person accounts of college SMITLs (Connelly & Clandinin, 1990). Seidman (2006) provides an interview protocol which has three phases: the experience of participant relative to context, the participant’s details of an experience, and the meaning of the experience. All interviews were scheduled and held at the interview participant’s home campus or a location which was mutually convenient and appropriate for the focus group or one-on-one interview.

The researcher answered any questions about the research prior to the interview or after the interview was conducted. In narrative inquiry, the researcher must understand the context of the lived experience of the research participant. It was just as important for the researcher to use this interview to establish context as it was for the research participant to aid themselves in establishing a timeline to support their responses and recollection of individual events. The individual interview focused on the unique or specific details of the SMITL’s direct experience and its meanings (Seidman, 2006). The interview questions identified major innovative academic technology projects and allowed the researcher a better understanding around the decisions made by the participants and their feelings relative to these implementation decisions. In addition, the interviews provided the research participant an opportunity to add individual information, either contextual or as a participant in their narrative which may be relevant to their decision making.

To substantiate the rigor, analysis, and process, a research journal was used by the researcher to track all field notes (Schatzman & Strauss, 1973). All interview response data was organized into themes, word clouds, or concepts. After the data was collected from the interviews, the researcher began analysis by evaluating word similarities, matches, or concepts that had a relationship.
Data Storage and Management

Data will be stored on an encrypted file storage system, protected by file and folder security, and backed up (Rubin & Rubin, 2012). This process of encryption and password protection provided a layered approach to security and ensured that data is protected while at rest. Sixty days after the filing of this dissertation, all audio and raw data transcripts will be digitally shredded using a DOD 5220.22-M wipe-standard which satisfies the federal requirement for the destruction of secure digital information. Any paper notes will be scanned into digital document storage creating a digital duplicate of the paper document. The original paper notes and or appendix documents will be physically shredded after confirmation that the electronic scan has been successfully captured. Digital copies will be burned on to optical storage for three years to satisfy the Northeastern University Institutional Review Board requirement.

Data Analysis

Data analysis provides structure, order, and allows for interpretation for collected data (Marshall & Rossman, 1999). All research subjects and their respective university names will be kept confidential, with identities only known to the researcher. Pseudonyms will be assigned and used for all research participants and to any direct quotes that are published as part of the final research.

All data will be transcribed using a standardized template (Appendix D). This template will ensure consistency across all transcripts. Data will be coded using MaxQDA software designed to capture and assign codes to words or word patterns in qualitative responses. A separate code sheet will be used to eliminate codes being used for multiple groups. Codes will be ordered into defined into themes for further data analysis.
All interview response data will be organized into themes, clusters of words, or concepts. Many researchers report making a matrix of words and or phrases so that clarification can be made at the interview if answers are ambiguous. Richmond and McCroskey (1995) discussed capturing the non-verbal communication signs used by their interviewees to help capture additional meaning. After the data is drawn between the multiple interviews, the research will look for matches or concepts that seem to have a relationship. It is suggested that qualitative researchers make use of literature review and external empirical data to help compound or provide a negative case for the new research findings as they begin to emerge. It seems most important to transcribe non-verbal signals in addition to the transcript interview.

**Trustworthiness**

Triangulation is a technique that can be used to improve a researcher’s reliability in qualitative research (Lincoln & Guba, 2000). This can be used to reduce a researcher’s bias and increase trustworthiness (Golafshani, 2003). In this dissertation, triangulation will be used in a review of the strategic plan and mind-maps of interviews in concert with the individual interviews. The use of different methods will compensate for individual limitations (Lincoln & Guba, 2000; Brewer & Hunter, 1989). Golafshani (2003) describes that through the use of multiple methods, including transcription, audio recording, surveys, and interviews, a researcher can strengthen the reliability and validity of their study.

Data information was collected principally through one-on-one interviews. In this research study, participants were interviewed by the researcher using a constructed question framework and structured interview. The individual research questionnaire will leverage iterative questioning. Iterative questioning is used to rephrase questions and answers provided by the interview participant with a design to clear up any misunderstandings. All interview
questions, a brief description of the study, and research intent were sent to interview participants in advance of the study. To aid in the development of trustworthiness, all participants were encouraged to be honest and frank in their interviews. Interview participants reviewed the transcript notes prior to data analysis to ensure accuracy. In addition, the researcher noted and captured non-verbal communication cues designed to help capture meaning and context. The researcher made it clear that all participants can decide that they no longer want to participate and their information would be digitally shredded and not included in the final research project.

In research, reliability is often measured by a process’s repeatability, in the same context, with the same participants to produce the same results (Shento, 2004). In my study, which investigates the evaluation and strategic adoption of an innovation, the changing nature of the phenomena limit such an ability and it is unlikely that another researcher could duplicate the same study at a different time and place (Marshall & Rossman, 1999). In this case, my research should be viewed as a prototypical model, allowing the process description to determine if proper practices have been followed (Shento, 2004). In order to follow this rubric, the researcher will provide information on the research design and its implementation, the operational detail of data gathering, and a reflective appraisal of the project (Shento, 2004).

As a final step, Mind Maps (Buzan & Buzan, 2006) were used as a way to systematically organize research data creating structure for the data set. Mind Maps provided an alternative form in which research data can be analyzed (Whiting & Sines, 2012). Mind Maps are a visual technique used to create graphic representations of complex ideas, foster collaboration, and can serve as a communication tool for emerging ideas (Enright & White, 2012). This secondary process provided a verification to the initial qualitative research (Whiting & Sines, 2012). In
addition, it provided a secondary and visual ability to engage others through visual learning to better understand the topic which is mapped (Enright & White, 2012).

Protection of Human Subjects

Qualitative researchers are part of a qualitative research project. In the case of this study, the researcher is part of the data collection process serving as the conduit for interview question and answers (Denzin & Lincoln, 2003). Participants were interviewed by the researcher using a constructed question framework and structured interview. All interview questions, a brief description of the study, and the intent were sent to interview participants in advance of the study. This provided two benefits, first allowing participants to understand the context of the study and also allowing participants to reflect on their position or answers in advance of the in-person interview. Many of the questions are open-ended and the interview followed a fixed-question framework, which was consistent across all interviews. All interview participants will have the option to ask questions or comment outside of the fixed format questions.

The primary participant engagement was an in-person interview located at the participant’s campus or a location identified as convenient and comfortable by the research participant. The researcher answered any questions about the research prior to the interview or after the interview is conducted. On average, interviews lasted approximately 60 minutes, and complete engagement, including review of transcript and corrections did not exceed two hours.

All work was done in concert with the Northeastern University Human Subject Research Protection manual (HRSP) and no work began prior to formal IRB approval. All research participants were given an informed consent form (Appendix B) designed to comply with Northeastern University and human subject protections including HHS regulation 45 CRF 46.111. Informed consent forms were sent to participants in advance of the study and signed no
earlier than 15 days prior to the first interview to ensure they were current and reflected the participants understanding of their rights. All forms provided a copy of the specific IRB approval numbers to identify the research project. Participants were free to withdraw at any time (Creswell, 2012).

All participants volunteered to be interviewed for participation in this research study. There were no physical risks associated with this research. Participants were asked to verbally discuss how they evaluate and make decisions on innovation, evaluate 21st century higher education learning and teaching methods, and have responded to the academic product known as a Massive Open Online Course. The largest risk to interview participants may be loss of confidentiality. The expectation of privacy was reduced by the fact all research participants are all members of public institutions. As public institutions, Freedom of Information (FOI) guidelines have the potential to provide comparable, strategic details about what was discussed as part of this research. Regardless of the public or private nature of the comments, efforts were made to maintain the confidentiality of participants. Participants were classified by average institution size, student population, and Carnegie classification. All research subjects and their respective university names were be kept confidential. As the research benefited from using direct quotes, pseudonyms were assigned to protect all research participants. To enhance the protection and confidentiality of the research, all e-mail communication between the participants and their executive assistants or schedulers will have “host header” and individually identifiable information removed prior to electronic storage.

Risks to human subjects are minimal and are justified by the potential benefits of the research. Data will be stored on an encrypted file storage system, protected by file and folder security, and backed up (Rubin & Rubin, 2012). This process of encryption and password
protection will provide a layered approach to security and ensure data is protected while at rest. After acceptance of the dissertation, all audio and raw data transcripts will be digitally shredded using a DOD 5220.22-M wipe-standard, which satisfies the federal requirement for the destruction of secure digital information.

The time invested by the research participants in the interviews resulted in the creation of a data set, which will help current and future higher education professionals understand the decision making of incumbent collegiate leaders relative to the MOOC product and more broadly, around educational technology innovation. This research will benefit existing campus leaders, and those who aspire to be campus leaders, by providing a view into how college administration functions and evaluates innovation.
Chapter 4: Research Findings

Background

This research used narrative inquiry (MacIntyre, 1981) and the Diffusion of Innovation theory (Rogers, 2003) to determine how an individual’s beliefs, actions, and perspectives impact or influence how academic technology and technological innovation is evaluated or used in a public college environment. To conduct this study, five research subjects were interviewed between January, 2015 and March, 2015. These individual interviews were approximately one hour in length.

This research evaluated the role and perspective of Massive Open Online Courses (MOOCs) through the eyes of a Senior Most Information Technology Leader (SMITL) role holder. Specifically, the research attempted to establish through qualitative inquiry the role that the participant felt was most needed at the university, the role that the SMITL should hold ideally, and the perception of how they will be thought of at their institution five years from the day of the interview.

Approach and Coding Processes

The design of this research sought to understand the experiences of senior information technology professionals, and identify which aspects they feel most influenced, impacted, and changed how they perceived and evaluated potential academic technology, including MOOCs in a college campus setting.

The design of this study presents a qualitative body of knowledge, which provides the perspective of participants. Participant responses were transcribed, coded, and analyzed to identify common themes and unique patterns of responses related to the research project. MaxQDA software was used to facilitate variable coding as well as to develop and model theme
analysis. Research was also performed using Microsoft Excel supporting basic mathematical calculations and the development of charts and graphs. Analyzing qualitative participant responses followed a three step process designed to identify, code, and develop themes. Responses were transcribed and imported into MaxQDA as documents with themes identified as they emerged. Participant responses were coded to differentiate speaker and participant answers. Participant responses were then re-examined and coded for instances of the codes within each theme. In this process, each interview was reviewed while coding for one theme. This process was repeated to map each interview against all five themes. After analysis of participant responses was completed, both the MaxQDA automated reporting and a manual cross-case analysis were conducted to examine participant responses across the various interviews to identify similarities and differences within the response pattern.

These processes provided the researcher a more natural and holistic lens to view coding across multiple themes and attempt to identify patterns between the three separate interviews. In total, 24 codes were applied to the five research interviews.

Codes and Themes

Five themes were established to encapsulate 24 separate secondary codes. The themes identified had two macro themes, role and perspective as well as academic and innovative technology. The five major themes were organized under these two macro levels. The theme of SMITL role and perspective encapsulated the sub themes of institutional role of the SMITL, the SMITL perspective on their tenure at their current university, and experiences at either their current position or previous position which related to how they approach innovative academic technology. The second major theme dealt specifically with innovative academic technology or innovative technology and included themes that related to how a SMITL becomes educated
about innovative academic technology, how they manage innovation projects, and the sources of information they use to learn about new and upcoming innovative academic technology.

In addition, a general response category was created to hold verbal and non-verbal participant response information. In addition to non-verbal response, the response category contained logistic information which ultimately did not lead to substantive findings. This data identifies participant reaction and reflective responses. The reaction theme was constructed to create a software based filter for the analysis. The MaxQDA software evaluates all imported transcription text. By capturing and tagging only the participant responses in a reaction code, the interviewer questions can be filtered out of all analysis. In addition, the reflective code is designed to capture where the interview participants were reflecting on the past or prior knowledge or experience. The reflection provides context for the following qualitative codes and themes. In addition it provides context which was used to help correlate the real-world aspect of the answers. The reflective code helps the researcher ensure that the participant is basing their answers on past experience versus a future vision of what will happen.

**Theme: SMITL Role and Perspective.** This research evaluated the role and perspective of MOOCs through the eyes of a Senior Most Information Technology Leader (SMITL) role holder. Information Technology has a broad and wide purview on a college campus (Claffey, 2009). This allows for some individual and campus-bases shaping of the CIO role, relative to each individual. The research attempted to identify which role the participant was speaking from, their perspective of the more macro “industry role” and how their work would be viewed as they exited.

Specifically this research attempted to establish through qualitative inquiry, the role that the participant felt was most needed at the university, the role that the SMITL should hold
ideally, and the perception of how they will be thought of at their institution five years from the
day of the interview. The SMITL role was initially broken down by the researcher into
categories of “strategist and plumber.” Those roles were further expanded to reference smaller
micro roles such as technology evangelist, facilitator, and entrepreneur. These terms provide a
frame or help the researcher bracket the responses of the participants.

To begin evaluating the responses from SMITLs to the growth of MOOCs and academic
technology, it is helpful to understand their self-awareness, their time as a senior IT leader, and
their perspectives of how the participants feel they will be viewed after they are no longer
present on campus. At the 2010 EDUCAUSE Annual Conference, CIOs Brian Voss and Brad
Wheeler delivered a point counterpoint presentation about the role of the CIO and the campuses’
needs for either a strategist or plumber. Wheeler and Voss (2010) identified that the campus
culture or climate, reinforces attitudes and the belief that technology projects will be successful
or that information technology can be depended on to meet its anticipated goals. The creation of
this belief, and the culture which surrounds it, identifies that CIOs must maintain primary
infrastructure, such as desktops, network, and internet services to meet the needs of the campus
constituents. Related to this research, it is expected that if CIOs are struggling to provide basic
computer service, or plumbing, they will not be positioned to champion innovative academic
technology projects on campus.

