TECHNOLOGY ENHANCED TEACHING AND LEARNING:
A STUDY THAT EXAMINES HOW THREE DIVERSE UNIVERSITIES
ARE INFLUENCING CHANGE

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Peggy A. McCready
DEDICATION

To my parents, Carole and Forrest McCready:

Thank you for teaching me that anything is possible through hard work and perseverance.
ACKNOWLEDGEMENTS

This dissertation would not have been possible without the 49 participants who graciously provided their time and insight into the research questions guiding this study. I’m incredibly grateful to have met such talented and dedicated professionals and to have learned more than I ever dreamed possible from their collective experience. I’m also thankful to Lynne O’Brien of Duke University, Joel Hartman of the University of Central Florida and Ben Hubbard of U.C. Berkeley, who participated in the study and introduced me to senior administrators, technology leaders and faculty members at their respective institutions.

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ABSTRACT

TECHNOLOGY ENHANCED TEACHING AND LEARNING:
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Peggy A. McCready
Robert M. Zemsky

Recent trends toward on-line learning and open education suggest that the role of technology will only become more prominent in higher education. As a result, faculty members will increasingly be expected to infuse more technology in face-to-face courses, while teaching in multiple course delivery modalities. Senior administrators and technology leaders are faced with the dilemma of advancing technology enhanced teaching and learning practices for a faculty that isn’t necessarily convinced change is necessary. The resulting tension between the administration and faculty will either limit actual change or prevent it completely. The following research examines those factors influencing the growth in technology-based teaching and learning at three very different institutions that have a focus on research and teaching. The study also examines those strategies or actions shown to be helpful in advancing new and innovative teaching practices. The research sites include Duke University, the University of Central Florida and the University of California, Berkeley. The findings suggest that there isn’t a one-size-fits-all solution to advancing technology enhanced teaching and learning, and an institution’s ability to successfully lead change requires a shared understanding of why
change is necessary. Change efforts require more than just a few faculty members that are willing to explore new teaching practices, as well as sufficient resources to advance experimental teaching initiatives. Incentives aimed at advancing the innovative use of technology to support teaching and learning goals also play an important role in leading change. The research suggests that the factors influencing technology enhanced teaching and learning differ among institutions and are unique to the institution’s mission, history, culture, and student population. Senior leaders all too often come into an institution and attempt to lead change based on their experience at a former place of employment. The findings suggest that leaders need to become familiar with the unique characteristics of an institution before making decisions about how best to advance technology enhanced teaching and learning, while partnering with the faculty in leading change.
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Chapter 1: Introduction

Efforts to Advance Technology Enhanced Teaching & Learning

Over the last decade there has been much discussion about the increasing role of technology in American higher education. As was so eloquently argued in *Thwarted Innovation* (2004), early attempts to permeate e-learning throughout higher education didn’t produce the intended results -- widespread, systemic change in how faculty teach and courses are delivered (Zemsky & Massy, 2004). Moving forward to 2008, research sponsored by the New Media Consortium predicted that technological innovation would have a major impact on teaching methodologies over the next five years (Glenn, 2008). While this research suggests that insufficient resources, such as the lack of instructional designers, may indeed slow down efforts to advance technology-based teaching and learning practices, nearly 60% of the study’s 289 participants reported that professors would soon teach in more than one medium (Glenn, 2008).

Now in 2013, the most significant innovation to occur in teaching with technology over the last five years is the development of Massive On-line Open Courses (MOOCs). MOOCs do not provide college credit, are open to anyone, typically at no charge and often with unlimited enrollment that commonly exceeds 20,000, 50,000 and even 100,000 for a single course. The initial providers of MOOCs included America’s most elite research universities. While there is great potential for MOOCs to transform teaching and learning in face-to-face courses, most institutions are just beginning to
experiment with these types of initiatives. The year of 2012 will likely be remembered as the year that on-line learning exploded in higher education. College and university presidents, fearful of being left in the dust or losing their jobs, are attempting to do everything possible to advance institutional efforts in providing on-line education, including MOOCs.

Another significant event that influenced a growing number of institutions to consider on-line education was the economic recession of 2008, which forced even the wealthiest of institutions to impose cost cutting measures. Public institutions interested in providing a high quality education that is both accessible and affordable are increasingly turning to on-line education as a method for improving efficiency, reducing costs and generating new revenue. Advances in the science of learning, substantial growth in the movement toward open-education, and an increasingly global society are all factors that have led some of America’s most prestigious institutions to embrace on-line education.

While there are a variety of reasons behind the growing trend toward on-line education, it’s important to note that few institutions have fully considered the wide-range of implications in advancing these efforts, including faculty development and the costs associated with providing high-quality, on-line courses. Most institutions face difficulty determining which courses or programs should be made available on-line, while searching for the right balance between on-line and face-to-face learning. The unfortunate reality for many of America’s leading research universities is that there is
still a rather large community of academicians that cling to traditional teaching practices within an organizational culture that rewards research over teaching.

A growing number of institutions have updated their strategic plans to include “innovation in teaching” as a priority, although few have developed a strategy for advancing the exploration of new and innovative teaching practices, with or without the use of technology. At the center of teaching innovation, lies the harsh reality that there are significant differences between “the have’s and the have not’s” of American higher education. The result is an increasing level of differentiation between institutions that are innovative by choice versus those that are innovative by necessity.

Despite recent advances in on-line education, technology is still primarily looked upon by faculty members as a tool for improving efficiency or enhancing current teaching practices, as opposed to transforming teaching and learning. For institutions to successfully integrate technology into the teaching and learning process, faculty members will have to reexamine the curriculum in terms of what they teach, in addition to how they teach it (Miller, Martineau & Clark, 2000). An institution’s ability to foster new teaching practices relies on adequate incentives and resources for change.

The selection and integration of technology must be accomplished in a manner that is consistent with the institution’s mission and strategy, so that learning is improved, while organizational priorities and identities remain intact (Miller et al., 2000; Bonk, Cummings, Hara, Fischler & Lee, 2000). Another essential element for advancing technology-based teaching and learning practices is the development of a formal assessment process that allows institutions to measure the impact of technology on
teaching and learning. Few institutions have the resources to lead these assessment efforts, and for many institutions, the end-of-semester course evaluation is the primary tool for evaluating teaching.

Technology has the potential to change the fundamentals of the higher education market, including the nature of teaching and learning. The forces and trends cited above strongly suggest that the role of technology will only become more prominent with time, influencing more faculty members to embrace on-line education or elements of on-line teaching in face-to-face courses. The factors influencing this transformation will vary by institution and the path to leading change will likely be fraught with tension between the administration and faculty. For many institutions, long-term improvements to teaching with technology will come slowly and will require a significant commitment by the administration and faculty. While there isn’t a one-size-fits-all solution to advancing technology enhanced teaching and learning practices, an institution’s ability to successfully lead change will require a shared understanding of why change is necessary and incentives for change.

**Overview of Research**

As evidenced by the literature reviewed, there is an increasing awareness of the need to rethink traditional teaching practices through the use of technology. While numerous research studies have focused on faculty adoption of technology or the effectiveness of technology for enhancing education, few studies have addressed the
factors influencing the evolution of new teaching practices and strategies necessary for leading change. The primary objective of this study was to identify how three very different universities, with a focus on research and teaching, are influencing the evolution of new, technology-based teaching and learning practices, primarily in the Humanities and Social Sciences. More succinctly, the study sought to identify those factors that are believed to be influencing the growth in technology-based teaching at the selected institutions, while examining those strategies found to be helpful in leading change. The study focused primarily on classroom-based and hybrid courses, which include both face-to-face and on-line instruction. As there is a high degree of speculation that recent trends in open and on-line education will influence teaching in face-to-face courses, the study also explored how the institutions and faculty are responding to these increasing trends.

The most effective way to learn about this phenomenon was through qualitative case study research that examined three universities with a reputation for promoting innovative teaching and learning practices through the use of technology, either traditionally or out of recent developments. While the factors influencing change differed among the universities, there is a great deal that can be learned from studying both the differences and similarities in strategies across institutions. The study also sought to identify those strategies (or actions) that were most helpful in leading change efforts, for example, how the institutions incentivize, encourage and support the faculty in the exploration of new or innovative technology-based teaching and learning practices.
Research Questions

The research questions guiding this study were exploratory in nature and the phenomenon under consideration had different outcomes based on the institution’s classification, size and funding model. Through qualitative research, the study provided an opportunity to gain valuable insight from faculty, senior administrators, and technology leaders regarding their experience in advancing, supporting or adopting technology-based teaching and learning practices. There were five research questions that guided the study:

1. What strategies (or actions) were most helpful at influencing technology-based teaching and learning practices?
2. How does the institution encourage and support faculty in developing new teaching practices for the advancement of learning?
3. How have teaching practices changed through the use of technology?
4. What considerations or factors should be taken into account when attempting to introduce technology into the curriculum?
5. How does the view on technology-based teaching and learning practices differ, if at all, between senior administrators and faculty members?

Site Selection & Study Participants

Three universities with a reputation for promoting technology-based teaching and learning practices, either traditionally or as the result of recent developments, were
selected for the study. While all three institutions have a focus on research and teaching, their institutional characteristics, including the student population they primarily serve, are unique. The selected sites include the University of California, Berkeley; Duke University, and the University of Central Florida. The University of Central Florida (UCF) is both the youngest and largest of the three institutions. UCF is also the only site that is a multi-campus university, which includes 10 regional campus locations in addition to the main campus that is located in Orlando.