The term SMITL strategist was used to define future thinking or forward thinking senior
leaders who identified with the evaluation of future trends, strategic planning, concepts and
theoretical changes in the computing world. Information Technology (IT) strategists are often
identified as those individuals who link an IT project to an existing business strategy seeking to
change a “what can we do” into a “how to implement and execute” scenario. Specific to the
perspective of new innovative academic technology such as MOOCs, a CIO could be evaluated for applying new academic technology to shape, solve, and meet academic or business goals of the institution.

In contrast to the CIO who is often viewed as a strategist, a SMITL could be viewed as a plumber and yet still be classified as a senior leader. A portion of the SMITL respondents identified a focus or dominance of activities of keeping network operations, data center operations, and general technology and computing environments working across the campus (Wheeler & Voss, 2010). They call themselves plumbers because their principle day to day job and responsibilities are managing and maintaining infrastructure operations. CIO plumbers often ensure the technology deployed is meeting the usable expectations of the campus. Often, this position is linked to making existing technology work and providing incremental improvements to technology through equipment replacement lifecycles, standardization, and process improvement. Specific to emerging academic technology, there is an expectation that the CIO plumber would wait until a product had a fully defined business and value proposition or was recommended by a non-CIO body to be implemented.

While all participants generally identified with the plumber or strategist model, some participants identified the work they are doing in non-plumber or strategist terms. To better state the findings and provide a greater level of detail, three additional categories were developed to identify specific nuances among self-identified SMITL operational roles. These three categories were SMITL evangelist, SMITL facilitator, and SMITL entrepreneur. SMITL evangelist is broadly characterized as someone who had a role and expectation that they would bring next generation technology before the campus leadership or faculty. They are most aligned to creating agility within their organization and preparing to be reactive and proactive in the
constant technology changing systems. SMITL evangelists often build the critical mass needed for an innovation to succeed, then establish the technology footprint required to support the institution’s position. On the other hand, SMITL facilitator is defined as an individual who didn’t serve as a subject matter expert but rather identified a role as needing to bring together various constituencies internal and external to the campus and facilitate a knowledge moment. This facilitator role, closely mirrors the expectations of an outside consultant, who can bring together pieces of knowledge and facilitate a position based on data as it becomes known. The final category which was created was SMITL entrepreneur. While similar to SMITL facilitator, the SMITL entrepreneur category was specifically designed to capture participant identification where respondents identified or stated a deep understanding of technology or campus needs and had or were planning to develop this need into an over performing or high performing service through partnership with a vendor, grant funder, or other resource.

**Theme: Innovation Education Influencers.** When asking questions specifically about how innovative academic technology is evaluated for adoption, another theme developed. The theme of *Innovation Education Influencers* or *Influencers* was established to note the sources or actions that a SMITL used to help them become aware of trends in innovative academic technology, increase awareness of innovations, or make conclusions and decisions on innovative academic technology. This theme focuses on the evaluation of how learning about innovative academic technology occurs. In total, five major codes were developed to track Innovation Education Influencers, these codes are strategic plans, faculty and staff, paid analyst service, C-Level executives, and State Local EDucation (SLED) conference and publications.

Within peer feedback, specific references to campus-based faculty and a SMITL’s peer group are differentiated by being designated as faculty or peers respectively. A second major
category was the paid analyst service, which references subscription based memberships which are made to for-profit organizations. Providers of these services include companies such as Gartner, Forrester, or InfoTech in which the CIO benefits from a paid analyst or research firm providing subject matter experts. A third major code which was constructed is State Local EDucation (SLED) membership and conferences. SLED is a common industry term designed to note an industry vertical market, such as all consumers who are business classified as a school, college, university, or municipality, and generally includes non-profit organizations. In the context of this research, SLED conference and publications denotes membership in an organization or group which is non-profit and or peer based. An example of these organizations is EDUCAUSE, a national organization that serves as a national consortium of higher education schools focused on technology, library, and innovation as well as the regional NorthEast Regional Computer Program (NERCOMP) consortium of higher education schools. This code identified and organized references to information sources such as the *The Chronicle of Higher Education*, *Campus Technology*, the *EDUCAUSE Quarterly* and blog which participants identified as a source of information or part of their ongoing strategy for information management.

**Theme: Innovation Enabler.** Innovation Enablers emerged as a theme that captured specific action based responses. Rogers’ (2003) Diffusion of Innovation Theory states that each innovation will have a set of innovators, in addition to early and late adopters, all adopting the same technology across a given time. The theme of Innovation Enabler or Enabler was specifically designed to help classify participant responses relative to their position on the Rogers (2003) scale. The core of this research study centers on how a technology is developed and evaluated for campus adoption. Five themes capture participant responses and are identified
as governance, pilot programs, political challenges, and safe-harbor. For the purposes of this theme, the sub-theme of governance defines campus operational or policies around decision making. The theme of pilot programs captures references to campus-based limited engagements, trials, or tests. These pilots were often bracketed with time limiters, participant limiters, or academic calendar semesters. Pilot programs exclude any type of phased implementation, where a large project is phased into a campus over time. The last theme that emerged is “safe harbor” and refers to a safe zone or scrutiny free area that was created. This theme was identified by participants as fostering an environment where a faculty member who is trying academic innovation would not be negatively impacted in the promotion and tenure process if the innovation was not successful. While the bulk of responses referenced creating a safe harbor for faculty, it was noted in multiple responses that the safe harbor environment could extend upwards on the organizational hierarchy reaching as high as the campus president.

**Theme: Innovation Source.** Specific to understanding the efficacy and success of academic technology innovation attempts, the innovation source is broadly defined as the class of individual who serves as the “champion” or “evangelist” of the innovation. The innovation source theme linked specific participant responses to Rogers’ (2003) Diffusion of Innovation theory which discusses the success, failure, and adoption of initiatives. As defined by Rogers (2003), these approaches are often based on the top-down approach, where leaders make decisions and disseminate that information down the organizational hierarchy. The other theme that emerged relative to innovation source was bottom-up, which was also referred to as “grassroots.” This indicates that the initiative was developed by lower hierarchical ranking employees who were pushing the innovation above them in the organizational system.
**Theme: Experiences.** The broad theme for SMITL identifies and groups experiences that centered on innovation and academic technology innovation. These themes range from the availability of budget dollars to support initiatives to establishing positive faculty relationships from which to broker introduction into

- **Self-awareness:** awareness of the role and scope of the individual, what their purview or institutional license is to move forward.
- **Trust-Knowledge:** a need to establish, correct, or develop trusting relationships where faculty are willing to engage with the SMITL
- **Agility:** developing and continuing to operate a department/division of information technology which can respond to unknowns quickly and efficiently
- **Institutional knowledge:** a strong understanding of the strategic plan for the institution, the strategic plans of other institutions, or challenges within the higher education industry
- **Peer Interactions:** knowledge and understanding that campuses contain silos; references to positive and negative interaction which can impact later projects, perception, or efficacy.
- **Prior Success and Failure:** a SMITL’s prior success or failure in establishing innovative academic technology which provides a lens for future projects.

**Introduction to Qualitative Data Analysis**

This research seeks to evaluate how the Senior Most Information Technology Leaders (SMITLs), as technology and higher education managers, at five public higher education institutions in the Northeast, adapt and perceive they will need to adapt to the evolving MOOC movement. The research is specific to public higher education institutions and seeks to determine if and how this population of leaders is evaluating the value proposition of these
innovative academic technologies. The research seeks to understand if any common themes exist across research participants and if so, if these themes align into a structure which may serve as a blueprint for the future evaluation of academic technologies.

This research tracked the learning, evaluation, and potential adoption of innovative academic technology using MOOCs as a constant. Research findings are broken down into three major sections of SMITL role, innovation influencers, and innovation enablers. The SMITL role is designed to understand a senior IT leader’s current perspective of what role they serve on campus, their perspective on the role of the position, and how they feel they will be viewed five years after their departure. During the course of this research, multiple objects were consistently referenced by participants as aiding in the understanding, evaluation, and operation of innovative academic technology and MOOCs specifically. These operators are broadly defined and categorized in two sections, influencers and enablers. Influencers are typically operators which provide the SMITL information on upcoming or existing innovative academic technology. A second set of operators are categorized as enablers and describe how a campus or SMITL enables the use of this innovative academic technology. Collectively, these three sections outline an innovative academic technology decision pyramid which identifies operators which are broadly identified as helping successfully position innovative academic technology on campus.
SMITL Role: Strategist Versus Plumber.

The pace of technology change continues to increase (Moore, 1965). Today, SMITL leaders are confronted by a myriad of technology decisions and they must balance the reliability and cost-effectiveness of their IT infrastructure with the need to remain agile and nimble to solve business problems. In addition to the traditional corporate technology such as desktops and servers, today’s CIOs must balance a much broader technology infrastructure which includes a greater influence from the growing consumer technology market. As technology has evolved, so has the role of the CIO. In attempting to best understand the perspective of SMITL participants, they were asked about their perspective and opinion of the SMITL position. Figure 1, details the responses from the research participants. As identified in Figure 1, the CIO job is shifting from a singular role, one of strategist or tactician or plumber, to a role which sometimes requires technology evangelization, subject matter facilitation, or business entrepreneurship.

Figure 1. SMITL role. This figure illustrates coded responses to SMITLs about the role of the SMITL on campus.
These three factors or data elements help to create a boundary for the CIO responses and provide insight into the SMITL’s role, their time on campus, the health or maturity of the information technology systems they manage, and their departing outlook on their accomplishments.

As a finding, all participants stated that the role of the CIO should be to serve as a principle strategist for technology at the institution. All CIOs referenced challenges and “plumber work” as the bulk of the day-to-day task. CIO West stated, “On an annual basis, I would like to think the CIO is a combination of a strategist and a plumber, but you’re wearing the 2 hats almost all the time.” CIO Johnson stated,

“I believe the CIO really needs to be strategic in thinking, big picture, visionary-type person who understands the value of keeping the lights on and the plumbing going, but spends a portion of their time strategically looking at where we can take the university (and) specifically as it relates to the university's mission.”

He later stated,

“CIO(s) who are focused on keeping the plumbing going, keeping the lights on, making sure that, operations are consistently, available and the services are available, and they troubleshoot and solve problems as they arise. That doesn't mean the CIO's not involved in those things, but the CIO shouldn't be focusing day-to-day operations, uh, um, on those activities. If the CIO is doing that, then they're not really a CIO in my mind.”

CIO Scott, who had served at multiple higher education institutions of difference sizes, discussed differences based on the size and makeup of the IT department. He stated,
“CIO is the strategist, and I think the CTO (Chief Technology Officer) role is the plumber, and if you aren't fortunate enough to be in an environment where you have both, you have to be a little bit of both. I think primarily strategist though. I believe that the only purpose of IT in an organization is to create value. In order to create value, you have to have strategy and innovation.”

Multiple SMITL participants stressed that the creditability of the SMITL is dependent on keeping the IT core functions operational and providing business value. A lack of confidence will exist among the user community and administration if core operations are not functional. This lack of confidence will limit the ability of the SMITL to be an active participant in institutional strategy conversations which use technology to enable change.

Bridging the divide between plumber and strategist, and one of the key themes which did emerge, is the role of *facilitator*. Rather than focusing specifically on plumbing or strategy, the CIO’s who identified themselves as a facilitator made deliberate references to the strategic plan and serving as part of a supporting team of university leaders. CIO Taylor stated, “My role was to bridge the gap between the (new academic) technology and the faculty,” He also later stated, “(my) role as the CIO will be as a supporter to enhance and fund new technologies.” CIO Taylor identified that he facilitated the research, deployment, and growth of new technologies by serving as a facilitator of technical subject matter expertise with the campus faculty.

In a similar fashion, CIO Johnson connected his previous business experience to creating a lifelong understanding or internal rule, which he continues to follow in the academic space stating, “So I get back to the teaching moment from that business moment. If it already works in the business environment well then, I certainly can incorporate that into the classroom. But how do you get the faculty to jump on board here?” CIO Johnson referenced using business decision
criteria or objectives of return on investment to help guide technology-based academic decision making.

Research participants reported being in the SMITL role, in a higher education environment between 1-28 years. Two CIO participants had been SMITLs in higher education less than 5 years, and three participants had 10+ years of experience as a SMITL in higher education. This trend aligns with recent research in higher education (Marks & Rezgui, 2011; Brown, 2002) which indicates that a CIO shortage has begun where the number of senior IT executives are beginning to retire and there are not enough CIO candidates in the pipeline. This is also consistent with the 2014 Leadership Board CIO (LBCIO) report which identified that as the aging of the CIO workforce is continuing, and as older CIOs retire, new, younger, and less experienced CIOs will continue to increase (Zastrocky, 2014). Research, participants’ backgrounds and employment histories vary. Some participants have spent a large part of their career in higher education and are very familiar with faculty concerns and academic governance, while other participants had a combination of non-profit, government, or business experience prior to serving in higher education. Within this sample size, there was no prior job response or participant articulated response which was identified or self-identified by participants as an industry experience which impacted the participants’ view or position on technology innovation.

**CIO Self-Evaluation.** To provide cross-check validation and additional background information on the CIO role on campus, participants were asked about a major innovative academic project. In addition, they were questioned about their potential legacy on campus after their exit at a point five years from the date of the interview. These questions were specifically designed to understand the internal versus external perspective of the participant’s role as of strategist or plumber. While CIO respondents felt the principle duty of their position was to serve
as a strategist and facilitator, they referenced that they would likely be known for “cleaning-up” challenges. CIO Taylor stated, “Five years from now, I'd like them to say that he cleaned up the mess, empowered the campus to be, to reach their full potential, technically, academically, as a member of a very respected (higher education) community.” As part of that clean-up, CIOs referenced building or maturing a structural system or governance which would support future strategic and academic technology advancement during and after the CIO’s departure. CIO Scott, who aligned with the clean-up metaphor and similar challenges stated, “I think they (the campus) will also say they underestimated the role (of the CIO), what effect it actually could have in how many areas.”

Can the CIO truly remove him or herself from the plumber aspect of the work given the operational and service needs of information technology? CIO respondents clearly feel the role of CIO is to serve as a strategist, while they have stated a desire to make corrections or execute plumber work during their tenure in the position. A large number of CIOs reported inheriting a technological mess when they entered their position. Outdated technology, undertrained staff, and a lack of defined process and documentation represented some of the common challenges that CIOs encountered. Most respondents identified that a significant part of their tenure was about maturing the technology and associated systems infrastructure. CIO Taylor stated this vision and aspirational outlook best stating, “So, eventually these, my role as a plumber and institutional role as the innovator will intersect in the next few years and they'll be as one.” This response articulated the IT leader’s vision that he would develop process, governance, and confidence in a computing infrastructure which would and could provide a platform for innovative academic technology for faculty moving forward. Gartner’s 2013 CIO survey identified that CIOs must adopt a dual role of being reactive to needs for efficiency while also
working to leverage information technology to take advantage of opportunities which support business growth (Gartner, 2014). CIO West connected with the challenge that CIOs face when interpreting budget, strategy, and technology projects. He stated, “I think you’re really the strategist psychologist, all the time, because you’re constantly trying to feel out, deduce, where the campus is at this particular time, financially, psychologically?” This provides the context for the challenge of the higher education CIO, where a SMITL must interpret many different information streams and make decisions based on multiple variables.

**Influencers**

After developing an overview of how the SMITL evaluates the role of the CIO, their background as a senior IT leader, and understanding how they believe they will be viewed five years from now, a better perspective can be constructed. This information can also help shape an understanding of how technology becomes positioned with the CIO and the campus. Participants identified a number of variables or items which provide assistance in enabling the use or experimentation of innovative academic technology. Five primary influencers were referenced by participants as helping to inform a SMITL’s knowledge, understanding, and perspective on innovative academic technology. The principle sources of gained knowledge were paid analyst service, C-Level executives, industry publications, faculty and staff, and the institution’s strategic plan.
Influencers

<table>
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<th>Frequency</th>
<th>% percentage</th>
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*Table 1.* Statistical representation of frequency and percentage of coded Influencer response

![Influencers](image)

*Figure 2.* Innovation education. This figure illustrates coded responses identifying sources SMITLs use to learn about innovative academic technology.

One of the most frequently listed source of information is a paid analyst or information service. Gartner, Inc. also called simply Gartner was referenced a multiple times by multiple respondents. Gartner identifies themselves as “the world’s leading information technology research and advisory company” (Gartner, Inc., n.d.). They provide their clients with research,
as well as analyze and interpret business IT within the context of the client’s individual needs (Gartner, Inc., n.d.). CIO Johnson specifically highlighted the use of paid analyst services stating, “Gartner identifies business moments in a bunch of different ways, that being one of them. They would identify a teaching moment.” Analyst services were also referenced as being able to bring in outside experts. These outside experts might have a broader license to discuss emerging technologies without negatively impacting the local CIO or college leadership.

Referencing an upcoming Gartner analyst consulting engagement, CIO Johnson stated, “He's going to talk a lot about these provocative technologies and how these things can be incorporated into the university.” While the value of Gartner is beyond the scope of this research, part of their publically stated value proposition is in providing SMITLs with data and information to make specific decisions, which will save the consumer a sum of money greater than the analyst service.

The SMITLs who did discuss using Gartner as a source of information, referenced the Gartner Magic Quadrant. This is one of Gartner’s principle market research reports which provide qualitative analysis into a market, as well as the maturity of participants, often identifying up and coming technologies (Gartner, Inc., 2008). Gartner information services, is in principle, no different than other tools providing broad and summarized information. The principle differentiator is in Gartner’s brand reputation and paid analyst service. Gartner will evaluate data and make an industry recommendation to the CIO on a course of action or strategy, whereas other information resources typically just provide data. The efficacy of a Gartner information and analyst service depends on the topic and the value or weight that the SMITL believes the Gartner recommendation holds.
CIOs noted that they receive news from SLED publications and conferences including feeds or electronic bulletins and paper based subscriptions. These influence their understanding of academic innovation and technology by providing a stream of information about trends in higher education as well as higher education campuses. *The Chronicle of Higher Education* and subsidiary publications such as the *Chronicle Wired Campus* newsfeed, *Campus Technology*, and *EDUCAUSE Quarterly* were specifically listed as top information publications by interviewed SMITLs. One research participant specifically highlighted the ideas and writings of Jeff Salingo, contributing editor of *The Chronicle of Higher Education* and author of *College (Un)bound*, referencing some of Salingo’s theories which he felt were contentious but dealt with disruptive innovation. Specifically, the SMITL objected to Salingo’s book, stating that a college education, with an increasing cost, and high failure rate for students, is struggling to provide appropriate Return on Investment (ROI) to prospective college students and may be disrupted by personalized education, alternate credentials such as badges, and online education (Salingo, 2013).

A CIOs work and interaction with their executive-level peers assists in the identification of how innovation is sparked on campus. Participants most often noted their institutional C-level executives, but in addition noted other C-level executives from other higher education institutions or corporations. Relative to the MOOC questions, 40% of participants referenced early 1990’s presentations or conference engagements with C-Level executives at The Open University, as driving their understanding of early MOOC-like technology. Rogers (2003) suggests that decisions about adopting innovation can be made collectively or authoritatively. Authoritative decisions are made in a top-down manner, often by C-Level individuals. In this research, participants described support or the lack of support from C-Level individuals such as a
campus presidents as having had an impact on academic innovation. Beyond academic innovation, basic institutional growth is dependent on how high functioning a C-level team operates (Favaro, Meer, & Sharma, 2012). A CIO or SMITL, in concert with the president of the university and other C-level leaders, can demonstrate executive level leadership in driving innovation throughout the university (Favaro, et.al, 2012).

Participants mentioned multiple times the importance of the university’s strategic plan as well as references to where a SMITL’s current project plans aligned to the overall university mission and vision. It appears that where there is top-down support for emerging academic technologies, those technologies begin to thrive when the CIO’s efforts are combined with other C-level champions and map to the university’s strategic plan. In the following example, UMass Lowell states in their 2020 Strategic Plan for the university a vision that,

“The Committee on Information Technology envisions that UMass Lowell will become a leader in the use of information and instructional technology in order to sustain top-quality teaching, learning and research” (UMass Lowell, 2009).

Further, in the university strategic plan that it will, “Advance the use of technology to assess and improve student learning with such innovations as smart classrooms and web-enhanced teaching” (UMass Lowell, 2009).

This plan provides clear guidance and visibility of the value, strategy, and expected contribution of IT to the university’s mission and its success on executing the strategic plan. Research respondents reported similar alignment and value in the strategic plan. CIO Taylor discussed a past innovative academic product’s success, stating, “…he (the President) saw this (new academic technology) as an opportunity to grow the institution. And he was quite
successful with it. It was a huge money maker for (the university). And he provided a great service for the community at the same time.”

CIO Johnson corroborated this finding when discussing his experience of a campus leader being replaced, stating,

“A CIOs ability to push or contract is somewhat based on the top leadership, what the top leadership sees the health of the institution. Now, depending on who the new president is, if they're really new, then they've got to take a year of seeing what the landscape's like, so there won't be any transformation then. If we get someone who's familiar with the environment, who understands what has to happen, then we can move a little faster.”

Internally, a college president is expected to control internal issues and set the pace or drumbeat of the university (Wiseman, 1991). Interview participants confirm that their leadership has a somewhat symbiotic relationship with regard to the campus president. CIOs anchor their technology position and rate of change based on the campus culture. While a CIO can help provide innovation and technology, this must align to the overall institutional mission, values, and strategic plan. The president, and sometimes the provost, were identified as often setting the “drumbeat” for change and helping to connect academic or operational resources or personnel needed for the SMITL to implement technology-driven improvements. Before advocating for new innovative academic technologies, CIO West developed a strategy of meeting with the individuals who would be impacted by the potential technology. Discussing a past innovative academic technology *false start*, he stated, “It was an object lesson for me that I needed to work from the ground up on all levels. At my university, I tested out the waters with (business owners) long before I went to the Provost and tried something different.” When discussing this particular
issue, he painted the challenge, “It wasn’t about the technology. It was about the decision, and I can’t stress that enough.” This previous false-start experience gave rise to an internal SMITL strategy of connecting projects to end-users and consumers before large campus-based operational or product decisions were publically made.

Rogers’ (2003) Diffusion of Innovation theory identifies that innovation can be provided from the top-down, often referencing C-Level executives or from the bottom-up, including employees who are not at the C-Level. Representing the bottom-up, collegial peers were referenced as a principle group who provide information on academic technology-based innovation. When discussing how he gains knowledge about new technology, CIO Scott stated, “The other thing is that you can never underestimate the power of up and coming geeks because they all have something that they love and they’re attached to and so tapping into that energy, going down in the organization and talking to young techno nerds and finding out what’s exciting them.”

In addition to campus staff, the term faculty was the most identified peer-group which provides academic innovation ideas to the SMITL. While SMITLs also referenced reliance on other campus-based personnel as being part of the idea incubation process, as noted in Figure 3, faculty represented 41% of that response, indicating that they serve as one of the chief initiator of ideas.
**Figure 3.** Faculty Influencers. This figure illustrates coded responses identifying a response of faculty, compared to other sources SMITLs use to learn about innovative academic technology.

Noting the importance of the faculty on various committees to bring ideas forward to the leadership, CIO White stated, “We, we rely a lot on faculty. Whether we go with their ideas or not is one thing, but they bring us ideas.” When discussing the university’s most recent academic technology innovation development, which was a combination of telepresence classrooms and asynchronous video, CIO White stated, “(Campus Department) folks are the leader in the lecture capture research, and they're bridging that to the faculty, they're getting the faculty to buy into that.” He further stated that he expected that if faculty had a positive experience with early pilot programs, the faculty would help to evangelize the technology amongst themselves, creating a grass roots movement toward a broader based adoption.

Regardless of the specific role of an innovative academic technology, the SMITLs referenced various ways in which academic and innovative technology information is acquired
by themselves and the broader campus community. While the SMITL may serve as the chief technologist on campus, they stated that they did not need to serve as the “thought leader” or initiator of the idea for it to be successful. It is clear that a key theme which occurred when discussing these various knowledge-acquisition moments is that the CIOs did not need to author all innovative technology ideas on campus or to serve as their champion. Almost all participants discussed taking some type of role which was identified as a facilitator of knowledgeable peer voices. Highlighting this management design, CIO Taylor stated, “There's 360 IT professionals in this system. And through that group, you hear various information that helps us form a more intelligent decision basis.” Some CIOs also referenced sources for information through “conference attendance” by the CIO or campus community member at a conference event. Conferences, in concert with self and or peer attendance were referenced indicating conference attendance, takeaway, workshop, or presentation aided in the academic technology discovery phase.

Overall, participants referenced a blended approach to learning about new innovative academic technologies. Other CIOs discussed a multi-pronged approach to learning about innovation. Presenting the best description of this approach, CIO Taylor discussed his institutions approach to learning about academic technology which cut across numerous services. He stated, “We're a member of the Gartner group. We're also involved in a regional EDUCAUSE, a group called NERCOMP. So, we have our ear to the ground a little bit.” This model of multiple resources with different specialties allows a SMITL to have multiple tools and sources to engage based on project or need. CIO Taylor’s practice specifically combines the broad industry research of organizations such as Gartner with specialized higher education
technology adoption information provided through organizations which are in the education specific space such as EDUCAUSE and NERCOMP.

**Strategic Plan**

This research confirmed and provided additional qualitative data on the value of the strategic plan as an influencer of innovative academic technology. In 2013, Gartner identified that a CIO has a responsibility to manage strategic planning in their domain, but also to help an executive team improve strategy making more broadly (Hunter & Yu, 2013). This finding was similar to the Chronicle of Higher Education’s 2013 Survey of Chief Information Officers, which indicated that CIO’s often link their IT strategic plan into the institution’s plan and budgeting process (Leadership Board for CIOs, 2014). One of this study’s principle findings was the value of the institution’s strategic plan and its ability to set parameters or boundaries for the CIO, the campus, and the culture on campus. Research participants discussed and referenced elements in the institutional strategic plan throughout their interviews. While they did not provide a rationale for why the strategic plan was referenced, it was perceived that the institution’s strategic plan provided a decision orienting framework for the SMITL.

An undercurrent which resonated across multiple questions was the participants’ belief that technology should live in the institution’s strategic plan. This aspect seems to create a design and license for the experimentation of new academic technologies because the institution or its leaders believe that technology can provide an efficiency or opportunity to the core business. This aligned with a recently published Center for Higher Education Chief Information Officer Studies (CHECS) Inc. study on CIOs in higher education indicating that CIOs are often highly aligned with the institution’s strategic plan (Brown, 2014). One particularly interesting observation was a study participant’s response that a micro-department within the Information
Technology division had been created and specifically tasked with working on innovative technology. In this particular case, this micro department reduced the burden on the CIO to balance the “plumber versus strategist” role and instead, provided a focused, and budget resourced area which could concentrate on strategic innovation without needing to worry about plumbing challenges. This was separate, but similar to CIO Scott’s distinction between the CIO role, who would oversee strategy and innovation, and a CTO who would oversee daily IT operations.