**Table 1. Overview of Research Sites**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Founded</th>
<th>Institution Type</th>
<th>Fall 2011 Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California, Berkeley</td>
<td>1868</td>
<td>Public, AAU</td>
<td>Undergraduate: 25,885 Graduate &amp; Professional: 10,257</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Number of Students: 36,142</td>
</tr>
<tr>
<td>Duke University</td>
<td>1924</td>
<td>Private, AAU</td>
<td>Undergraduate: 6,526 Graduate &amp; Professional: 8,220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Number of Students: 14,746</td>
</tr>
<tr>
<td>University of Central Florida</td>
<td>1968</td>
<td>Public with growing research capacity</td>
<td>Undergraduate: 50,002 Graduate &amp; Professional: 8,696</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Number of Students: 58,698</td>
</tr>
</tbody>
</table>

The researcher spent between 4 and 5 days at each institution to allow sufficient time for data collection. The study included a total of 49 participants. A total of 33 individual interviews were conducted across all institutions, which included faculty, lecturers, vice provosts, deans, department chairs, chairs of the faculty senate or governance committee, technology leaders, instructional designers, and technology support specialists. A faculty focus group was conducted at each site that included a total of 16 faculty members (across all institutions) who were teaching in the Humanities or
Social Sciences. Several of those individuals serving in senior leadership roles also had teaching responsibilities. While the study intended to focus primarily on technology enhanced teaching and learning for classroom-based and hybrid courses, the conversations with study participants quickly shifted toward on-line.

**Introduction of Chapters**

Chapters 2 through 4 are meant to acquaint the reader with the selected sites by providing a brief overview and introduction to the institution’s history, culture and unique characteristics. The case studies provide examples of how the institution is attempting to foster the evolution of new teaching practices and expanded use of educational technology from the distinct views of the administration and faculty. As efforts to grow on-line education are expected to influence changes in how faculty members teach face-to-face courses, the case studies also provide information regarding efforts to expand the provision of on-line courses at the undergraduate level and through the provision of MOOCs. Where study participants expressed concern about the disadvantages associated with the increasing use of technology, the cases provide a summary of these concerns. Finally, the case studies provide an overview of the strategies and incentives believed to be helpful at influencing technology enhanced teaching and learning practices with lessons learned for each case. The final chapter, Chapter 5, draws upon the case study research to answer the five research questions.
guiding the study. Chapter 5 also provides concluding remarks and opportunities for future research.
Chapter 2: Duke University

Brief History & Overview

A southern icon located in Durham, North Carolina, Duke University is a highly selective, private research university that is consistently ranked among the nation’s leading institutions by the *U.S. News & World Report*. Recognized as one of America’s medallion universities, Duke provides a superior liberal arts education for undergraduate students, while advancing the frontiers of knowledge as a major research university. Duke was founded in 1924 and is a relatively young institution in comparison to many of its Ivy League competitors. Despite its youth, Duke has distinguished itself as one of 62 leading public and private research universities in the United States and Canada that have been recognized by the American Association of Universities for their excellence in research and teaching. Duke is also known for providing a hands-on approach to undergraduate education with an institutional culture that fosters a strong commitment to service learning and interdisciplinary programs in research and teaching.

Duke University traces its roots back to 1838, when a gentleman by the name of Brantley York was employed as a permanent teacher for a subscription school in rural Randolph County, North Carolina. Braxton Craven, York’s successor, would later turn to the state of North Carolina for assistance in re-chartering the school in 1851 as the Normal College, which earned the privilege of granting degrees in 1853. In exchange for providing free education to Methodist preachers, the church would provide financial
support for the College that in 1859 would officially become known as Trinity College (Duke University, A Brief Narrative, 2007).

A significant turning point in the development of Duke University occurred in 1887, when Northern-born, Yale trained John F. Crowell became president of Trinity College. Crowell, who was committed to the German university model that emphasized research over recitation, led a substantial revision of the College’s curriculum, established the first campus-wide research library and persuaded the trustees that the future of the College lay in an urban environment where it would be far easier to attract students, faculty members, and financial support (Duke University, A Brief Narrative, 2007).

In 1892, Trinity College moved to Durham, North Carolina. While the College wasn’t devoid of financial difficulties, enrollment had increased, including students from out-of-state, enabling the college to survive the vicissitudes of the Civil War and Reconstruction (Duke University, A Brief Narrative, 2007). In 1924, James B. Duke, a tobacco and electrical power industrialist, formalized the Duke family’s philanthropy efforts with the establishment of The Duke Endowment. The Duke Endowment, a forty million dollar trust fund, was distributed in the Carolinas among hospitals, orphanages, the Methodist Church, three colleges and a university built around Trinity College (Duke University, A Brief Narrative, 2007). James B. Duke agreed to name the new institution Duke University on the condition that it would serve as a memorial to his father and family.
Today, Duke University consists of nine separate colleges and schools including Trinity College of Arts & Sciences, the liberal arts undergraduate college, and eight professional schools that include business, divinity, engineering, environment, law, public policy, medicine and nursing. The schools of environment, engineering, and public policy also offer undergraduate instruction, and many professors teach across traditional disciplinary boundaries. Duke’s campus spans more than 9,000 acres with nearly 7,200 acres of forested lands, putting students, faculty and visitors in touch with nature (Duke University, Campus Overview, 2012). Students frequently commute between Duke’s East and West Campuses that are separated by 1.5 miles of park-like grounds. The majority of academic programs, student activity and classes take place on Duke’s West Campus, which is replete with Gothic architecture, a common staple of America’s most prestigious universities.

Duke enrolls nearly 15,000 students through undergraduate, graduate and professional degree programs. Over 30,000 student applications were received for undergraduate admissions in 2012, of which 1,714 were enrolled (Duke University, Quick Facts, 2012). Duke attracts the highest quality students, while competing with America’s best colleges and universities for faculty who are respected leaders in their field. The University has a low number of transfer students and an exceptionally high completion rate with 95% of its undergraduate students graduating in four years (Duke University, Quick Facts, 2012). As an institution which measures quality by its hands-on approach to providing an undergraduate education, Duke has a low student-to-faculty
ratio (8:1), fostering small class sizes and a higher level of interaction between the faculty and students (Duke University, Quick Facts, 2012).

While undergraduate education has always been central to the vision of Duke and its expectations for faculty, senior administrators suggest the University is turning again to a focus on pedagogy. Duke’s faculty offers a different view, suggesting there is little incentive to improve one’s teaching, indicating decisions about tenure, salary and promotions are primarily based on research productivity. There is a paradox that exists between the view from the top (administration) and the view from the field (faculty). While the administration has great aspirations to foster innovative teaching and the expanded use of educational technology, faculty members don’t necessarily believe there is reason to change.

Like most research universities, Duke struggles to lessen the perception that teaching and research are separate and competing entities (Duke University, Making a Difference, 2006). “Our best researchers and scholars are not given, and do not expect, reduced teaching loads,” proclaims Duke’s strategic plan (2006). Yet, at the same time, an increasing number of high-impact courses were migrating from regular rank faculty to non-regular rank faculty, prompting Duke’s administration to revisit its faculty buyout policy, eliminating courses taught by non-regular rank faculty with an enrollment below eight students (Duke University, Arts & Sciences Strategic Plan Update, 2010). A senior administrator explained, “If faculty can get grants and buy out of courses they will,” suggesting that Duke’s culture is not one that values teaching across the board.
Recognizing a new model of teaching has emerged, replacing that of “sage on the stage,” the University’s strategic plan (2006) calls upon its faculty to pursue the thoughtful and innovative application of educational technology in an effort to provide active, inquiry-based learning, foster communication and interaction, and maximize opportunities for students to learn both inside and outside of the classroom. The administration’s rationale for the expanded use of technology is that it will enable faculty to spend more time on engaging students in the learning process, supporting curricular goals and identifying ways to integrate teaching and research activities (Duke University, Making a Difference, 2006).

The challenge for Duke is that technology has not traditionally played a central role in supporting the University’s teaching mission. Efforts to expand the use of educational technology and influence the evolution of new teaching practices have resulted in small pockets of innovation, suggesting the proverbial ice is beginning to melt, although at a pace more slowly than what the administration had hoped would occur. The factors influencing the University’s expanded use of technology are unique to the institution’s primary model for teaching, which includes small, face-to-face courses that foster a high level of interaction between the faculty and students. Recent efforts to advance on-line education at the undergraduate level are primarily meant to provide a larger course selection for students, while providing added flexibility and convenience in how students complete courses. The key difference is that Duke’s faculty is innovative in its teaching by choice, versus innovative by necessity.
The Culture of Duke

Duke University is an institution that is still largely driven by its undergraduate mission. One of the advantages of being a highly selective, private research university is the institution’s ability to shape its admissions by attracting the best quality students, who perform brilliantly and work hard to succeed. Unlike public universities that cater to traditional and non-traditional undergraduate students, including part-time and adult learners, the largely homogenous undergraduate population that Duke serves is comprised principally of high-quality, full-time students, who live on campus for four years and move on after graduation.

Duke University is a resource rich, high-touch environment, so the sheer lack of resources isn’t going to be the reason a student doesn’t succeed. In senior leadership’s view, the University has a lot of administrators, which it considers to be a key factor in advancing the institution’s strategic priorities. In the same manner that Duke seeks to ensure its students have the support they need to succeed, senior administrators work closely with the faculty to ensure they have the resources necessary to be successful.