CIO White stated explicitly the importance of the strategy plan as influencer stating, “If it's in the strategic plan, it's possible. If it's not in the strategic plan, it's highly unlikely.” When evaluating the potential for new innovative academic technologies to penetrate the campus, White observed, “If it's not in that strategic plan, it's going to be very difficult to get funding for it. Unless you go outside, you go to a grant, you go to another source of a system project and you get more monies coming in that way.” While not specifically stated, various participants made inferences to the strategic plan as the campus blueprint in which any major initiative would or should live. It was interesting to note that few participants referenced a separate IT strategic plan. This confirms research indicating that CIOs are placing less value on a formal IT strategic plan and embedding their IT strategies in the institution’s plan (Hunter, 2003). Rather than a long-term plan, CIOs referenced a desire to plan in six month cycles and rarely crafted plans exceeding 18 months in total. SMITLs stated that given the rapid rate of change in technology, it was difficult to have an operational and tactical strategy in place longer than 18 months. CIO Scott, put this challenge of IT change and strategy into a non-technical format stating, “In business, if you look at a value chain, starts out where you have a series of different things that
you do, from marketing to product development to all those kinds of things and when you get to the end of the chain, you produce profit. Higher ed(ucation) is not a whole lot different.”

Collectively, influencers serve as a way for CIOs to learn and increase their knowledge about many of the moving parts in play including technology, academia, and strategy. By themselves, influencers don’t create success. CIO Scott, stated, “You can get a lot of that data…your own manipulation (is) the key is to have access and have a platform to be able to do the process. I started looking and realized it may not be that specific technology that you’re going to deal with in the future but the implications of the trends of a similar technology are certainly going to evolve.” Regardless of the debate about strategist / plumber, this research has shown that the CIO uses their experiences, in addition to influencer data, to filter out and select the best innovative academic technologies to support institution enablement. Perhaps best exemplifying this statement, CIO Scott stated, “I’m not worried about getting the specific technologies right, but I want to get all the arrows lined up. What direction are the arrows (technologies and innovation) tending to go.”

**Enablers**

Participants identified a number of items which provide assistance in enabling the use or experimentation of innovative academic technology. After identifying a specific emerging academic technology, the SMITL needs to help foster the development or understanding of this technology within the campus community. Experimenting with innovative academic technologies often involved a series of characteristics which have been defined as “enablers” because they help the SMITL create an environment in which experimentation can be undertaken.
SMITL respondents provided four principle enabler responses. The enablers include governance, funding source, pilot program, and safe harbor, and are explored and defined in the next section.

*Table 2:* Statistical representation of frequency and percentage of coded *Enabler* response.

<table>
<thead>
<tr>
<th>Enabler</th>
<th>Frequency</th>
<th>% percentage</th>
<th>% percentage (valid)</th>
</tr>
</thead>
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<td>41.30</td>
</tr>
<tr>
<td>Governance</td>
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<td>13.04</td>
<td>13.04</td>
</tr>
<tr>
<td>Pilot_Program</td>
<td>15</td>
<td>32.61</td>
<td>32.61</td>
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<tr>
<td>Safe_Harbor</td>
<td>6</td>
<td>13.04</td>
<td>13.04</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
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</tbody>
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*Figure 4.* Enablers. This figure illustrates coded responses identifying a response of enablers or enablement strategies SMITLs use when actuating innovative academic technology.

In addition to the identification of these four primary enabler responses, data analyzed indicated that the presence of two or more of these enablers were included in 100% of all participant responses which identified existing campus-based experimentation or evaluation of innovative academic technology. Sixty percent of respondents referenced three or more enablers
in their participant response. This suggests that SMITLs use multiple enabler strategies simultaneously.

**Governance**

Information technology, as a broad term, encompasses hardware, software, systems, strategy, and operations. Governance is designed specifically to promote the alignment of IT and business strategy. IT Governance promotes increases in investments which foster change and more importantly incorporates strategy into initiatives (Hunter & Yu, 2013). While the technology may not be fully understood, the governance or process by which unknown qualified technology is adopted can be evaluated. Maintaining and working within the established governance allows the enabler a defined system to implement new innovative academic technology. This research identified that a strong process or governance for making changes serves as an enabler and is also a high priority for CIOs. Sixty eight percent of CIOs listed governance as very important in the *Chronicle’s 2013 Survey of Chief Information Officers* and 82% are considering improving governance as a high priority (*The Chronicle of Higher Education*, 2013). Referencing campus-based elements which helped foster innovative academic technology, research study participants pointed to standing committees, lunch and learn activities, or various offices which are specifically charged with innovation. They specifically discussed governance or defined committee structures which helped define ownership and process to evaluate academic ideas. In this research, the code *political challenge* was used as a subcode to governance to capture terms which were within a university purview and those which may extend beyond the single university authority or reach. An example is the unionized environment in which many SMITL leaders worked. Within many of the public institutions in which interview participants worked, members of the IT staff and general faculty were members
of a union. Their employment, termination, raises, and benefits are all managed under a collective bargaining agreement that was often controlled by a higher-level system office or in once instance, the Governor’s office. The governance code was used to broadly to reference that the campus had a political and/or operating body which exerted governance over IT.

All of the governance systems were unique. CIO White referenced a special committee, which, in addition to providing ownership around teaching and innovation hosted a lunch and learn activity for campus, stating, “once a month each (special committee) member has to pick anything they want that's, that's trendy and cool to them, and they have to present on that.” This once a month activity was designed to create and increase a campus and employee exposure to technologies and evaluate the potential fit of these technologies into the existing campus environment and business practice. In a similar vein, CIO Taylor discussed the need for a growing governance structure to help fund academic technology initiatives. He stated, “We have a very formal governance structure for moving money in technology. (We want) to be entrepreneurial… to give faculty and the students and administrators (who want to) to try something different.” While governance can take many forms and levels of formality, it is used to assign decision rights and accountability regarding the adoption of information technology (Zastrocky, 2014). The governance structure on campus identifies who is capable of making investment decisions for information technology, it ensures accountability, and it is often outcome driven. While governance doesn’t guarantee the decisions will always be correct, it does provide accountability and defined responsibilities for those who are able to make choices.

**Funding Source**

Similar to governance, funding sources were also described as enablers by participants. Funding sources or budget challenges were referenced by more than 40% of enabler responses
indicating that they represent a critical success factor to fostering innovation. These responses included byproducts of having funding or not having funding, such as money available for technology training programs or personnel cuts which reduced the efficacy of campus or departmental-based academic innovative technology enablement. According to the 2013 EDUCAUSE Core Data Survey, U.S. institutions spend a median of 3.2% to 5.2% of their total university budget on information technology (Lang, 2014). Participants also referenced budget availability and their SMITL role or SMITL experience, with CIO White specifically referencing budget challenges, “There's not a whole lot of effort put on five years forward. There's not a lot of that planning and it's based on, my opinion, it is lack of resources, both personnel and financial resources.”

Within the broad category of funding source, budget availability was directly identified as an enabler specifically by SMITL participants. The uses of the term “budget” varied and were generally broken into two principle categories. Some participants referenced placing the funds in one-time categories, which could be used for single innovation bursts. Other participants referenced using the money to structurally or departmentally fund positions, which were designed to help foster innovation. CIO White attributed his campus’ success to budget funding which allowed the increase of full-time staff to support innovation, stating, “…And the only reason why it's successful today is because I was given resources, both financially and people. It's now fully staffed back to five people, and we're back to the old model of researching trends, providing opportunities for faculty, being the bridge between the technology and the classroom and the faculty member.”

SMITLs also referenced multiple budget unknowns which might be presented to them across the fiscal year. This may be more specific to public schools that are reliant on a state
subsidy and may have budget cuts passed mid-year by the legislator or government administration. Three of the five participants specifically stated adjustments to their approved budget as challenges. CIO White stated, “This current fiscal year we started out with, with a budget, and we were requested to cut 10%.” It was clear that the CIO feels the institutional challenges which occur when a budget is adjusted and is aware of the long-term impact it has on the campus. “Because the finances are just so tight in the state, and being a public institution, this university, operates on 40 cents of the dollar from state money. 60 cents on the dollar comes from tuition and residents. So although we're a state institution, we're, we're a hybrid of privately funded institutions. So that's a struggle” stated CIO White. The public funding struggles extend beyond the role of the CIO. In 2013, a national survey of public budget funding identified that states were spending 28% less per student than they did in 2008 (Oliff, Palacios, Johnson, Leachman, 2013).

Not all universities have the same budget struggles, and different universities have different priorities relative to technology and innovation. It is unclear if there is a causal relationship between a SMITLs budget and their SMITL role. Multiple SMITLs referenced entrepreneurial roles, with CIO White stating, “Obviously the very inexpensive and easy to implement ideas are obviously easiest to start. But if we get something that's got some traction, momentum behind it, uh, we can work with vendors, one of our colleagues here, we try to work with vendors as best we can to even get some kind of a pilot.”

All schools follow some type of computing replacement cycle which is naturally designed to replace aging technology. Where budgets may not allow for special projects to promote innovation, the CIO respondents indicated that the basic technology replacement cycle has an ability to aid in becoming more innovative just with the natural replacement cycle. “We
need to replace technology and academic computing every three to five years. So, we have a funding stream to do that, and a governing structure to do that….we have a very formal governance structure, um, for moving money in technology, academic technology to the campuses” stated CIO Taylor. While good governance helps ensure that a process is being provided to prioritize and fund technology, entire institutions are struggling with institution-wide budget challenges. The result is that governance committees are being provided less funding to appropriate to transformative or incubation projects and institutions are seeking more risk-adverse portfolio to ensure maximum budget dollar impact (Deloitte, 2014).

Pilot Programs

The second most frequently referenced enabler of academic technology was the use of a pilot program. SMITL respondents overwhelmingly referenced the use of a pilot, test, or trial as a means of trying technology innovation in the campus environment. CIOs referenced pilots in the form of small-scale experiments for which the CIO and the campus could determine how a larger initiative with similar technology might work. CIOs discussed the ability of a pilot to create a structured start but later, if successful, the intent was to foster a faculty-led grass roots type of movement. Exemplifying this point, CIO White stated,

“(Another university) started a very similar project with one or two classrooms with lecture capture and flipped (student centric) classroom furniture five years ago and today they have over 25 classrooms of the same model. And they said it just, it spread like wildfire once the faculty actually saw it, touched it, and test drove it, they loved it. So we're hoping we're going to be able to have that momentum.”
CIO Johnson corroborated the value of the pilot experience and discussed it as a tool to change the campus viewpoint on implementing new academic technology stating, “You have (a) group of people here who are very resistant to change. But what I'm suggesting that the way you stimulate that thought process is going to have to evolve slowly, because that's the way university environments work.” Discussing his campus environment and a large scale innovative academic technology deployment, CIO Scott discussed using pilots as a way to test a technology’s impact and performance during a student centered pilot evaluation. He stated, “…the pilot program… It worked so well that we went ahead and extended it where we got out of the (old) business model.”

CIO respondents indicated that cost wasn’t always the chief concern when looking at budget. Even within public institutions, where there is an expectation that budgets are tight, the CIO may be able to provide some budget relief either in the form of direct dollars or vendor negotiation. CIO White stated, “Obviously the very inexpensive and easy to implement ideas are . . . easiest to start. But if we get something that’s got some traction, momentum behind it, uh, we can work with vendors, one of our colleagues here, we try to work with vendors as best we can to even get some kind of a pilot.” In other cases, CIOs identified money had been appropriated specifically to support pilots or trials of academic technology. CIO Taylor stated, “(We) basically gave the faculty, on the first round, a blank sheet, a blank check to say, go out and try something you want to try. Test it. We'll evaluate it. And it may become a standard that we want to use throughout the whole system.”

In addition to providing feedback, pilot programs also began a process of acceptance of technology for the different constituent groups. When discussing a classroom technology-based innovation, CIO White stated, “We're starting with one or two rooms but I honestly believe it's
going to spiral into every room that we get a chance to touch, we're going to try to touch in the future.” Overall, SMITL leaders heavily referenced pilots for both technology and traditional academic-centric projects. While participants didn’t specify a length, size, or scope of the pilot, it appears that the term *pilot* itself has a connotation which allows for a greater amount of risk to be taken when exploring innovative academic technology.

**Safe Harbor**

While the term pilot was identified specifically as way to bracket expectations and provide a technology to incubate, SMITL’s respondents also discussed specific protections provided to those who explored academic technologies. While a pilot environment allows an idea or academic technology to incubate and serve as an enabler, one of the most common references which occurred in conjunction to references about a pilot was the creation of a “safe harbor environment.” The safe harbor environment was a theme in which environmental parameters were noted that insulated the participant or host and provided protection to the participants. These protections were not physical but rather emotional and employee review based. More commonly referenced in a legal context, the safe harbor responses indicated the creation of a penalty free space for innovation to occur.

Many CIO respondents referenced the use of a safe harbor style environment to provide younger faculty a safe space to work. Within early-career faculty specifically, there was mention of the promotion and tenure process and a discussion that a failed innovation attempt should not negatively impact faculty in the promotion and tenure process. There was no measure of the efficacy of this strategy or an overall strategy design. When discussing academic technology innovation specifically, CIO Taylor stated, “We want to give them that vehicle at no risk to their
tenure track or their future or the institution's future to try something new and streamline it through our governing structure and fund it.” CIO Johnson echoed the sentiments of the value of the safe harbor structure stating,

“You have (a) group of people here who are very resistant to change. But what I'm suggesting that the way you stimulate that thought process is going to have to evolve slowly, because that's the way university environments work. And you have to get the younger faculty members to start embracing this. Now there's a risk for those young faculty members, because they could get, um, you know, sort of kicked in the teeth when it comes time for tenure by other people who don't want to change. So there's a lot of politics that you have to be cognizant of here.”

One common occurrence was that SMITL respondents never stated that a safe harbor was requested as part of the innovation enablement strategy. Rather, the participant indicated that it was a protection provided from the top-down. Rogers (2003) states that innovation is strongest and most successful when developed as a grassroots approach. This safe harbor model, serves as both a top-down and bottom-up enabler, with both top and bottom individuals receiving direct benefit.

It was identified that many SMITL leaders look at a layered or multi-factor approach to implementing innovative academic technology. CIOs explained that they used existing governance, developed or made available a funding source, helped create a pilot program, or created a safe harbor environment. Beyond the actual enablement strategy, CIOs’ responses demonstrated their needs and challenges in working in a multi-variable environment as well as the push/pull constraints on resources. In many cases, both influencers and enablers can create a
series of gates, or a defined process, in the higher education system which the CIO can help to accelerate. CIO Taylor stated,

“So, we're trying to be a little more flexible and agile in this (innovative academic technology) space because the students are much quicker to adapt to new technologies than the institutions are. So, we want to give them (faculty) that vehicle at no risk to their tenure track or their future or the institution's future to try something new and streamline it through our governing structure and fund it.”

In addition to their own experience, role, and scope of authority, most CIOs showed a deep understanding of the institution’s strategic plan and budget. This data included knowledge about campus supporters of technology, resources, alternate sources of funds (i.e., grants), and potential partnerships. They often demonstrated an understanding of their college’s or university’s budget relative to that of other institutions in their Carnegie classification. In addition, CIOs demonstrated increased breadth of experience, understanding the role of the faculty by serving in some type of adjunct capacity. The majority of participants identified a broad working understanding of institutional operations and priorities, connecting them with the strategic plan while balancing them with an understanding of less quantifiable cultural forces.

The MOOC Momentum

Prior to the start of this research, the MOOC movement was increasing dramatically. MIT’s position as an education and innovation institution is undisputed. MOOC learning has become a natural extension of their campus-based environment. The question specific to this research, is how are public universities in New England responding to the growing MOOC movement? It was expected that the participant outcomes would provide data on how MOOCs were being adopted and provide strategies to other public institutions on implementation and
integration decisions. Rather than a more narrow focus on specific MOOC courses or MOOCs as a platform for transforming education, the participant information uncovered limited engagement with MOOCs and reasonably little desire to adopt, either individually or campus-wide, MOOC content. Although specific MOOC provider data did not emerge, participants provided significant data and decision metrics which help identify why and how innovative academic technology is developed and delivered on their campuses.

How an academic institution is responding to the MOOC momentum is in part based on the SMITL’s knowledge of MOOCs and the value proposition that they provide. All interviewed participants were familiar with MOOCs and many provided specific details about the MOOC value proposition to higher education in their response. While an understanding of the value of MOOCs was present, the majority of participant’s response pivoted out of the MOOC landscape and into various component aspects of MOOC teaching and learning or other innovative academic technologies. Some participants discussed prior knowledge or partially initiated pilots with MOOC or MOOC-like offerings. Participants also discussed innovative technology and a cultural awareness as characteristics of success or failure.

At public New England colleges, respondents identified that the MOOC value proposition was misaligned with their public university or the return on investment was too great for it to garner support.
Figure 5. Contributing factors in change. This figure illustrates coded responses identifying contributing factors in change use when actuating innovative academic technology. As identified in Figure 5, CIOs discussion of budget and or funding sources dominated conversations about factors which enabled innovative academic technology to occur within a college campus. SMITL respondents indicated that there was not a clear way to monetize MOOC learning which was inhibiting its potential offering on campus. Building on this lack of value statement, interview participants indicated that their campus’s role in MOOC learning was not easily defined. Interpretation of the definition of MOOCs may be one of the challenges of campus adoption. One of the findings that did emerge is the provider versus consumer role that higher education institutions need to adopt when evaluating MOOCs. CIO Scott, reflecting on his experience at multiple universities as the SMITL stated, “If you think, the learning is commoditized but the accreditation, the certification, the grading, the transcripting and the human experience around the education's all the value add stuff, I think there's a place for traditional universities to accept
MOOCs that are delivered by other places. That's one side of the issue. How do we deal with students who bring the knowledge to our campus from a MOOC experience and how do we include them into the rest of our experience? I think that's challenge one. The second part of it though is whether you as a university should engage in offering MOOCs and being the one who provides that. I think that there's a combination of little tests for that. I think one is do you have the recognition that it makes somebody think that it's worthwhile to come to your site? I think the answer for regional universities like us is probably not. The reality is that if you can take something like a high performance computing or multithreading programming class at MIT in open course, or you can take it from us, which one are you going to sign up for?”

Another principle challenge uncovered when evaluating MOOCs was the basic value proposition of the offering. CIOs stated a basic business problem relative to the public university mission and model. When discussing MOOCs and their evaluation, CIO West stated,

“(Open University) had demonstrated that you could offer distance ed to large groups of people at a reasonable cost, but you couldn’t extract cost from the students. (Open University) did it with adjuncts. When it came time to put that model in the U.S., it won’t work, because if you use tenured faculty, it’s not going to work unless the university got behind and funded this loss leader….the technology is there, it’s been there for a while, and now it’s even better than, I think it was in 1998. The economic model has to change. When MOOCs came back in the late 2000s, as opportunities, I think the question still remained. The technology was much better, but the economic model was misunderstood.”
The majority of CIOs working in public higher education institutions did not identify themselves as responding to the MOOC movement. Research questions on MOOCs were frequently pivoted from the common definition of MOOC to a conversation about innovative classroom technology, for example, alternate and related academic technology efforts such as video lectures and video captures. It was interesting that in almost all cases, the participant response cut through the brand name *MOOC* and focused on what the value proposition was of the underlying technology. While the authoring and dissemination of video technology is a part of how MOOCs operate, public CIOs typically did not reference campus initiatives to be either a consumer or creator of MOOC content. CIO Johnson stated,

“While they (online video lectures) were being branded as MOOCs, the way they were being delivered were no different than iTunes U or this company called The Great Courses, which (is) almost like a correspondence school. You pay for a bunch of CDs or you can deliver them online now, where you can view them as a bunch of videos. And you're actually seeing a lecture, in a classroom setting ... So it's a traditional model being videotaped and being then presented to you as a student.”

Research participant responses indicate the lack of an institution’s specific role as provider or consumer of MOOC learning combines with an undefined value proposition to make it difficult for SMITLs to advocate for MOOCs. SMITLs identified aspects of MOOC learning and a response to incoming MOOC-based credentials as actionable strategies but did not advocate or aspire to become a MOOC provider institution. CIO West stated previous challenges in implementing an innovative academic technology in concert with another C-Level executive, validating the challenge of implementing innovative academic technology on campus when there
isn’t broad-based support. He stated, “That’s another way of looking at that same thing; two people with different perspectives. Mine (my perspective) would have been a ‘go’ decision, and just bear the brunt of the rocks and stones. His was, ‘We’re not ready for it. People are hesitant to change their behavior.’ (It) was a ‘no go’ decision.”

Based on this research, it is determined that the limited value proposition, in combination with institutional position as a provider or consumer, creates challenges to adopting MOOC technology on campus. CIOs did show an ability to mine specific aspects of a broad innovative academic technology such as video-based course delivery, social media integration, and other capabilities, and launch those as small discrete initiatives successfully. MOOCs, which span both a technology based C-level leader and an academic C-level leader, do not have a clear champion or value proposition which make the project more difficult to justify.

**Conclusion**

The findings define three primary themes which are grouped as the SMITL role, influencers, and enablers. The three are not mutually exclusive but rather begin to form a decision pyramid which supports a campus’s success with innovative academic technologies. Each public university is different in size, mission, and scope. The institution’s strategic plan serves as a formal representation of the public university’s position, its future vision, and an anchor for the SMITL to position potential innovative academic technologies.

CIOs of public universities must focus on providing strategy to their campus with technology and business innovation projects. They must balance this strategic role, with an understanding that trust is built with the user community by first providing core infrastructure and operations. SMITLs identified that their depth of experience with technology, strategy, and business help to provide them the hard and soft skills needed to be an effective IT leader. Their
awareness and willingness to serve in different secondary roles, such as facilitator, entrepreneur, or evangelist, couples with deep institutional knowledge to make them effective leaders.

Faculty, conferences, strategic plans, industry publications, and peers are defined as influencers and serve as ways that a SMITL or campus learns about an innovative or academic technology. Faculty are the most well recognized and defined influencer population, yet SMITLs identify that their influence can have positive and negative impact on an innovative academic technology project. While respondents didn’t require a specific number of influencers to move an innovative academic technology forward, 100% of respondents indicated the presence of at least two of the identified influencer objects.

After learning and constructing an understanding of the new innovative academic technology, SMITLs rely on enablers to help incubate technology. Enablers such as pilot programs, a safe harbor, budget funding, and governance are referenced or implemented by the CIO to aid in the adoption or experimentation of innovative academic technology. CIOs do not act alone, they are influenced by institutional culture, trust, past success and failure. The success of an innovative academic technology is often a series of small successes rather than a single big win.

Innovative academic technologies and MOOCs live within these primary themes. SMITL and campus leaders are continuously evaluating technologies for adoption. While this research focuses on how a technology successfully evolves onto a campus environment, it also defines some requirements for innovative academic technology. Principally, in today’s environment of constricted budgets, a new technology must present a strong value proposition. The principle value noted in this research was an ability to have a short-term positive fiscal impact on the university. Together, when SMITLs leverage their experience and knowledge,
listen for influencers, and aid in the creation of enablers, innovative academic technology can be successful.
Chapter 5: Discussion and Recommendations

Introduction

Massive Open Online Courses (MOOCs) have been said to be an “innovative disruption,” fundamentally shifting the value proposition and business model of the industry (Christensen, 2011). If this is true, it was expected that MOOCs or similar innovative academic technologies might provide a chain of evidence of past innovations. This research focused on Senior Most Information Technology Leaders (SMITLs) responses to the adoption of innovative technology and its ability to serve as a change agent to the campus. It specifically queried senior campus IT leaders on how they evaluated MOOCs as an innovative academic technology for adoption.

The topic and future value of MOOC learning has shifted since the research project began in 2013. At the onset of this research, MOOCs appeared poised to disrupt traditional higher education practices. Led by institutions like MIT and Harvard, many colleges aspired to provide MOOCs as part of their campus offerings. This research attempted to see if the private-school logic, as a MOOC creator, would exist at the public institution level. It was expected that the research would provide data on the challenges or benefits in adopting a campus-based MOOC strategy and implementation. Overwhelmingly, SMITLs identified that MOOCs were not on the long-term strategic plan, and that, in some cases, MOOC pilots had been abandoned, or MOOCs had lost their campus based leaders who were driving adoption. In addition, research participants often redacted the term “MOOC” as a brand name and provided information on similar MOOC-like technologies which were being adopted on campus, effectively creating a white label product. A white label product is a product produced by one company prior to another company providing a marketing dressing of their brand onto the product and selling it.
In 2015, at the time of interview, participants stated that MOOCs were not part of the campus strategy or in the campus strategic roadmap. Participants did provide a wealth of data on the adoption of alternate or similar innovative academic technologies. Other participants described past and current institutional struggles with evaluating MOOCs specifically. Study participants did not reference any one single innovative academic technology that produced significant campus changes. The researcher used narrative inquiry and open coding to provide qualitative data which collects the observations of innovation technology adoption across public higher education institutions.

Through this research, the researcher identified consistent variables, which were present in innovative academic technology projects. These variables were classified into two principle groups as influencers and enablers of the success of an academic initiative. While these two groups of influencers and enablers develop a model for SMITLs to help foster innovative academic technologies locally, it is incomplete. In addition to influencers and enablers, multiple variables such as culture, trust, the undefined value proposition of innovative academic technologies, and the need for strategic planning underpin the SMITLs responses, providing insight into the depth, decision making process, and holistic perspective that a SMITL brings to their campus leadership team.

The perspective of an innovation’s success or failure can be based on the constituent viewing the change (Whitworth, 2012). In addition to the classification of key variables as innovators and enablers, there were specific contextual elements identified as contributing factors in change. Contributing factors such as the SMITL’s role, how they support innovation, and how they view emerging academic technologies, more fully represents the findings and provides additional depth within specific major influencer and enabler objects.
Factors in change provide data elements which serve as an undercurrent to some of the influencer or enabler categories. These contextual elements aren’t consistent across all responses and as such may be campus- or CIO-specific. They provide depth in the SMITL’s perspective on innovative academic technology, their role within the campus community as a perceiver of innovation, and as a facilitator of change. Innovation often starts with an idea that seeks to be implemented (Rogers, 1995).

The additional findings related to influencers and enablers are discussed in the next section. These findings note deeper themes, trends, and a visual model of the influencer and enabler decision pyramid, which is constructed based on the research. The researcher did not initially seek to explore decision making hierarchies; however, these findings provides a broad based decision pyramid for SMITL and campus CIOs when evaluating and addressing academic technology decisions. This study has produced tangible findings and data, which any campus leader could use when evaluating how to foster innovation on campus.

Influencers, Enablers, and Culture

What is an academic technology innovation? While the researcher sought to understand the impact of MOOC learning as an academic innovation on campus, it was clear that innovation holds a different value based on the potential consumer. The term ‘innovation” itself is often connected to some type of “new technology” (Hannan & Silver, 2000, p. 10). Innovation can be seen as a product, a process, or a strategic choice (Child, 1972). Figure 6 shows a graphical representation of the findings revealed and integrated into an aspect of Rogers’ Diffusion of Innovation Theory. Rogers (2003) defines that innovation will be most successful when begun at a grass roots level.
This research identifies two major categories supporting how a SMITL acquires information about an innovative academic technology, known as *influencers*, and how they begin to operationalize that information through *enabler* strategies. These two themes of influencers and enablers are useful for SMITL leaders because they allow them to gain and develop an understanding and allow experimentation with innovative academic technology. Innovative academic technology, because it often doesn’t have a fully defined value proposition, requires more support from SMITL leaders to help position it for campus success. Figure 6 provides a graphical representation of the influencer and enabler model showing a funnel for the progression of innovative academic technology from knowledge acquisition to innovation experimentation.