The University’s strategic plan (2006) suggests that faculty members find it easier to establish multifaceted relationships that span professional interests at Duke than at other leading research universities. The ease in developing multifaceted relationships likely stems from the relatively small size of the University, close proximity of the schools, and incentives that Duke provides to encourage interdisciplinary courses and programs. A senior administrator explained that the Dean of Trinity College, Laurie Patton, recently announced a min-grant program aimed at fostering curricular innovation.
through interdepartmental cooperation. “She’s interested in interdepartmental cooperation, and she’d like to see some courses come out [of the mini-grant program] that are being co-taught by people from different departments,” said a senior administrator. The goal of the mini-grant program is to encourage the faculty to think creatively about how to deliver courses and further develop the curriculum by providing a small amount of resources to incentivize teaching innovation.

While Duke may share similar principles, values and aspirations with that of America’s Ivy League institutions, a senior administrator suggests that the University is not bogged down by some of the long-standing traditions held sacred at places such as Harvard and Yale. “Duke doesn’t see itself as an Ivy League institution, so it has to do things a little differently in order to distinguish itself,” said a senior administrator. Because Duke has taken an entrepreneurial approach to advancing the institution’s mission and academic reputation, it has a tendency to attract faculty members who see themselves as “start up” type people. In addition to hiring faculty members who are entrepreneurs, Duke seeks individuals who are also risk takers, collaborators and institution builders (Duke University, Making a Difference, 2006). Duke’s President, Richard Brodhead, who is Yale trained and formerly served as the Dean of Yale College, described Duke’s culture as one of continual growth, improvement and self-reflection (Brodhead, Primetime Forum, 2012):

This is a school that wherever it was in the present, there’s always been a hunger to figure out what could we really be, what could we grow into, what’s the promise we could fulfill and the service we could render to the world.
While Duke University appreciates the value of a deliberative and inclusive decision-making process, senior administrators suggest that Duke has a “bias towards action,” making the University appear progressive in comparison to many of its Ivy League competitors, which have a reputation for being risk adverse and slow to change. Duke has a tendency to say, “We have to understand this, so we’ll jump in and in parallel, we’ll put in the right kind of governance and committees and information sessions, which are also important,” said a senior administrator. The result is an institutional culture that values shared governance but doesn’t allow it to get in the way of making strategic decisions in a timely manner.

In order to advance the University’s strategic priorities, Duke relies on a collaborative and networked leadership model. As an example, there are many champions of academic technology at Duke, including the Provost, Vice Provosts, Deans, Department Chairs, and the Director of the Center for Instructional Technology, who are individually and cohesively working to expand the faculty’s use of educational technology. Duke’s ability to influence the faculty to engage in change efforts is improved through its collaborative leadership model that spans the University’s schools and departments.

Duke’s administration does not consider the University to be in the same league as the Massachusetts Institute of Technology (MIT) or Stanford University when it comes to the development of technology, suggesting that Duke is mostly recognized as a leader in the application of technology. Speaking from memory, Tracy Futhy, Vice President of Information Technology and Chief Information Officer, recalls that Duke was one of
the first institutions to experiment with the application of Apple’s iPod in an educational setting. In 2004, Duke gave the entire incoming freshmen class an iPod, which had been preloaded with Duke-related content. At the time of the project, Duke was hailed by many as being out there in the forefront of thinking about new directions, while simultaneously being assaulted by others, who suggested the University was just doing it to win over the students with the latest “gimme and gotchas,” explained Futhey.

In reality, Duke’s leadership and the faculty believed iPods and their mobility would become essential and relevant to the educational experience, and it turns out they were right. “Just because you don’t have a well formulated idea of exactly where something is going to end up doesn’t mean you shouldn’t or can’t start experimenting with it,” said Futhey. The willingness of the faculty to take some level of risk at introducing new technology and the recognition by senior leadership that experimental projects will likely morph over time, are essential elements in leading change.

**Teaching: With or Without Technology**

“Duke has a very hands-on approach to undergraduate teaching and wants to turn out critical, analytical, and problem-solving students,” said Angela O’Rand, Dean of Social Sciences. O’Rand recalls when she began using technology in an introductory course on sociology in the mid 1980’s. “At the time, all the students had an email account, but not all of them were using it,” explained O’Rand, a stark contrast from how students communicate today. O’Rand attempted to conduct an experiment on rumor
transmission through the use of e-mail. “I asked them, don’t forward what you get. Summarize what you get [through email] and send it to the next person that you choose, because rumors are not one-to-one transmissions, they are translations,” explained O’Rand. It was a clunky process at best, and at the time, O’Rand was teaching students about social networks.

Faculty members acknowledge that Duke’s classrooms have improved over the course of the last 15 years. As the technology in classrooms has become more accessible and more reliable, faculty members suggest they have become more likely to integrate technology into their teaching. Like most institutions, Duke has a steady program of classroom renovations that are funded by the Provost’s Office. “Sometimes it's just a combination of removing fixed seating, cosmetically changing the room, putting in much better presentation equipment and whiteboards,” said Stephen Nowicki, Dean and Vice Provost of Undergraduate Education. Nowicki suggests that completing the renovations is not that expensive except for maybe two out of every three classrooms have an asbestos removal problem, which drastically increases the cost and timeline for renovations.

The design of Duke’s classrooms is also changing, transitioning from long rows of fixed seating that supports traditional lecture-based courses, to moveable furniture (tables and chairs on casters) and sufficient whiteboards that support team-based and active learning activities. In August 2008, Duke opened “The Link,” a Teaching and Learning Center that brings together a variety of informal learning spaces and six flexible and technology-rich classrooms that foster innovative spatial and technological
approaches to teaching and learning. The Link was designed to encourage collaborative work and project-based learning with the goal of determining how students learn and how the design of classrooms can better support learning.

When it comes to teaching large, undergraduate courses, faculty members suggest they would prefer classrooms similar to those that exist in the professional schools, which include tiered, fixed seating in rows that form the shape of a horseshoe. The design of these rooms allows the faculty and students to more easily engage in classroom discussion. The unfortunate reality is that new classrooms of this size are often difficult to provide due to the competition for limited space in existing buildings.

Senior administrators suggest that Duke has overcome a tendency to build the digital classroom of yesterday, a problem that many institutions encounter with the rapid emergence of new technologies. While Duke is no longer installing technologies that are quickly approaching obsolescence, it continues to struggle with supporting an ever-increasing number of consumer-based technologies that present a unique set of challenges with security and compatibility issues. Part of the problem, suggests Ed Gomes, Senior Associate Dean, Trinity Technology Services, is figuring out what’s on the horizon and trying to stay ahead of the curve, so that when a faculty member suddenly shows up with some new and interesting tool, the support staff isn’t completely surprised.

While Duke’s faculty has become more likely to incorporate digital materials into classroom lectures and seminar discussions, a faculty member participating in the study suggests the actual teaching of most lecture or seminar courses hasn’t changed, except for
the fact that it’s easier for the faculty to incorporate current examples of what they’re discussing because of the vast amount of resources available via the Web. There appears to be an inherent tendency by the faculty to use technology primarily for enhancing current teaching practices, rather than transforming the way one teaches. Despite this tendency, there are small pockets of teaching innovation occurring at Duke that are slowly gaining momentum.

One of the most innovative experiments to occur in teaching took place during the spring 2009 semester when a group of five faculty members developed a course entitled, Wired - New Representation Technologies for Historical Materials. The course engaged students in the learning process by having them explore how to record and communicate complex sets of visual and physical data from historical buildings and archaeological sites, developing new methods of interpretation and representation through visual technologies (Wired - New Representation Technologies, 2012). The development of the Wired course led to the founding of the Wired Group, which is using digital visualization technology to transform teaching and long-term research initiatives in the study of sculpture, architecture, urbanism and painting.

A faculty member engaged in developing the initial Wired course suggests this initiative was the most transformational teaching movement to ever occur in his department. The same faculty member gave credit to the department chair and University for providing a substantial amount of resources necessary for the project to succeed. Those resources were invested in developing the first course, which brought together five faculty members from different disciplines to reconsider and redesign the way
undergraduates are taught historical material culture. The faculty followed a set of five questions in developing the Wired course (Duke University, Humanities Writ Large, 2012):

1. What do we teach and how do we teach it?
2. What do students need to know, and how do they best learn?
3. How can we rethink teaching in the light of the possibilities that are now available for research, communication, and exchange, as well as for student involvement in original research projects?
4. Can we model in the classroom what Humanities scholars actually do?
5. Are there ways in which new tools available for teaching can reconfigure what happens in the classroom?

Mark Olson, Professor of Visual and Media Studies, suggests the project’s success stemmed from the faculty’s willingness to invest a year in examining the possibilities and developing the class through face-to-face meetings. Faculty members weren’t given any additional leave time to plan the course, which would have been helpful, but it was out of their own interest and excitement around collaborating that they spent a year planning the course. Five faculty members taught the course initially, which was a substantial investment that the faculty suggests made a significant difference. Professor Olson explained that the project was unique in that it wasn’t based on incorporating an existing technology into a prescribed teaching method. “It was really, to me, one of those rare moments where it wasn’t about throwing a technology at a discipline and saying, use it, it’s ready made,” said Olson. Today, the course is offered on a team teaching basis and continues to evolve in a variety of different ways, blurring the lines between teaching and research.
Another example of teaching innovation can be found in Duke’s recent initiative to introduce the flipped classroom model, which doesn’t necessarily have to incorporate technology, but frequently does. The flipped classroom transposes what happens inside and outside of the classroom. Students are required to master the basic course content before coming to class, where they work on applying their new knowledge to solving problems. Administrators suggest that given the small size of many of Duke’s classes, students are accustomed to coming to class to engage in discussion and problem-solving activities, indicating that factors such as class size and student expectations influence Duke’s teaching and learning practices.