*Figure 6.* SMITL Innovative Academic Pyramid. This figure illustrates the process by which SMITLs learn and support academic technology incubation.
Influencers

Rogers’ (2003) diffusion of innovation theory suggests that innovation will be more successful when it emanates from the ground up. This theory was confirmed as being applicable to the public higher education environment through the qualitative narrative of the research participants. The participants’ mention of faculty-driven innovative ideas, deep information provided by subordinate staff, and a staff wide buy-in to the campus strategic plan are aligned with Rogers’ Diffusion of Innovation Theory. Faculty, who often serve both academic and administrative roles, are positioned to request innovative academic technology and explore it. The researcher found that a contributing factor in public higher education institutions, but not fully discussed in Rogers’s (2003) diffusion of innovation theory, may be the need to have influencers and enablers available to support this grass roots movement. Specifically, five common influencer themes were seen across many participant research findings. These sources of influence include analyst services, C-level executives, industry publications, faculty and staff, and the institution’s strategic plan. One of the most referenced influencers were campus faculty. Faculty did not serve as an equal influencer but rather were the dominate influencer being referenced over 40% of the time. Throughout the research, CIO participants provided a wealth of feedback about their institutional faculty signifying the depth and breadth of this resource to the SMITL.

Integration of Faculty. References to faculty were divided in opinion. They were one of the largest identifiable and referenced sources but different from any other influencer. When describing faculty, participants described faculty in ways that ranged from favorable to unfavorable. While not conclusive, there may be a correlation between the perceived role of the
CIO and how that perception influences his or her relationship with the faculty body. Study participants described the role of faculty in three different ways. First, participants described faculty members as a campus-peer who could provide data on innovative academic technology. Secondly, participants also viewed the faculty as a person who needed or would benefit from the safe harbor environment. Finally, the faculty were individuals who embodied the campus culture and community, of which community members could choose to accept academic change and innovate, or resist the change and push legacy solutions.

While the faculty role could not be quantified beyond serving as an enabler and part of the campus culture, the SMITLs clearly relayed in interviews that faculty roles are important and significant. When discussing a potential academic technology innovation, CIO White stated, “It's not easy but it's, it's worth doing if the product looks promising and faculty want it. That's the key, the faculty will drive it.” Similarly, CIO Johnson openly stated a challenge he was having with faculty on adopting technology in the classroom, “…and faculty is not … At least the faculty here, the older faculty, are not, open to learning about how to use technology like that to increase the value of their course material.” Discussing an innovative academic technology, CIO West observed, “There’s tremendous potential for it, but you run into the old argument by faculty-- ‘If it’s not in-seat, you’re threatening my existence.’ That’s a challenge that we haven’t gotten over. We can’t even have that discussion at a campus with a unionized base. It’s very, very hard.” Research participants identified that the faculty body is one of the most critical influencer objects on campus. The participants advised that SMITLs should create thoughtful and deliberate relationships with faculty groups to help seed innovative academic technology initiatives.
C-Level Executives. In addition to the above findings, all SMITLs referenced positive relationships with their peer groups and members of the college administration. In a few instances, there was evidence that a trust is established between members of the cabinet and the CIO. This trust was exemplified by stories which noted a “push / pull” relationship where the SMITL would provide, make, and withdraw investments in new academic technology knowledge which helped shape either their (the other C-Level executives) understanding or the campus’ understanding of an emerging academic technology. CIO West specifically stated the challenge in front of SMITLs is often about building trust and credibility versus implementing a specific technology. He stated,

“...It (Academic Technology) represents a lot of leg work, and again, with the faculty, it’s not the technology. I see the role of a CIO as building this foundation of trust and short-term victories, upon which you can add in really outrageous technologies...you can’t talk to people about MOOCs or any other innovative technology unless there’s a foundation that says, ‘We trust this person to bring to us a new and innovative idea.’”

Where SMITLs enlisted a peer with significant experience, they often created a reliance on this person to serve and manage the influencer stage. CIO White stated, “The (Facilities and Administration VP) is very current on, on furniture and building (systems). We get a lot of input. It's a multi-prong feedback system, and we listen to all of it.” Aggregated together, these responses indicate a need for SMITLs to establish a foundation of trust with the end user, peer, and C-level administration members and, where possible, capitalize on delivering small wins to build a system of continuous feedback, information, and influence on campus.
CIO Enablers

After the idea is influenced through one more influencer objects, it requires an organizational enabler to flourish. The four enablers are the creation of a pilot environment, the establishment of a safe harbor to operate in, budget funding, and a governance structure to support decision making. The pilot environment is designed to limit the scope of the project and set expectations relative to a small resourced test. In addition, several participants referenced an effective governance structure as something that is needed to help establish decision making and provide an appropriate voice for campus constituents. It is possible that this connects to the process oriented approach to shared governance which lives within the higher education community.

The creation of a safe harbor environment was broadly defined as a way to develop a space which protects the participants, specifically faculty, from penalty if the academic technology fails. While many SMITLs referenced needing to protect or reduce the risk to young faculty of experimenting with innovative academic technology, some CIOs use this strategy to provide self-protection as well.

CIO Safe Harbor. While often protecting the pilot participants, respondents in this study presented some evidence to suggest that the pilot also protects the CIO as the project sponsor or facilitator. CIOs discussed projects they had led which failed and the challenges and lessons associated with those experiences, with CIO Johnson stating “…that false start was a really valuable learning experience for me, because it demonstrated the value of getting, a level of buy-in from the user community”. Multiple SMITL research participants discussed that some level of protection was provide to their role as CIO by leveraging external consultants or pilot programs to mitigate potential risk if an innovative academic technology failed. CIO Johnson,
discussing a consultant coming on campus stated, “He (the consultant) (is) going to talk a lot about these provocative technologies and how these things can be incorporated into the university. And, and we're not going to be worried about faculty thinking about their job's going away or that, you know, ‘I don't want to do this.’ Right?”

The SMITLs made it clear that campus leadership isn’t the only group which needs to be “sold” on innovation. Sometimes the resistance to change or adoption of innovative academic technology comes from internal IT staff. Discussing the launch and development of a cloud-service, CIO Johnson stated, “The innovative part of this whole (innovative technology) thing is just the culture of going into cloud-based, you know, software service solutions, which we have not done in the past, um, at least at this university. So, just getting people's minds around, you know, not hosting something in my local data center was, was part of a cultural shift.”

**Campus Culture.** How does innovative technology enable campus change? A campus’s culture is one variable that was referenced multiple times by participants as an influencer, an enabler, and an inhibitor to working with academic technology innovation. Comments on culture were linked to participant responses which connected to the influencers of peers and faculty as well as the strategic plan. Participants identified that campus leadership and integration into the strategic plan were deeply meaningful in identifying and changing the campus culture. Additionally, participants mentioned culture when discussing how success for pilots was to be evaluated or judged.

Where faculty are asked to innovate, cultural challenges and departmental or divisional silos often play a part in the ability to provide adoption. While this study explored what items and characteristics helped impact a SMITL’s understanding, the variable of “culture” was frequently provided as a limiter. The term “culture” was referenced an average of 2.8 times each
interview, demonstrating the impact of culture on the decision making and evaluation process.

When discussing the local culture, CIO Taylor stated, “So, uh, our biggest issue is not that we're not funded well enough to try new academic technologies, it's to get, um, a spirit of collaboration, uh, to clean up some of the political issues we've had over the last three years about topped out approach to one size fits all, to a grass roots approach up, where the faculty and students generate the technology they want to see in the future.”

In addition to campus culture, participants suggested that pilot programs, which were successful, might begin a small change in the campus’s culture. Forty percent of research participants made reference to some form of campus culture. This represented one of the larger variables as impacting a SMITL’s ability to start an innovative academic technology project.

When discussing MOOCs specifically, CIO White stated, “We just really are not in the massive online arena. I think that's just the culture of this institution and I don't really see that culture shift changing.” CIO Johnson corroborated that this challenge extends beyond a single campus, stating, “If I could provide the capabilities ... right? ... because that's my responsibility, provide the capabilities to be able to address these problems, that's, that's only step one. The second step is, culturally, the people who have to use this tool set have to actually use it.” In a similar theme, CIO West identified that culture is organic and that the SMITL can help change a campus culture by participating in campus committees and listening to the concerns of constituents. He stated, “When I came in, I started attending the monthly meetings (of the faculty technology committee). Just listening to them changed the culture.” From participant responses, it is clear that the culture and trust objects are organic and interrelated. CIO West provided a metaphor in which a SMITL’s decisions are much like as looking at the stars. The key variables for success
are often always present, but sometimes they align to support decision or technology, and other times they do not.

Throughout this study, the variable *culture* continued to be discussed by participants. In the Figure 6 pyramid, culture is listed as crossing both the influencer and enabler plane. Research into the descriptive actions surrounding the word showed that it was neither an influencer nor an enabler but could impact both. Based on participant feedback, the culture of an organization will change over time. Innovative academic technology successes will improve the campus culture and its desire to make new investment decisions in support of additional academic technologies.

**Contributing Factors in Change**

In addition to the influencer, enabler, and culture themes, this research uncovered additional contextual, operational, and structural information which warrants discussion. The below contributing factors in change are grouped more narrowly than the primary themes. While specific scoring or weighted rubrics were not constructed as part of this inquiry, this data provides some point in time information noting responses from the CIOs about today’s technology and campus landscape.

The researcher noted common themes which emerged from participant responses which included the role of the CIO, strategies used to support academic innovation, and dealing with the unknown value proposition presented by most emerging academic technology. Specific to this broad research which evaluated MOOCs, these contributing factors in change help illuminate the pulse of campus and strategic operations and provide insight into how academic technologies are positioned and championed within an academic environment.

**Strategists, Plumbers, Leaders, and Followers.** Participants were the most passionate when answering questions related to their roles in helping promote and foster innovation within
the campus community. SMITLs specifically discussed assisting with campus-based challenges and leveraging the wide purview of the IT department’s strategic perspective to bring unique solutions to large campus projects. Despite discussing this large strategic role, the researcher notes that CIOs seem to be struggling with meeting their own expectations as a chief strategist. CIOs reported that their principle work would flip flop between strategist and plumber. CIO participants reference that they were are trying to get ahead of some technology hurdle, which required plumbing work to execute on the value proposition or strategy of the technology. In addition, the CIOs report that they are challenged by budget limitations and are faced with a rapidly changing technology environment. Exemplifying this challenge, CIO Johnson stated, “(Students are) using everything from tablets and phones to computers.” CIO Scott, best exemplified the challenge in front of SMITLs retelling a student's comments on the Blackboard mobile application review stating,

“Blackboard's development is stuck in the '80s. Can you imagine what this would be like if it was built by Apple or Google? There you go. That's the students' perspective. They're not comparing school X to school Y, they're comparing school X to Google and Apple and their best computing experiences. I think the key to it though, is leveraging technologies and skills or behaviors that they already bring to the door with them to be successful here. Everything that we do should look like what the rest of their daily life experience looks like.”

Programs like the Cloud, social media, and Bring Your Own Device (BOYD) put pressure on CIOs to continue to rapidly evolve their technology portfolio and position (Krigsman, Segal & Shaw, 2012). While this change will require investments in innovative and academic
technologies, SMITLs will struggle to keep pace with the rapidly changing consumer-driven technology environment.

**SMITLs Supporting Innovation.** “Innovation…is a purposeful change by means of the systematic inquiry we call scientific method and of the new knowledge gained thereby. Innovation aims at application; its goal is not knowledge in itself but effective change” (Drucker, 1959, p. 24). CIOs reported an expectation that they serve as their campuses technological information source, providing leadership to technology enabled projects. Evaluating their role in supporting academic technology innovation, CIO White stated, “So we can get those people to buy in, we can get a pilot going, and, you know, and then, then it's the, it's our job here I think as the CIO to find funding, find the resources to, to develop it further.” Exemplifying this challenge and leveraging prior business experience to help solve academic teaching problems, CIO Johnson stated, “I'm going tell you how I would approach this problem. I've already ... I've met with the provost and, um, I've shared a lot of what I see. So, so that teaching, that teaching moment I talk about with the digital component? If you take the word 'teaching' moment and change it to 'business' moment (the solution is more clear).”

**Strategic Plan and Undefined Value Proposition.** While CIOs are challenged to provide technology decisions in a rapidly changing technology environment, they also reported struggles managing technology projects as they evolved from pilots to full-campus solutions. The data in these findings confirm similar studies conducted more broadly about higher education CIOs. In 2013, the *Center for Higher Education Chief Information Officer Studies, Inc.*, a non-profit organization, identified that 14% of CIOs surveyed in higher education were responsible for areas outside of IT (Brown, 2014). Innovative Academic Technology is not always “academic” at its core. When discussing admissions and recruitment solutions, research
participants noted challenges or outlined vagueness in the launch of innovative academic technologies. In its broadest sense, it appears that the challenge was related to the ownership of the problem versus ownership of a solution. As reported, a problem with enrollment is academically owned by the admissions department. One of the solutions to enhance enrollment was to leverage a leading edge, cloud-based, customer relationship management system to increase the responsiveness of the admissions department. While the admission department ultimately owned the problem, the CIO and SMITL served as the champion of the implemented solution. During his interview, CIO Johnson specifically discussed a campus based project shifting from successful pilot, to successful departmental launch, to a full campus-wide solution. He was asked specifically if his role as Champion of the Technology would shift as the solution went from launch to campus-wide initiative. He responded,

“While I consider this to be on the same platform, being used primarily, at least initially, by the same organization within the university, it's the same project for me. We're kind of fumbling around the answer to that question.”

At another campus, the challenges were similar. CIO West reported,

“Many people have demonstrated the potential (for a specific academic technology), but they haven’t gotten past the economics, because the provost mistakenly perceived it as a quick way to make money, as opposed to a quick way to increase enrollment. Enrollment does increase money, but they’re two different things.”

While the ownership of a participation project or technology solution doesn’t not make the project successful or fail, this lack of clarity around campus ownership appears to be an
administrative risk which will require greater advanced planning as projects go from limited
scope pilot to institution-wide initiatives.

While CIOs reference a desire to provide strategy, they often answer that plumbing first
needs to be completed. Bridging the divide between these two norms are innovative
“infrastructure” or “platforms,” such as cloud based services, which provide both a plumbing
solution in server hosting and application uptime but also serve as a jumping off point for
innovative services. CIO Johnson stated, “I can give you all the technology in the world. If you
don't tell me how you're going to use that technology as part of your teaching methodology, or in
the pedagogy of the course, what good is it?”

Forty percent of research participants referenced a separate IT strategic plan. This
confirms research indicating that CIOs are placing less value on a formal IT-based strategic plan
and embedding their IT strategies in the institution’s plan. CIO West stated, “(The) strategic
plan is updated annually, and it’s communicated to everybody. Everybody knows what it is. The
challenge to one of the silos, to me, was to develop an IT plan that’s in concert with that.” CIO
Scott further elaborated on a project he was working on to “build out a strategic plan that aligned
with the university's goals and objectives. (We’re) early in development in terms of the
university's 10-year strategic plan.” The additional reliance on the institution’s plan may come
from the fact that CIOs don’t see a future forecast of technologies which create easy wins. CIO
Johnson stated his perspective on the changing landscape of technology, stating. “I don't believe,
today that there's a technology where I can say, ‘If I build it, they will come.’” CIO Scott, citing
similar concerns, uses a more business-centric approach to plan for technology. He stated,
“All of it is underpinned by this concept that I use of value chains. In business, if
you look at a value chain, starts out where you have a series of different things
that you do, from marketing to product development to all those kinds of things and when you get to the end of the chain, you product profit. Higher ed is not a whole lot different. It's just the order of those things is a little different, so in marketing you have the catalog. You have all kinds of activities that you do to try to recruit students and that kind of stuff. When you come out the end, what you're really looking at is for margin for reinvestment, the ability to gain efficiencies, and in each of those links in the value chains.”

Regardless of the planning cycle and particular strategies used, research participants indicated a need to align with the university, division, and department strategic plans. They indicated that broad strategies often would be derived from the institution’s primary goals, and information technology would have broader reach into the operational and tactical action items which lived within the plan.

**White Label Innovation.** One of the more interesting outcomes from this research was that the CIO participants’ desired to discuss MOOC based technology without calling them MOOCs. During the research, MOOCs struggled to overcome generalization with common asynchronous distance learning. In many ways, the MOOC was deconstructed and different segments such as distance delivery, lecture capture, and lecture playback were referenced in participant responses. In many ways, the CIOs “white labeled” MOOCs. This is an interesting observation, but it may have to do with the conceptual understanding of MOOCs. Multiple CIOs identified learning about MOOCs prior to the MOOC-moniker. Reflecting on when he first learned about MOOCs, CIO Scott stated,

“So my first experience with MOOCs was prior to them really being MOOCs and that was about 1998, '99…. Open University was the leader in that kind of thing
from the very beginning but all the way back to doing correspondence degrees.
Their next thing was, so they already had classes where they would have 700
students in a class but they were all sending paper and so the university and their
offices had readers and all of those things, designed to pyramid it up to a faculty
member of record kind of a thing. They were just getting ready to start to move
towards an electronic version of that. I think what happened was that their model
took over in places where due to necessity; you had to have education in a
distance.”

When evaluating emerging academic technology, only 40% of research participants referenced
some local-MOOC conversation. In comparison, similar innovative academic technologies such
as Software as a Service (SaaS) enrollment initiatives, lecture capture video based systems, and
other cloud technologies were all referenced. These alternate technologies have many
similarities to MOOCs providing an undefined value proposition and are early in the innovation
hype cycle. Perhaps more interesting was the fact that 60% of the research participants did not
reference a particular brand or the original equipment manufacturer as a source of information.

Broad questions about academic technology may not have lent themselves to brand-specific
answers, but given the density of equipment manufacturers, webinars, marketing, lunch and
leans, it was surprising that the providing vendor was not referenced.

In addition to a limited MOOC discussion, research participants were relatively silent on
the use of features within the learning management system which may support online learning.
The study participants also generally did not discuss the existing learning management system.
Only 40% of CIO respondents mentioned by name their learning management system, discussed
the evolution of the LMS roadmap, or its ability to meet changing student demand. This data
does not identify a particular gap, further research may want to identify if and when “brand” becomes conjoined with a technology capability or when the shift begins occurring from a whiteboard style problem statement to a formal RFP or vendor selection.

**Conclusion**

A search of higher education conferences will reveal multiple workshops, articles, and presentations dealing with how to be innovative in higher education. The growth of these workshops underscores the challenges facing leaders in higher education. The United States spends approximately twice as much on higher education as other developed nations and does so with lower graduation rates and higher total expenses (Giegerich, 2012). Higher education is undergoing a transformation from a mass model to a universal model, designed to broaden its reach to the entire population (Trow, 2007). Pressure to make changes can come from a number of external or internal sources, including other peer institutions, staff, or students. Successful innovation requires not just the right tools, but also a forward-thinking culture and support system. In addition, for innovation to be successful, institutions must evaluate supporting structural and procedural changes (Mitchell, 2009).

More recently, a 2014 report by the State Higher Education Executive Officers’ Association (SHEEO) found that states struggle to develop policies that use fiscal resources wisely while aligning existing opportunities with student needs (Finney, Perna, & Callan, 2014). This supported data found in a 2012 Grapevine study, also conducted by SSHEO, which reported that 41 states cut their 2011–2012 fiscal year’s spending on higher education (Palmer, 2012). While budgets were cut, a third of the states participating in the study reported double-digit decreases in that spending (Palmer, 2012). Today, numerous national, federal, and non-profit groups are working together to educate educators and charting a corrective course for higher
education. As a solution to fiscal crises, many colleges have chosen to set their own directions in this respect and innovate solutions to fiscal problems. As an example, a recent *NY Times* article written by an adult student who earned a “10K degree” through alternative education lauded open learning and alternative approaches to education (Brooks, 2013). The article described, through the social and economic standpoint of the 20 year-old student, how important it was to both succeed in higher education, and in a manner that left himself without significant debt (Brooks, 2013). Yet the limited and defined value proposition for MOOCs seems to be its biggest barrier for campus adoption. Discussing MOOCs and disruptive innovation, CIO Johnson stated,

“And you could apply the principle of disruptive technologies to MOOCs and say, ‘You know, we don't really need schools. We don't need brick and mortar schools. We'll teach everybody with MOOCs.’ But they really are short-sighted opinions, because they're not taking into account the fundamental cultural and value proposition that the, that the end users, or the customer, would benefit from.”

Innovation often involves “supply-pushed” changes, led by college administrators seeking new revenue, while also being “demand-led” and thus helping to capture the changing interests of potential students who consume the product (Wildavsky, et al., 2011). In 2008, McNeely and Wolverton discussed the impact technology could have on 21st century learning, based on changes and developments in economics, culture, and technology itself, and questioned the preservation of previous models of learning. Similarly, the Spellings Commission on the Future of Higher Education (2008) identified that post-secondary schools must increase access, accountability, affordability and quality of education. Specifically, the Spellings Commission called for higher education institutions to embrace and harness technology to meet the growing
needs of learners and the workforce, while finding efficiencies that could lower the cost of the higher education credential (Spellings, 2006).

As of September, 2014, more than six million people have signed up for a MOOC class (Selingo, 2014). In many ways, MOOC offerings combine aspects of academia, technology, and a culture of access to information to build their own unique learning community. Yet overwhelming MOOC student drop-out rates may challenge any institutional strategic plans to construct MOOCs. An argument can be made that after receiving ACE recommendation, a greater number of students will be interested in evaluating open learning as a replacement for tuition driven credit. The most recent figures from the Babson Survey Research Group’s 2013 survey of 2,800 academic leaders indicated that the opinion of MOOCs is diminishing in its perception of the product’s ability to be sustainable (Kolowich, 2015). Challenges and questions continue to persist with universities pitted between the high costs of MOOC development, the high dropout rate, and timeless aspect of the learning.

This research provides information on the viewpoints of five public SMITLs as they discussed themes on how they evaluate and operationalize academic technology innovations in higher education. This research, which identifies that paid analyst recommendations influence the CIO perspective on the value of MOOCs may consciously or unconsciously impact participant responses. In 2014, Gartner Inc. indicated that MOOCs were entering the obsolete before plateau stage. The CIOs perspective is clearly shaped by their belief that technology will be transformational, and while MOOCs value proposition is entering the trough of
disillusionment, the potential exists for it to plateau (Gartner, Inc., 2014). CIO Scott best stated the challenge in front of SMITLs and the evolving role of the CIO stating,

“I think they will also say they underestimated the role, what effect it actually could have in how many areas. One of the cool things about technology change is that it can be very insidious and I think Apple's the best example of that. Apple's been able to produce in a pretty consistent fashion a number of products that when they first came out, everyone looked and said, ‘What the hell do I need that for?’ Then after a short period of adoption, ‘How the hell did I ever live without this thing?’ I think other technologies are that way if we do them right.”

SMITL leaders defined items such as industry publications, faculty, peers, and C-level leaders, which influence and create awareness about innovative academic technologies. They defined objects such as governance, budget, pilot programs, and safe environments as enablers to help structure around experimentation these projects. They also identified that there are contributing factors in change which serve as the principle changing variable from campus to campus. SMITLs demonstrated an overwhelming belief that the CIO’s role was strategic, pushing and pulling these contributing factors in change. The SMITL defined and defended their role as a campus leader who will make informed and educated opinions. These opinions are informed and shaped by success and failure with the influencer and enabler strategy. Successes and failures were often identified as having cause and effect outcomes, ranging from a CIO building an internal lessons learned or failing and re-tooling their approach as new technologies present themselves.

Given the rapid change of technology and campus operations, these three principle groups of influencers, enablers, and factors live in a structured but organic and moving decision
model. Through the research compiled in this study, scholar practitioners and other SMITLs or CIOs may find best practices to aid in their local campus innovation plans. This research has been compiled through the lens of the senior IT leader, who brings a technology-based and unique C-level perspective to both their understanding of technology and how innovation occurs.

**Recommendations for Future Research**

This study provides details on how academic innovations can be approached by public institution senior IT leaders. This research identifies principal behaviors and attitudes of technology leaders relative to their perspective and their approach to potential adoption of technology on campus. This research was limited to public institution CIOs and future research may branch off both deeper and broader to determine if these patterns exist similarly in other populations. A broader project which tests a similar question set using private school technology leaders, may uncover different patterns. A similar study may be used, leveraging focus groups instead of individual interviews. The focus group may help set the context for discussing experiences, relevant organizations and professional experiences which may influence the participants’ decisions (Seidman, 2006). In addition, a longitudinal quantitative study might examine public and private senior leaders across a multi-year technology adoption curve.

In future research, a case-study analysis of a particular institution might be undertaken to measure the behavior and performance of an academic technology initiative relative to other supporting and leading factors on a college campus. In addition to the CIO, there are many technology or academic leaders including library directors, provosts, CFOs, and others who can play a pivotal role in an initiatives success and/or failure. The actions and reactions of these peers, and partnering with the CIO has proven to be a consistent theme and specific empowering or supporting interactions may be identified.
If provided an opportunity to continue the work begun here, this researcher would plan to interview the same research subjects for a longitudinal-based follow-up. Given the growth, maturity, and evolution of the MOOC technology, the changing climate of higher education, and the increased pressure on cost containment, the greatest benefit in future research may come from evaluating the same population in two years’ time, as the technology continues to mature and progress through the adoption cycle. At that time, chief technology leaders may be evaluating a transition from a MOOC 1.0 platform to a next generation 2.0 platform or an aspect of MOOC learning may have splintered off into their own discrete products.

This broad, qualitative study, designed to identify if common variables existed, did not truly test or compare the efficacy of the enabler variables. In these research findings, at a macro level, all enabler variables were created equal. Future research may evaluate the potential weight distribution of different enablers.

**Budget restrictions.** Multiple times throughout this study, references were made to budget cuts and the limits that a budget cut places on the CIO on his or her institution’s ability to change, grow, and innovate. On some occasions it impaired the CIOs ability to maintain current services. In response to local or state-wide funding challenges, it was also noted that sometimes a third-party source or “outside” groups may have the ability to help fund projects which enables certain CIOs to identify and acquire outside funding relative to budget need or desire to leverage technology which is not funded.

**Piloting Technology Innovations.** Given the overwhelming response to the use of pilots, it would be interesting to evaluate if there are specific conditions which drive the use of pilots which are specific to innovative academic technology versus other types of technologies. Some participants referenced the use of infrastructure providers, such as cloud providers, or hosted
application providers, and there was a limited reference to pilots. Future research may evaluate if the academic technologies have a different adoption plan than traditional plumber technologies.

**Analyst services.** Multiple CIOs referred to paid analyst services. Analyst services like Gartner, Forrester, and InfoTech provide multiple levels of membership and analyst service from a dedicated analyst to basic whitepaper information. Given the number of references made by CIOs to analyst services, future research may explore if there is any difference in the efficacy of knowledge provided to the SMITL relative to the type of membership or services which are provided.