In an effort to promulgate the flipped classroom model, Duke’s administration featured an article in Duke Magazine on Professor Stephen Craig, who after twelve years of teaching introductory and organic chemistry in the same manner, decided to do away with lectures and textbooks to free up class time for interaction and team-based learning. Students were expected to “bone up on the basics outside of class, using instructional materials, videos, and short segments of recorded lectures,” which the students could refer to in class for solving problems (Duke Magazine, 2012, para. 3). While Professor Craig found that test scores didn’t improve using the flipped classroom model, he believed there were other benefits -- getting to know the students at a different level intellectually and higher levels of student confidence in speaking and writing -- that were reason enough to continue teaching the course in this manner (Duke Magazine, 2012).

Nearly all of the classes taught in Duke’s Medical School at the National University of Singapore follow the flipped classroom model. While the flipped
classroom model of teaching isn’t new, it’s new to many professors at Duke. As the amount of learning materials available on-line continues to increase and professional associations continue to draw attention to the benefits of active learning, Duke’s Center for Instructional Technology (CIT) suggests that faculty members have become more willing to experiment with team-based learning. Senior administrators suggest that another factor believed to be influencing a trend toward active learning is the increasing number of undergraduate students who have suggested they are bored in large, lecture-based courses. As more faculty members have become interested in moving away from lecture-based instruction, Duke’s CIT recently coordinated a faculty fellowship that supported 18 faculty members in redesigning their courses to use team-based learning practices for the fall 2012 term.

A senior administrator at Duke suggests that all too often individuals associate innovation with the use of technology, which is a mistake. Innovation rests within the art of teaching, which in some cases, such as the flipped classroom model, might be enabled by technology. An example of teaching innovation where technology doesn’t play a central role is DukeImmerse, a new initiative that transitions education from a teacher-centered view to a “learner as intellectual worker” approach (DukeImmerse Summary, 2010). DukeImmerse is a multidisciplinary, integrated curricular program that allows a small group of undergraduate students (no more than 12) to explore a single issue or problem by completing four integrated courses during the course of one semester. The first program, entitled "Black Freedom Struggles in the 20th Century: A Comparison of the Civil Rights Movement in the United States and the Anti-Apartheid Struggle in South
Africa,” included a cluster of four courses on two of the most significant liberation movements of the 20th century. By having the students complete all four courses together, students gain a deeper understanding of the issues through a greater level of engagement with the course content and high level of student and faculty interaction.

The DukeImmerse curriculum is developed around topics that directly relate to faculty research, providing a stronger connection between the students’ learning experience and the faculty’s research interests. As the students are required to complete all of their courses together, there is greater flexibility in scheduling teaching and learning activities outside the classroom, and in some cases, outside the country. Having successfully completed two pilot sessions of DukeImmerse, the University is continuing to assess whether the program is affordable on a long-term basis, and how it might scale as a larger initiative for future curricular development. This particular initiative further highlights the difference in student learning experiences between “the have’s and the have not’s” in American higher education.

While all universities have faculty members who serve as role models for teaching, what remains to be determined are those factors encouraging these individuals to become better teachers. One faculty member explained that it’s simply a matter of motivation. “These are extremely smart and capable people, and there's no doubt they could learn [to become better teachers], if they put their mind to it,” said a faculty member. Further, “Anyone who suggests they’re no good at teaching just isn’t willing to put in the effort to learn how to become a good teacher.”
A faculty member explained that there are very few incentives at Duke for improving one’s teaching. “These are smart, intelligent people who are able to write great books and do great research, and the only reason they’re not teaching better is because there’s no reward for teaching,” said a faculty member. The faculty member further explained that tenure and salary increases are not based on one’s teaching contributions. The primary reason the faculty suggests they put any effort into improving their teaching is because they care about the students. Like most universities, Duke has a Teaching Awards program that recognizes excellence in teaching for a small number of its faculty members, which includes a monetary award of $5,000 (Duke University, Trinity College, Teaching Awards, 2011).

Assuming Duke had better incentives to encourage excellence in teaching, the faculty also needs to learn how to improve their teaching. A faculty member explained that while you can learn a lot from other institutions, you need the opportunity and support from the department chair to do so. For example, not all techniques work well for large classes, so faculty members need someone who has experience teaching large classes that can take a look at the syllabus and offer suggestions. A faculty member explained that one way to improve teaching is to encourage the faculty to find someone they believe is a good teacher and have them co-teach a course with that person. “If I want to learn how to teach, the way I learn is to find the best teacher and co-teach with them, so that I'm in the classroom, day after day after day, seeing what they do,” said a faculty member.
Duke is currently providing incentives for team-teaching through the Provost’s Undergraduate Team-Teaching Incentive (PUTTI) that awards course development funds toward new multidisciplinary, team-taught undergraduate courses. While PUTTI helps foster team-teaching across disciplines, there are other possible strategies the faculty suggests may help within individual departments. “If you have a faculty member who is an excellent teacher, arrange for this individual to co-teach a course with other faculty members in the department, while providing additional resources to support their teaching,” said a faculty member. What’s important to understand is that best practices don’t work nearly as good as models, when it comes to learning how to improve one’s teaching.

**Disadvantages of Technology**

A faculty member teaching in the School of Public Policy suggests that while technology has proven beneficial for improving efficiency and gaining access to information, it has also led to significant challenges in how the faculty communicates with students. “They [students] don’t wait for office hours, they don’t wait for class or come knock on my door,” said the faculty member. He further elaborated that today’s students prefer to communicate electronically, as opposed to in person, and also expect that course information will be updated and readily available through the University’s Learning Management System (LMS), which is more work for the faculty. Managing student communication within today’s climate of instant messaging has proven
challenging for some faculty especially for those individuals who haven’t established preferred protocols for communication.

Another issue raised by the faculty was the use of Duke’s LMS. A faculty member explained that the LMS is not a tool routinely used by students to communicate with their classmates or the faculty. While faculty members suggest the LMS is helpful for managing timesaver types of activities, such as grading, they also find it to be mismatched with how today’s students are communicating, suggesting it falls short in key areas around student collaboration and communication. “Today’s students are communicating with text messages, not email, and the LMS is forcing them to use older modes of communication,” said a faculty member.

Peter Burian, Dean of Humanities, believes that part of the problem with using technology, especially in the traditional Humanities, is that technology ought to be an aid to the kind of teaching you want to do and not an end in itself. “There is this kind of bewilderment that you somehow have to use fancy technology to be considered with it,” said Burian. On the same premise, a faculty member explained that just because your professor doesn’t want you to use laptops in the classroom, doesn’t make him a dinosaur. Whether students should be allowed to use laptops during class is a topic where faculty opinion varies greatly. A faculty member suggested that the answer to this question is not necessarily either/or. Without a nuanced rhetoric about how the technology is being used, the conversation often becomes polarizing, in the sense that you have to use technology or you’re considered obsolete.
When it comes to evaluating at an institutional level how Duke’s faculty is using technology to support teaching and learning, the University falls short. Like most institutions, the primary tool for evaluating teaching is the end-of-semester course evaluation, which faculty members suggest provides little data concerning the use of technology. While the course evaluation is suggested to have at least one question concerning technology, it simply requests that students identify any specific technologies that were used throughout the course. Department chairs and deans who wish to assess the faculty’s use of technology per course or by department are at a loss.

**On-Line Learning**

To say that Duke University has been reticent in its view of on-line learning is at best an understatement, yet that is how faculty members describe the University’s perspective of on-line education at the undergraduate level. A newcomer in the market of on-line learning, Duke began providing its first on-line courses in the summer of 2010, which included two courses that were only accessible to undergraduate students attending Duke. The courses were meant to complement the students’ service learning experiences over the summer, as well as provide alternative opportunities for students to earn academic credits while away from campus (Fereshteh & Hartsoe, 2010).

In November 2012, Duke announced efforts to expand on-line education at the undergraduate level through a consortium of 10 prominent institutions known as Semester Online. The consortium is expected to provide approximately 30 online
courses that will be available to students from participating institutions, as well as students elsewhere, who would have to apply, be accepted and pay tuition of more than $4,000 a course (Seligson, 2012). The courses will intentionally be small and will mirror the classroom experience by providing live instruction with on-line elements that encourage students to collaborate through virtual classrooms and small group sections (Ferreri, 2012). One of the reported benefits of the on-line consortium is the ability to expand the number of course options available for students, while maintaining institutional expectations in regard to academic rigor and quality. Participating institutions include Duke University, Brandeis University, Emory University, Northwestern University, UNC-Chapel Hill, University of Notre Dame, University of Rochester, Vanderbilt University, Wake Forest University and Washington University in St. Louis.

While Semester Online enables Duke’s students to complete on-line courses, it comes with certain limitations. For example, Duke’s students are not permitted to complete on-line courses for credit at an institution of their choosing, such as Harvard, and Duke’s admissions policy does not currently allow newly admitted students to transfer in credits for courses completed on-line. What remains to be determined are the number of on-line courses that Duke’s undergraduates will be able to complete toward their degree and whether the University will revise its admissions policy to accept some number of transfer credits for courses completed on-line.

In addition to recent advances in on-line education at the undergraduate level, Duke was an early participant in providing Massive On-Line Open Courses (MOOCs), an
emerging trend among higher education institutions to further the cause of open education by providing on-line courses that are accessible to anyone, often at no charge. A Vice Provost explained that part of the reason Duke was an early participant in providing MOOCs was the simple consideration that as courses increasingly move on-line not everyone is going to be able to offer the courses they would like to provide. While other institutions have far more experience in providing on-line education, at least at the undergraduate level, Duke does not perceive this to be a stumbling block for its faculty. In fact, Duke’s faculty members who are engaged in this challenging new endeavor are viewing MOOCs as a way to improve their teaching, while reaching a much larger, international audience.

In addition to the $20,000 that faculty members receive toward the development of a MOOC, Duke's Office of Information Technology (OIT) and its Center for Instructional Technology (CIT) are providing a range of support services including course design, strategies for on-line teaching, access to recording technologies and video editing expertise (Ferreri, 2012, Oct.). Duke is also assigning an intern to specifically help faculty work through copyright issues for course materials. Since the quality of Duke’s courses is directly linked to the reputation of the University, there is a self interest in developing a superior quality product, which comes at a cost. The level of resources being provided for MOOCs ($20,000) far exceeds the course innovation grants ($3,000) provided for classroom-based courses or mini-grants ($5,000) provided for interdisciplinary curricular innovation and development. The reality is that large,
institutional experiments, such as MOOCs, often carry greater resources and priority, than individual faculty projects meant to foster teaching innovation.

A technology support specialist suggests that while he believes MOOCs are here to stay, he is not convinced the same is true for the companies leading these efforts, as colleges and universities may decide to do these things on their own at some point in the future. Regardless of the level of external involvement, administrators seem to agree that the development of MOOCs will influence changes in the way that faculty teach, whether on-line or in the classroom. Duke’s faculty members are already thinking differently about how to provide on-line content through the use of video. The end result is that the videos don’t necessarily have to include a faculty member lecturing, but could include material that resembles the nightly news through interviews with special guests and site visits to key locations that serve as helpful sources of information.

Duke’s President describes MOOCs as “an exciting prospect with great promise,” criticizing any school that isn’t willing to experiment with on-line learning, while cautioning those who think on-line learning is a magic bullet able to solve all the problems of education. President Brodhead also suggests that while there are things you can learn on-line, there are also things you can only learn when you’re in the company and in relationship with living people. “The place that gets it right will be the place that gets the best of on-line, combined with the best of face-to-face, person-to-person learning, because the value of that is only going to go up,” said Brodhead (Brodhead, Primetime Forum, 2012).
Duke’s interest in expanding on-line education appears to be influenced by several factors: the need to keep current with peer institutions, as many of the Ivy League institutions have recently entered the market for on-line education; the ability to provide greater convenience, choice and flexibility for students; and the opportunity to extend the reach of Duke’s faculty on a global scale.

**Strategies & Incentives for Change**

Part of the challenge in supporting faculty members in their use of technology is that individuals have very different needs and essentially move at their own pace in adopting technology. Taking a proactive approach to determining how individual needs are evolving, Duke’s academic technology consultants paired up with librarians to conduct a series of interviews with faculty members. The interviews were tremendously helpful in identifying the specific technologies that faculty members were using, while also highlighting any gaps in service, suggests Shaun Miller, Head, eLearning Tools and Strategy. By having targeted conversations with the faculty, staff members could also anticipate what type of additional support services may be needed in the future. The challenge with conducting individual interviews is that it takes a significant amount of time and you need to have the conversations on a fairly regular basis as individual needs continue to evolve.

Part of Duke’s strategy for leading change has been hiring senior administrators who are recognized for their contributions to teaching. In July 2011, Laurie L. Patton
assumed the role as Dean of Trinity College of Arts & Sciences. Previously, Dean Patton served as the Charles Howard Candler Professor of Religions at Emory University and directed Emory’s Center for Faculty Development and Excellence. From 2000 – 2007, Patton chaired the Department of Religion at Emory, and in 2005, received the Emory Williams award, Emory University's highest award for teaching (Duke University, Trinity College, Office of the Dean, 2012).

In February 2012, Dean Patton led a faculty forum that focused on the creative use of technology in the classroom, which highlighted the work of three professors and included free-flowing discussion about what’s working, what isn’t working, and what the faculty suggests the University should be doing. Recognizing that actions speak louder than words, the Dean went one step further by asking those faculty members who expressed a need for additional support to let her know what is needed, so she can provide the support for at least one semester. While senior leadership draws attention to the benefits of technology enhanced teaching and learning, they also reinforce the notion that the sheer lack of resources isn’t going to be the reason a faculty member doesn’t explore the expanded use of educational technology.

Another incentive for the faculty to experiment with technology is the Duke Digital Initiative (DDI), which has been in existence for approximately eight years and aims to support the faculty in exploring the use of new and innovative technologies in support of teaching and learning. In the most basic form, DDI makes it easy for faculty to experiment with technology in their teaching. While these types of programs are relatively common among higher education institutions, the difference is that for most
institutions, faculty members are required to develop a proposal that outlines specific goals and objectives for how the technology will be used. At Duke, a sentence or two about what the faculty would like to explore is essentially all that’s needed.

While time is often the best possible incentive one can provide for faculty, it’s also one of the hardest items to make available. “You have to negotiate with the department chairs on the best use of a faculty member’s time,” said Keith Whitfield, Vice Provost for Academic Affairs. A lot depends on whether the department chair, or dean in some cases, views the exploration of new teaching practices and use of educational technology as an important priority for the department or school. If a department chair gives a faculty member a reduced course load to redesign the way a course is taught, then that decision comes at a cost. Recognizing that the short-term cost will lead to long-term benefits is what leads to exploration and change.

Stephen Nowicki, Dean and Vice Provost of Undergraduate Education, describes his job as a combination of future thinker, idea gatherer, enabler and cheerleader. Nowicki explained that he’s constantly looking for new ideas from the faculty, as well as individuals that might be willing to serve as early adopters, resourcing the faculty and trying to bring their efforts more to the forefront. While Nowicki suggests that time is much more valuable than money to the majority of faculty, administrators shouldn’t rule out fun as a motivator. “If somebody is a good teacher, then part of their reward system is the satisfaction of doing a job well done, but part of it is that it’s fun,” said Nowicki. The more the faculty finds the changes that they’ve made rewarding and enjoyable, the
more likely they’ll share their experience with others, influencing a steady momentum for change that will eventually reach a tipping point.

In some cases, the factors influencing change are based on the specific needs of a program or school. For example, Duke’s Fuqua School of Business decided 16 years ago that online collaborative teams were going to be the future of business, and therefore, their teaching practices had to reflect people working in that environment, which led to the development of an online, global MBA program. The development of an on-line program was essentially a school-based decision that was driven by anticipated changes in the job market and the type of skills students would need to remain competitive. “That type of change would never happen in the Arts and Sciences, where you’re primarily working with undergraduate students,” said a senior administrator. Senior administrators suggest that the drive for change at the undergraduate level comes from individual faculty members who share their ideas and experiences with others. If a faculty member who is well regarded does something new and interesting that is found to be worthwhile, then this faculty member becomes a powerful force for leading change.

Lessons Learned

While Duke’s administration suggests the University is turning again to a focus on pedagogy, the faculty offers a different view, suggesting there are few incentives to improving one’s teaching. The result is a paradox that exists between the view from the top (administration) and the view from the field (faculty). The administration’s ability to
foster the expanded use of educational technology is limited as technology hasn’t traditionally played a central role in supporting the University’s teaching mission and there isn’t a pressing need for the faculty to change. While faculty members indicate they have become more likely to integrate technology into their teaching, these changes haven’t necessarily led to the development of new teaching practices. Despite an inherent tendency by the faculty to use technology for enhancing one’s current teaching practices, there are small pockets of teaching innovation that have occurred, which are beginning to gain momentum. These pockets of innovation are primarily the result of a small number of faculty members willing to experiment with their teaching, who received additional support and resources from their department chair or dean.

Duke’s teaching practices are also influenced by the largely homogeneous undergraduate population it serves, which is comprised principally of high-quality, full-time students who live on campus. The University’s primary model for course delivery includes small, face-to-face courses that foster a high level of interaction between the faculty and students. While Duke also has a number of large, lecture-based courses, the administration is currently working with the faculty to increase the level of student engagement in these courses through the introduction of team-based, active learning by way of the flipped classroom model of teaching. This is one area of teaching innovation that is currently gaining momentum.

Unlike public research universities, Duke’s efforts to advance on-line education at the undergraduate level aren’t meant to improve access, grow enrollment or generate additional revenue. Those factors driving Duke’s expansion of on-line education at the
undergraduate level include the institution’s desire to provide a greater selection of courses for its students, as well as added convenience and flexibility in how students complete courses. Other factors influencing advances in technology enhanced teaching and learning include the desire to keep current with peer institutions, as many of the Ivy League institutions have recently entered the market for on-line education, and the opportunity to extend the reach of Duke’s faculty on a global scale through the provision of MOOCs.

One of the best strategies for influencing teaching innovation at the undergraduate level comes from individual faculty members who have done something new and interesting that was found to be beneficial. These individuals become a powerful force in leading the evolution of new teaching practices, as they share their experiences with others and influence a steady momentum for change that eventually reaches a tipping point. They also serve as a role model for excellence in teaching, encouraging their peers to take some level of risk in experimenting with new and innovative teaching practices with or without the use of technology.