A final research path may be to evaluate the “innovativeness” of academic technology on an innovation scale. This research identified that some of the technology, such as cloud-services, have been in place for over five years. Future research may evaluate the SMITL’s belief that they are exploring innovative technology specifically in the higher education sector relative to the technology’s exploration in another vertical. The application of a technology such as SaaS based services may be new in higher education and this may serve as an “innovator” relative to the vertical market of higher education peers but the true innovation is often done by early adopters who are evaluating the technology right out of the research and design aspect.
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NOTIFICATION OF IRB ACTION

Date: December 18, 2014  IRB #: CPS14-12-01
Principal Investigator(s): Kristal Clemons
                        George Claffey
Department: Doctor of Education Program
           College of Professional Studies
Address: 20 Belvidere
         Northeastern University
Title of Project: MOOC Learning and Impact on Higher Education
Participating Sites: Permission received from American Embassy School
DHHS Review Category: Expedited #6, #7
Informed Consents: One (1) signed consent form
Monitoring Interval: 12 months

APPROVAL EXPIRATION DATE: DECEMBER 17, 2015

Investigator’s Responsibilities:
1. The informed consent form bearing the IRB approval stamp must be used when recruiting participants into the study.
2. The investigator must notify IRB immediately of unexpected adverse reactions, or new information that may alter our perception of the benefit-risk ratio.
3. Study procedures and files are subject to audit any time.
4. Any modifications of the protocol or the informed consent as the study progresses must be reviewed and approved by this committee prior to being instituted.
5. Continuing Review Approval for the proposal should be requested at least one month prior to the expiration date above.
6. This approval applies to the protection of human subjects only. It does not apply to any other university approvals that may be necessary.

C. Randall Colvin, Ph.D., Chair
Northeastern University Institutional Review Board

Nan C. Regina, Director
Human Subject Research Protection

Northeastern University FWA #4630
Hello ____(Insert First Name)____. I found your name listed on your institution's website as the Senior IT Manager and Leader. My name is George Claffey. This year, as part of a doctoral program at Northeastern University, I began investigating how public higher education technology leaders have been engaging with the growing Massive Open Online Course (MOOC) movement. Specifically, I am evaluating strategies that CIOs use as they begin to place innovations, both general and specific to MOOCs. I am hopeful that this research will result in the development of best practices that public university CIOs can use as they begin to look at new innovations and transformative technology.

I would like to inquire if you would be willing to participate in my research as a participant. Participants are being asked to take part in a single one-on-one interview as well as participate in a focus group. Your acceptance is completely voluntary. I anticipate that the total time required will not exceed 90 minutes. The one-on-one interview can be conducted over the phone, using video conference, or in person at a location of your choosing. All information will be collected confidentially and redacted. The focus group will be held in the Hartford, CT area at a time and date most convenient to participants. I appreciate your willingness to consider this request.

All interviewees will receive a copy of the full dissertation proposal and an advance copy of the conclusion section which will include the findings of the research. If you would like to participate or are interested in a deeper review of the research before deciding, please email me at claffey.ge@husky.neu.edu agreeing to participate.

Thank you in advance for considering this request.
Informed Consent Document

Northeastern University, College of Professional Studies, Education Department
Name of Investigators: Principal Investigator, Dr. Kristal Moore Clemons
Student Researcher, George Claffey

MOOC Learning and Impact on Higher Education

Informed Consent to Participate in a Research Study

We are inviting you to take part in a research study. This form will tell you about the study, but the researcher will explain it to you first. You may ask this person any questions that you have. When you are ready to make a decision, you may tell the researcher if you want to participate or not. You do not have to participate if you do not want to. If you decide to participate, the researcher will ask you to sign this statement and will give you a copy to keep.

Why am I being asked to take part in this research study?

We are asking you to take part in this study because you are a Chief Information Officer or Senior IT leader at an accredited public higher education institution in New England.

Why is this research study being done?

The purpose of this research is to develop a survey which will evaluate how Chief Information Officers (CIOs) in higher education institutions determine how they evaluate emerging academic technology. Specific focus will be the collection of information on how CIOs evaluated or are evaluating Massive Open Online Learning (MOOCs) and their potential use in public higher education schools.

What will I be asked to do?

Interviews will have two steps. The first step is an individual (one-on-one) interview which should take approximately 45 minutes. If you decide to take part in this study, we will ask you approximately 6-8 questions about how technology is implemented within your campus environment as well as the culture, communication, and support that you as the senior leader provide to the campus. Questions will be specific to you as the individual and answers will speak to your specific role, scope, and institution. A short phone call or Skype/video follow-up session may be held if there are any outstanding questions or statements which need to be clarified.

All individually interviewed participants will have the opportunity to take part in a second focused group of their peers. In this setting, 4-5 questions will be asked in a group setting. These questions are broader and speak to the larger role of the Chief Information Officer relative to academic decisions, the future growth of the Chief Information Officer position, as well as broad strategy and innovation questions. This focus group will last approximately 45 minutes.

Where will this take place and how much of my time will it take?

The primary participant engagement will be an in-person interview located at a location identified as convenient and comfortable by the research participant. As an alternate method, a standard conference call or video conference bridge will be set up. This study is expected to only require a limited amount of time, not to exceed three hours, between the primary interview and any possible follow-up questions that need to be asked. If the initial interview will be conducted in-person, subsequent follow-up or clarifications may be conducted via e-mail or phone.

Will there be any risk or discomfort to me?

It is expected that there is no foreseeable risk or discomfort associated with this study.

Will I benefit by being in this research?

APPROVED

Northeastern University - Human Subject Research Protection
Rev. 3/28/2014

000 Renaissance Park
Northeastern University
Boston, MA 02115-5000
Tel: 617.373.5700 Fax: 617.373.5435
There will be no direct benefit to you for taking part in the study. However, the information learned from this study may help current and future generations of Chief Information Officers, aspiring CIOs, or other senior managers/IT leaders with strategy or a framework for evaluating emerging academic technology.

**Who will see the information about me?**

Your part in this study will be confidential. Only the researchers on this study will see the information about your individual and focus group interview. The focus group attendees may know each other but for the purpose of research, all records of all conversations will be kept confidential. No reports or publications will use information that can identify you in any way or any individual as being of this project. All efforts will be made to maintain the confidentiality of participants.

Participants will be classified by average institution size, student population, and Carnegie class. All research subjects and their respective university names will be kept confidential. If the research benefits from using direct quotes, pseudonyms will be assigned and used for all research participants. To enhance the protection and confidentiality of the research, all e-mail communication between the participants and their executive assistants or schedulers will have "host header" and individually identifiable information removed prior to electronic storage.

Data will be stored on an encrypted file storage system, protected by file and folder security, and backed up. This process of encryption and password protection will provide a layered approach to security and ensure data is protected while at rest. Three years after acceptance of the dissertation all audio and raw data transcripts will be digitally shredded using a DOD 5220.22-M wipe-standard which satisfies the federal requirement for the destruction of secure digital information.

In rare instances, authorized people may request to see research information about you and other people in this study. This is done only to be sure that the research is done properly. We would only permit people who are authorized by organizations such as the Northeastern University Institutional Review Board to see this information.

**What will happen if I suffer any harm from this research?**

No special arrangements will be made for compensation or for payment for treatment solely because of my participation in this research.

**Can I stop my participation in this study?**

Your participation in this research is completely voluntary. You do not have to participate if you do not want to and you can refuse to answer any question. Even if you begin the study, you may quit at any time.

**Who can I contact if I have questions or problems?**

If you have any questions about this study, please feel free to contact my Dissertation Advisor and co-Principal Investigator Dr. Kristal Moore Clemmons at k.clemmons@neu.edu. You can also contact myself, the other co-Principal Investigator claffey.ge@husky.neu.edu

**Who can I contact about my rights as a participant?**

If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel: 617.373.4588, Email: n.regina@neu.edu. You may call anonymously if you wish.

**Will I be paid for my participation?**

Participants will not be compensated for participation.

**Will it cost me anything to participate?**

APPROVED

Northeastern University - Human Subject Research Protection
Rev. 3/28/2014
There are no costs to research participants.

Is there anything else I need to know?
You must be at least 18 years old to participate.

I agree to take part in this research.

______________________________       ________________________
Signature of person agreeing to take part       Date

______________________________
Printed name of person above

______________________________
Signature of person who explained the study to the participant above and obtained consent

______________________________
Printed name of person above

APPROVED
NU IRB: C-XX-14-12-01
VALID THROUGH 12-31-15

Northeastern University - Human Subject Research Protection
Rev. 3/28/2014
From: George Claffey [mailto:claffey.ge@husky.neu.edu]
Sent: Tuesday, January 06, 2015 9:03 PM
To: George Claffey
Subject: George Claffey's Invitation to participate in my dissertation research study

Hello. I found your name listed on your institution’s website as the Senior IT Manager and Leader. My name is George Claffey. This year, as part of a doctoral program at Northeastern University, I began investigating how public higher education technology leaders have been engaging with the growing Massive Open Online Course (MOOC) movement. Specifically, I am evaluating strategies that CIOs use as they begin to place innovations, both general and specific to MOOCs. I am hopeful that this research will result in the development of best practices that public university CIOs can use as they begin to look at new innovations and transformative technology.

I would like to inquire if you would be willing to participate in my research as a participant. Participants are being asked to take part in a single one-on-one interview as well as participate in a focus group. Your acceptance is completely voluntary. I anticipate that the total time required will not exceed 90 minutes. The one-on-one interview can be conducted over the phone, using video conference, or in person at a location of your choosing. All information will be collected confidentially and redacted. The focus group will be held in the Hartford, CT area at a time and date most convenient to participants. I appreciate your willingness to consider this request.

All interviewees will receive a copy of the full dissertation proposal and an advance copy of the conclusion section which will include the findings of the research. If you would like to participate or are interested in a deeper review of the research before deciding, please email me at claffeyge@husky.neu.edu agreeing to participate.

Thank you in advance for considering this request.
-George Claffey Jr.
Appendix C: Reflective Appraisal of Process

As I conclude this project, I reflect on the entirety of the research, the process, the participants, and the study. This reflection is written to provide future information to support similar research or researchers using Senior Most IT Leader participants in a research process. Overall, I did not follow the path that I expected. While the literature review indicated that I should be positioning the participant interviews at an ideal time to understand how a new technology such as MOOCs create an innovative disruption in higher education, the actual impact of the technology was less than predicted. Despite this deviation from what was expected, I believe strong research findings were uncovered. This is a direct result of the openness of the research participants in explaining their rationale and campus perspective on the role and scope of the CIO relative to how emerging academic technologies are integrated into campuses.

This process, starting in early 2013, was designed to map and track MOOC learning as it evolved, matured, and began to change our contemporary understanding of the higher education experience. Since beginning this research, MOOCs have begun to fade in public and professional opinion. The largest challenge to researching an innovative academic technology is that it fails or begins to fade during the research and the researcher must struggle to grow and support their research at a time when use is diminishing. While this research project took less than two years to complete, caution should be given to any future researchers who wish to evaluate emerging technologies. Significant speed and agility are required to protect the researcher from researching a technology which has been or is being obsolesced. This may challenge future researchers in determining sample size and research methods as they look for a process which can be completed reasonably quickly.
The SMITL research participants were simply a great group of leaders to interview. They serve as a wealth of knowledge with experiences and personalities shaped by their progression to the SMITL position. I would recommend that any current, former, or aspiring SMITL, who is doing practitioner based research, interview higher education SMITLs. The narrative inquiry method provided an excellent means for understanding, in their own words, the thoughts, feelings, and emotion of the research participant.

This research project is complete, but I believe that these participants and their stories are not fully told through this research. Future researchers should look to this population and evaluate other topics. In addition to gaining a greater appreciation for my peer group, I became more enamored with the different processes, experiences, and challenges which helped shape each participant and their understanding of their role. Through this process, and beyond the scope of my research questions, I have learned more about the role of the Senior Most IT Leader, and I hope to share this information and personally leverage it as I continue my career as a SMITL.
Appendix XXXX – Interview Script

My name is George Claffey and I am a doctoral candidate at Northeastern University in the Doctor of Education program. I am hoping this study will provide greater insight into how senior IT leaders and institutions are successful or decide not to make investments in emerging technology.

Thank you for agreeing to participate in this dissertation research. The purpose of this study is to tell the stories of senior IT leaders who are evaluating emerging technology which does not have a fully defined and direct value proposition. This interview will have a specific focus on the process and thoughts about innovation and the evaluation of Massive Open Online Courses or MOOCs at your campus.

I would like to remind you that all information will be kept completely confidential. No identifiable information will be used. Your participation is completely voluntary. If it is okay, I will be recording this session and I will provide you a copy of the transcript for your review. Is it okay to proceed?

Thank you for participating. I’ll be in touch with you about a copy of your transcript and for further information, so that we I can get an accurate account of your story.

Individual Interview Questions:

1.0 Let’s start off with some basic questions to better understand the prospective you will come from. How long have you been the CIO here.

1.0.1 Educause has a title referred to as the Senior Leader or IT Manager, meaning the highest ranking IT member of an organization. Thinking back and including your previous positions, how many years have you served in this capacity.

1.2: Can you tell me how you came into your role as a chief information officer (or senior IT leader)?

1.2.5 -Probe- EDUCAUSE, often asks if a CIO is serving institution’s chief strategist or plumber, someone who is focusing on making sure everything works. How would you characterize yourself and the needs of this institution?
1.3: Tell me about an early attempt you remember to launch an innovative technology or academic technology product.

1.4: Can you describe what problem your program was seeking to solve? Or what problem are/were you trying to solve with the launch of this technology?

1.1: Please tell me about your current innovative technology endeavor?

-Probe- You are now working on ____________, can you tell me more about it? Its purpose? How long you have been working on it? How do you see your project as changing in the future?
1.5: During the focus group we discussed the role of the SMITL and how the SMITL is viewed on campus. Specific to yourself, five years from now, when individuals are discussing a technology innovation project, what will they say about the role of the SMITL on campus?

2.1: Let’s discuss MOOCs specifically. Do you know when you first learned about it, how do you learn about emerging projects like MOOCs, was or is there any particular data points that shaped your understanding or prospective on this innovation?

-Probe- You have outlined a (process, strategy, or ad-hoc system) do you see yourself continuing in the same manner?

3.1: Focusing specifically on MOOCs, can you discuss if and how you evaluated this technology?
3.2: How do you determine an academic technologies potential fit for your institution?

4.1: How is IT strategic planning conducted?

-Probe- What are the artifacts of this work?

4.2: How does the strategic plan impact Academic Technology decisions?