Another strategy for leading change is the ability to recruit senior administrators and faculty members who are not only leaders in their field, but are also recognized for their contributions to teaching innovation, such as the Dean of Trinity College, Laurie Patton. Other factors that have helped Duke lead change efforts include an institutional culture that values shared governance, but doesn’t allow it to get in the way of making strategic decisions in a timely manner; a collaborative and networked leadership model that includes many champions of academic technology; a growing number of faculty
members that are willing to explore new teaching practices, and the recognition by senior leadership that you don’t necessarily have to have a well formulated idea in order to explore new teaching practices through the use of technology.

Despite the University’s best intended strategies to foster the advancement of technology enhanced teaching and learning, change appears to come slowly at Duke, with the exception of the University’s recent efforts to provide MOOCs. The rate at which change occurs also appears to be influenced by the level of resources the institution is willing to commit, such as the provision of $20,000 for the development of a MOOC. The key difference is that Duke’s faculty members are innovative in their teaching by choice, versus innovative by necessity.
Chapter 3: University of Central Florida

Brief History & Overview

The University of Central Florida (UCF) is a public, not-for-profit, four-year institution that couldn’t be more different than Duke University. Founded in 1963 as the Florida Technological University, UCF is a young institution that has evolved into a metropolitan research university, serving the economic needs of its region and state. In 2012, UCF was ranked as the nation’s fifth “up and coming” university by the U.S. News & World Report, a category that “recognizes institutions making the most promising and innovative changes in the areas of academics, faculty and student life” (U.S. News & World Report, 2012). Some might suggest that UCF has been making hay while the sun shines, as the University has more than doubled its enrollment over the last 20 years. UCF’s enrollment for the fall 2012 semester was 59,767, making it the second largest university in the United States (UCF, Facts at a Glance, 2012). In June 2013, UCF will celebrate its 50th year anniversary.

The University of Central Florida was originally founded to provide a steady supply of scientific and technical employees for the region’s burgeoning aerospace industry. Business and government leaders joined forces and enlisted in the cause of building a “Space University” (UCF, University History, 2011). Their efforts were successful as the Florida legislature approved the founding of a public university in 1963 that would be located just 12 miles northeast of downtown Orlando (UCF, University History, 2011). In 1965, the Board would select Charles N. Millican, Dean of the
College of Business Administration at the University of South Florida, to serve as the University’s first president.

With an economic interest in attracting a greater number of high-tech industries to the region, the Board strategically chose to name the institution the Florida Technological University. The University opened its doors in 1968 to 1,948 students, providing 55 degree programs within five colleges: Business Administration; Education; Humanities and Social Sciences; Natural Sciences; and Engineering and Technology (UCF, University History, 2011). In 1978, the Board selected a new name for the institution, the University of Central Florida, which was symbolic of the region’s need for a more comprehensive university.

Today, UCF continues to serve as the “people’s university,” providing a quality education at an affordable price for Florida residents. In an effort to improve access, UCF established 10 regional campus locations that extend the institution’s reach beyond Central Florida; developed Direct Connect, a strategic partnership with three community colleges and one state college, which guarantees admission to any student who receives an Associate Degree from one of the four participating colleges; and expanded the number of on-line courses and degree programs it provides for undergraduate and graduate students. The University’s efforts to improve access have been tremendously successful, as the institution awarded 167,765 degrees over the last 20 years, while increasing minority enrollment from 16.9% to 37.2% (UCF, Dr. Hitt’s 20th Year Anniversary, 2012).
One of 11 universities in the state of Florida, UCF has 12 colleges and 10 regional campuses, which offer 90 bachelor’s programs, 87 master’s programs, 31 doctoral programs, 1 professional program in medicine, and 3 specialist programs (UCF, Facts at a Glance, 2012). During the fall 2012 semester, the majority of UCF’s students (85%) were pursuing undergraduate degree programs with 28% of students attending on a part-time basis. Eighteen percent of the freshmen class represents first generation students, who are the first to attend a four-year college or university in their family (UCF, Common Data Set, 2011-12; Binnette, 2012). Admissions for fall 2012 included 3,638 first-time-in-college applicants and 6,110 transfer students (UCF, Five-Year Admissions Statistics, 2012). The undergraduate population that UCF serves is largely heterogeneous and includes a high number of transfer students, who have very different educational backgrounds and experiences.

As UCF reaches for the brass ring of becoming a top-tier research university, senior leadership has developed a number of strategic partnerships with local businesses, creating research centers that support local industries through the hire of UCF faculty members (Hitt, 2009). Another strategy that has worked well in advancing research and teaching efforts is UCF’s impressive Faculty Awards Program. Faculty recognized for their excellence in teaching and research are eligible to receive monetary awards ranging from a one-time, annual bonus of $2,000 to a $5,000 increase in one’s base salary, retroactive to the beginning of the fiscal year (UCF, Faculty Excellence Awards, 2012).

Like most public research universities, UCF has experienced decreased financial support from the state. Over the last five years, UCF lost 49 percent of its state funding,
totaling a $144 million reduction (Hitt, State of the University, 2012). As a result of the reduced funding, UCF tuition and fees have increased for in-state residents from $118.72 per credit hour in 2007-08 to $186.13 per credit hour in 2011-12 (UCF, Facts at a Glance, 2012). If the state doesn’t restore its funding, President John C. Hitt, the University’s fourth and longest serving president, has forewarned the legislature that UCF will have to limit access for the first time in fall 2013.

President Hitt attributes the institution’s growth and success to the power of University partnerships, although it is clear that UCF could not have achieved its current enrollment without the administration’s foresight to develop a business model for providing on-line education in 1996. The degree to which UCF has been successful at influencing technology enhanced teaching practices can be attributed to the fact that it’s still a relatively young institution, which isn’t held back by long-standing traditions or a faculty that is locked into a particular way of doing things. UCF was also an early adopter of on-line education and invested a substantial amount of resources into developing a faculty capable of teaching on-line.

While many of America’s elite research universities are just now beginning to experiment with on-line education, UCF has been providing web-based courses for 17 years. As the University marches down a path of providing half or more of its courses on-line, it faces its own set of unique challenges in supporting a faculty that teaches in multiple course delivery modalities for an increasingly diverse student population.
The Culture of UCF

A faculty member teaching at UCF explained the benefit of working for a young and developing institution. “The great thing about being part of an institution like UCF is that we can go in whatever direction we think is innovative and cutting edge in order to increase opportunity for our students.” Unlike most institutions, UCF’s culture and traditions foster change, explained Jana Jasinski, Professor and Chair, Department of Sociology. “While we have traditions, they’re not traditions that keep the institution in place they’re traditions that help us move forward” said Jasinski. Founded as a technological university, faculty members suggest that UCF has always been “tech heavy.” The University began using technology to deliver on-line courses in 1996, long before teaching practices were well established and embedded into the institution’s culture. “The way UCF uses technology to support its teaching mission has become its business model, as opposed to something the University does on the side,” said Joel Hartman, Vice Provost of Information Technology and Resources. As a result, the majority of faculty members at UCF teach in multiple course delivery modalities.

UCF is largely driven by its mission to provide access to higher education, while serving the economic needs of the region and state. In its steady pursuit of five simple goals the University has continued an upward trajectory that many consider to be a story of success (UCF, Strategic Planning: Key Elements, 2012):

1. Offer the best undergraduate education available in Florida
2. Achieve international prominence in key programs of graduate study and research
3. Provide international focus to our curricula and research programs
4. Become more diverse and inclusive
5. Be America’s leading partnership university

Over the last 10 years, UCF has demonstrated improvement in several quality measures, including a 98 point increase in the average SAT score for incoming freshmen; an 8 percentage point increase in its first-year retention rate for freshman from 79 to 87 percent; and a 13 percentage point increase in its six-year graduation rate from 50 to 63 percent (Hitt, State of the University, 2012). The one measure of quality that UCF has not improved is its student-to-faculty ratio (31:1), which is the highest in the state of Florida (UCF, Common Data Set, 2011-12). “The glaringly obvious fact is that we need more faculty members and more classrooms,” said President Hitt, “this is our pathway to smaller class sizes and a lower student-to-faculty ratio.”

At the same time the University is implementing a new Learning Management System (LMS), which it suggests will provide added value for on-line and classroom-based courses, it is also investing in a new classroom building that will enable the University to accommodate large, face-to-face courses. Classroom Building II is currently under construction and is budgeted at $23 million (UCF, Capital Projects, 2012). The new building will include seven classrooms: one seating 125; one seating 138; one seating 150; two seating 375, and two seating 450, all of which the University suggests will be full as soon as the building opens.

Determining class size at UCF is often a source of great pressure and stress, as the faculty has little say in the decision-making process and the colleges have been charged with growth. “We have to grow, that’s the only thing we’re obsessed on is growth,” said a faculty member. While the administration is charged with meeting ever-
increasing enrollment demands, the faculty is reluctant to teach even larger class sizes as they fear academic quality will lessen. The rapid growth of the institution and provision of on-line courses has created concern among the faculty. Faculty question whether UCF is at risk of becoming synonymous with for-profit institutions such as the University of Phoenix, which has an open admissions process and primarily serves non-traditional students through on-line courses. While some faculty members suggest UCF is not like the University of Phoenix, which tends to hire adjunct faculty from across the nation, there are those who suggest it is, as UCF provides on-line courses for up to 400 students.

Ida Cook, Associate Professor of Sociology and Chair of the Faculty Senate, suggests it’s always a good idea to be aware of what other institutions are doing in terms of on-line education. “In spite of ourselves, I believe we should always keep one eye on what the University of Phoenix is doing,” said Cook. The University of Phoenix has a physical campus located in Orlando just a few minutes from UCF’s main campus.

Part of UCF’s growth is due to its regional campus system that relies heavily on on-line courses, which are often provided by faculty teaching at the Main Campus. Still, nearly two-thirds of UCF’s undergraduate classes have fewer than 40 students, and there are more class sections with less than 10 students (323) than there are with more than 100 students (241) (UCF, Common Data Set, 2011-12). The question on everyone’s mind is “How big is too big?” which President Hitt attempted to answer during a State of the University address in September 2012:

When people ask, “When are you going to stop growing?” I have two standard responses. First, we will stop growing when our size becomes
unmanageable. Second, we will stop growing when the demand for access to higher education in our region is met. Neither of those has happened.

With a large number of commuter students, UCF has developed a business model that provides flexibility in how and where its students complete courses. In addition to developing 10 regional campus locations, UCF provides five different types of course delivery modalities (UCF, Center for Distributed Learning, 2011):

1. **World Wide Web (W)** - courses conducted via web-based instruction that may require minimal campus attendance or in-person exams
2. **Video Streaming (V)** - courses delivered over the web via streaming video, which may be supplemented by additional web activity, projects or exams
3. **Video Streaming/Reduced Seat Time (RV)** – classroom based content is available over the web via streaming video and classroom attendance is not required
4. **Mixed Mode/Reduced Seat Time (M)** – courses include both required classroom attendance and on-line instruction
5. **Face to Face Instruction (P)** – courses have required classroom attendance and meet on a regularly scheduled basis

“The course modalities have become so embedded into the University’s culture that everyone speaks in terms of modality labels -- the W’s, the M’s, and so forth -- which have become part of the institution’s vocabulary,” said Hartman. As far as student preferences in course delivery, the web-based courses tend to fill up first, followed by mixed-mode and then face-to-face courses. In fact, many of the students living on campus are taking web-based and mixed-mode courses, suggesting that student choice is a matter of convenience and personal learning preference, as opposed to strictly an issue of access. While students can complete most degree programs without taking any on-line courses, it’s rare for a student to get through their entire program without taking an on-line class, explained Hartman. The University also provides a number of degree and
certificate programs that are provided entirely through online instruction, including five undergraduate degrees and dozens of graduate degree and certificate programs (UCF, Center for Distributed Learning, 2012).

While UCF has grown in terms of colleges, programs and student enrollment, the same is not true of its faculty. The number of full-time teaching and adjunct faculty in 2007-08 was 1,258, which grew only slightly to 1,318 in 2012-13 (UCF, Facts at a Glance 2007-2008; UCF, Facts at a Glance 2012-2013). Facing increasing enrollment demands and decreasing financial support from the state, UCF has embraced on-line education as a means to an end, but this wasn’t always the case. The University first explored on-line courses with a focus on the pedagogical advantages, as opposed to the financial benefits. A faculty member teaching in the Political Science department explained that given the choice of teaching a large lecture class versus a large on-line class, he would choose the on-line class. “When you control for the instructor, the outcome has been that the online version is more student centered and produces better outcomes than the large lecture class,” said the faculty member.

Teaching: In Multiple Modalities

Is a good teacher, a good teacher in every modality? This is a question of increasing concern for senior administrators, as the University continues to grow the number of on-line courses and programs it provides in order to meet enrollment demands. During the fall 2011 semester, over 27,000 students enrolled in at least one web or video-
based course and over 6,200 students took only on-line classes (UCF, Center for Distributed Learning, 2012). For many of UCF’s colleges and departments, on-line courses are a fundamental strategy for serving their students. In some cases, departments have gone with their second choice of job candidates for faculty positions, because their first choice had expressed resistance to teaching on-line. The decision as to whether a faculty member teaches on-line rests primarily with the department chair.

As the level of on-line instruction increases at UCF, there is a greater need for faculty members with experience teaching in multiple course delivery modalities. During an interview with Joel Hartman, he explained that eight of UCF’s colleges have 25% or more of their credit hours generated on-line and four of the colleges have 50% or more of their credit hours generated on-line. With approximately 32% of credit hours generated on-line in a given year, either through web-based or mixed-mode courses, about a third of instruction at UCF is provided online.

In order to teach an on-line course at UCF, faculty members must first complete a development course regarding on-line teaching that is provided by the Center for Distributed Learning (CDL). The course (IDL 6543), which requires a minimum of 80 hours to complete, models how to teach online using a combination of seminars, labs, consultations and web-based instruction. IDL 6543 is delivered as a mixed mode course and is provided three times a year, once during the fall, spring and summer sessions, with a class size of approximately 40 faculty members. One requirement of the course is to interview Web vets, those faculty who have taught online courses for a long time. After
successfully completing the course, faculty members receive a stipend and access to the University’s system for teaching on-line courses.

Approximately half of UCF’s faculty is teaching on-line and roughly 90 percent of the faculty has completed IDL 6543. In the Political Science department, all new faculty members are required to complete IDL 6543, which senior administrators suggest is partially a political decision that relates to how some of the on-line courses are funded. UCF has been very deliberative about the way it prepares faculty to teach on-line, which isn’t true for many institutions that have recently embraced on-line education. As more institutions enter the market for on-line education, some administrators question whether this growth may be more harmful, than helpful. Tom Cavanagh, Assistant Vice Provost of Distributed Learning, expressed concern that the growth of on-line education by institutions that don’t have deliberative development efforts may lessen the quality of the learning experience and undermine the perception of on-line education by policy makers and board members.

As UCF’s faculty members develop a repertoire of on-line teaching practices, senior administrators suggest that a lot of what happens in on-line courses is also being applied in face-to-face courses. “When they teach in the classroom, they bring what they learn in the on-line environment into the classroom,” explained an administrator. Approximately one third of all face-to-face courses at UCF have a web-based section, which relies on the same technology that is being used in the on-line environment. Senior administrators suggest that IDL 6543 has influenced changes in how faculty members teach face-to-face courses. “They’ll infuse more technology in face-to-face
courses, and they’ll change the pedagogy after taking the IDL course,” said a senior administrator. A faculty member teaching in the Philosophy department suggests that even before he began teaching fully online or mixed-mode courses, he was using elements of on-line learning in his face-to-face courses.

With a large number of students completing general education program requirements (GEP), the lower division courses often fill up quickly making it difficult for students to get into these courses. Several of UCF’s colleges have begun providing lower-division courses on-line in order to build capacity and reduce bottlenecks in student registration. A faculty member in the Anthropology department explained that she is teaching three on-line courses and one mixed-mode course during the fall 2012. Two of the on-line courses she is teaching are GEP requirements, which have over 300 students in each course. The on-line strategy for each college and department is different and continues to evolve, which is why the Vice Provost for Information Technology & Resources and Assistant Vice Provost for Distributed Learning meet with the dean of every college at least once a semester to discuss emerging needs, trends and future objectives.

Elliott Vittes, Interim Vice Provost and Dean of Undergraduate Studies, suggests UCF’s curriculum is constantly undergoing revision, as the use of educational technology increases. At the undergraduate level, the University has two separate committees, a University Course Review Committee and a University Undergraduate Policy and Curriculum Committee. The use of technology broadly influences how courses are designed. While most colleges don’t stipulate the specific type of technology the
students will be using, there is evidence of increased usage as the fee for materials and supplies has increased, as well as the equipment fee for students in particular majors. In terms of the program curriculum, the changes can be seen in how new disciplines are emerging or how existing programs are changing their approaches, given the availability of new technologies. The program changes are more embedded into the discipline and aren’t necessarily easy to point out except in those fields where dramatic change has occurred, such as the practice of medicine.

When deciding which courses should be taught on-line, senior administrators often have to weigh the demand for enrollment with that of limited departmental resources. As an example, the English department recently decided it will no longer be providing face-to-face courses during the summer in order to reach a larger number of students from across Central Florida. A faculty member teaching in the English Department suggests this decision was made by the administration in order to increase student credit hour production, while more effectively utilizing campus resources. Class size is also increasing in face-to-face courses. A faculty member teaching a graduate seminar in English during the fall 2012 explained that enrollment in the seminar has doubled since 1997, increasing from 15 to 30 students. With larger course sizes, faculty members are faced with balancing the competing forces of quality versus quantity.

Similar to Duke University, UCF is experimenting with the flipped classroom model of instruction. Faculty members who participated in the study suggest UCF’s mixed-mode courses are already embracing the flipped classroom model through a combination of face-to-face and on-line instruction. A faculty member explained that she
is using the on-line component of her course to provide the lecture and the face-to-face component for student interaction and group work. The challenge, from her perspective, is one of scheduling, as the students are not prepared to do the in-class exercises on Monday morning, having spent the weekend doing the “college thing.” Part of the challenge is making sure that the homework is compelling and that the students are doing it for good reason. It also helps to develop a strategy for dealing with the lack of student preparedness, such as in class exercises that provide time for reading or a pop quiz, suggested a faculty member.

Experimenting with new teaching practices involves a certain level of risk that non-tenured faculty members aren’t necessarily willing to take. A senior administrator explained that there is a lot of anxiety among the faculty in taking risk, especially as the institution’s reputation continues to improve and the promotion process becomes somewhat of a moving target. Junior faculty members are under a great deal of pressure to publish, get research grants, and teach a large number of students, which is tremendously challenging. In some cases, faculty members are advised not to take a lot of risk when they’re new.

When it comes to making recommendations about best practices for teaching, a department chair explained that she expects the faculty know what they’re doing. “I trust that they know what’s working and that they’re talking about it -- we don’t typically have time to sit down as a faculty and discuss best practices for teaching a particular course.” The way a faculty member adapts to teaching with technology has a lot to do with the discipline, course needs and the individual’s style, suggested the chair. In terms of
improving one’s teaching, the more times you teach a course, the more opportunity you have to reflect on how to improve the course and change it over time. The department chair explained that she encourages faculty to teach an on-line course at least three times, in order to perfect the course. The first time a faculty member teaches a course they’re primarily working on the nuts and bolts, the second time they’re identifying what didn’t work and why, and the third time is when the faculty member figures out what they want to do and how to make the course better.

When asked what type of additional support services the faculty would find helpful to support their teaching, several faculty members suggested video production services. A faculty member explained that students in on-line courses prefer to watch videos in order to grasp new and complex concepts. The same faculty member suggested that the unit that provides video production support recently moved off campus, making it more difficult to enlist their services. Other faculty members indicated that they have been developing short videos on their own using YouTube, or they search for existing videos that illustrate key points they’re trying to convey. Whether self-produced or located on-line, the faculty suggests that videos are a helpful tool for teaching on-line.

In addition to providing videos, some faculty members prefer to add audio to their PowerPoint presentations, enabling the faculty member to explain the slides, as the students advance the presentation at their own pace – a feature that many campuses provide through lecture capture technology. A faculty member explained that from the students’ perspective, they’re getting the same experience they would in the classroom, where the faculty member would lecture while providing a PowerPoint presentation.
Some might suggest that this approach is still a “canned” lecture and that this method of delivery doesn’t necessarily engage students with the course content.

Not all faculty members are convinced that on-line learning is as good as face-to-face learning. One faculty member explained that he prefers to stop in the middle of his lecture to ask the students questions in order to gage their level of understanding. “I’m not totally sure I want to give up the interaction within the lecture, and while I understand you can come back to it at the next face-to-face meeting, I’m not sure that works for me,” said a faculty member. Other faculty members suggest the beauty of on-line learning is that every student has to perform; whereas, in a face-to-face course it is easier for students to disengage. Clearly there are advantages and disadvantages to teaching both face-to-face and on-line courses, and the key is determining how best to offset the disadvantages based on the individual’s teaching style, discipline and number of students enrolled in the course.

Still, the question of whether a good teacher is a good teacher in every modality is an area where at least one faculty member was willing to share his perspective. Bruce Wilson, a professor in the Political Science department, edits an assessment journal for political science teaching. “A lot of what we deal with [in the journal] is on-line assessment,” said Wilson, “the one commonality is generally the instructor.” Wilson suggests that a poor instructor in a face-to-face course will be a poor instructor in an on-line course and vice versa. So when you control for the instructor, you can actually structure classes in such a way that it improves the quality of instruction. For example, Professor Wilson’s students may be enrolled in a course with 400 students, but they only
know nine other students, because at the beginning of the semester they’re assigned to a small group of ten. “From the student’s perspective, they’re taking a course with an enrollment of ten, not 400,” said Wilson.

A faculty member who participated in the study suggested there are many reasons why an individual could be considered a bad teacher, including the pure lack of organization that could lead to bad teaching practices. If technology enables the faculty to be more organized and efficient, then that’s also helpful. Suggesting that when an institution assesses the quality of teaching there are various aspects of technology that should be evaluated, from whether the use of technology successfully promoted student learning and engagement, to how the faculty member utilized technology to organize course materials and provide resources in a way that improved the efficiency of course delivery.

While the majority of faculty teaching on-line courses have virtual office hours at set times during the week, they suggest that only a small number of students take advantage of their virtual office hours, as the majority prefer to communicate through email. In some cases, the faculty will advise their students to post general questions to the class listserv as a first resource, and if not answered, to send an email directly to the faculty member. The practices established for faculty and student communication in on-line courses do not appear to be handled any differently for face-to-face courses, which in many cases, also have large enrollments. When it comes to student communication on group discussion boards, the Center for Distributed Learning encourages the faculty to
establish communication protocols at the beginning of the course, so that students will rise to meet those expectations.

**Disadvantages of Technology**

While the faculty members who participated in the study seem to appreciate the advantages of teaching on-line, several individuals voiced concern about the increased potential for students to cheat in on-line courses. A large amount of faculty time is spent discussing how to “police” courses by attempting to reduce the capacity for student cheating, especially for assignments or exams with questions that are easily answered by a quick search in Google. When you have over two hundred students in a class, faculty members suggest the hardest part is being able to confirm that the coursework is rigorous and doesn’t lend itself to cheating. One faculty member explained that the University simply isn’t prepared to deal with this issue. “I just don’t think we’ve had enough experience to know all the best practices to stop that,” said the faculty member.

Other faculty members question whether those students who complete all of their courses online will be able to successfully communicate face-to-face or perform well in a group-oriented work environment. While students who complete the majority of their courses on-line will have gained experience communicating in writing, how will they handle explaining concepts in person? One faculty member suggested that if students complete all of their education online, then that puts the student at a disadvantage. The faculty’s concerns about on-line education relate primarily to ensuring academic rigor,
while finding the right balance between on-line and face-to-face instruction. Their concerns also echo the advice provided by Duke University’s President who suggests that while there are things you can learn on-line, there are also things you can only learn when you’re in the company and in relationship with living people.

In some cases, the sheer number of students that faculty are teaching per course and per semester leads to challenges. A faculty member explained that when students in an on-line course ask for a letter of recommendation, she is hesitant to write the letter, not having met the student. The same challenge occurs in large face-to-face classes, but the faculty suggests they feel slightly better about writing letters of recommendation for these students, because they are at least required to check their IDs when exams are completed. When you’re teaching three classes a semester and two of your courses have over 300 students, it’s unlikely that you’ll recall a student’s work or participation in class, whether on-line or face-to-face. One faculty member explained that she’ll schedule time to talk with the student and review the student’s work before committing to writing a letter of recommendation. While this method appears quite reasonable, it takes time away from the faculty member’s teaching and research responsibilities. Another downside of teaching large face-to-face courses is the difficulty of introducing active learning exercises during class, especially for courses that have several hundred students.
Strategies & Incentives for Change

Part of UCF’s strategy for change is improving the faculty’s access to technology and instructional support. Approximately 95% of UCF’s classrooms include an integrated audio-visual system that supports multimedia presentations. With nearly 500 classrooms across all campus locations, the University has developed an internal support team of audio-visual system installers, designers, engineers and programmers, which proves helpful in managing costs, while ensuring greater uptime for the installed systems. While the Office of Instructional Resources is responsible for supporting 40 of the general assignment classrooms (controlled by the Registrar), the remaining classrooms are divided among the colleges and supported by resident staff members. UCF also provides a pool of instructional designers to support faculty teaching on-line courses. One faculty member, who is relatively new to teaching on-line, explained that she meets with her instructional designer frequently to talk about strategies for on-line courses, such as identifying different ways to have the students engage with the course content through creating a variety of on-line materials, assignments and activities.

UCF’s Faculty Center for Teaching and Learning (FCTL) is another resource where faculty members, including adjuncts and graduate teaching assistants, can seek individual consultations on a broad array of topics related to teaching, as well as participate in a series of workshops and conferences that focus on particular themes of interest related to pedagogy. The model of the FCTL is one that relies on a community of colleagues that share information about their teaching and research experiences. There are a variety of incentives that encourage faculty to participate in FCTL activities,
including course innovation projects that provide a funded opportunity for faculty development. The FCTL also coordinates a two-day, technology camp that provides a comprehensive overview of Web 2.0 technologies, including complimentary software as compensation for faculty participation. Through the Scholarship of Teaching and Learning (SoTL), the FCTL promotes research on teaching models, enabling individual faculty members to publish their research, raising awareness across the University. During the spring session of 2013, the FCTL will be conducting collaborative research with 20 faculty members on the flipped classroom model.

Department chairs also play an important role in leading change by providing additional resources aimed at expanding the use of technology. The Chair of the Sociology Department, Jana Jasinski, explained that she purchased iPads for the faculty. “The idea was mobility, but also thinking about ways we could use the technology,” said Jasinski. Within a week or two of receiving the iPads faculty members were talking about helpful applications they found for teaching, as well as talking with their students about potential benefits for learning. Ultimately, these additional resources and incentives foster exploration and communication about how technology may potentially enhance teaching and learning.

While UCF provides a variety of opportunities for faculty to experiment with technology in their teaching, it also provides a promotional path for instructors who are primarily teaching faculty, suggesting it is an institution that values all faculty members. “There are so many opportunities and ways you can choose your own path, that’s something I felt since day one,” said a faculty member. Opportunities for faculty
development and course exploration have also been promoted through partnerships with local businesses. In one particular case, a company that provides satellite equipment collaborated with the University on a larger course experiment that involved teaching two courses from South Africa. The courses were taught in real time and included student interaction with the professor and special guests through Internet chat rooms and webcams, creating a virtual classroom. The professor explained that while there were technological difficulties from time to time, the students were more than understanding, recognizing the courses were an experiment that students were participating in.

Another important strategy for leading change is UCF’s impressive Faculty Awards Program aimed at incentivizing excellence in teaching and research. While it isn’t uncommon for institutions to provide faculty awards, few institutions come close to UCF’s monetary incentives. On an annual basis, UCF awards a total of $100,000, or 50 awards of $2,000 each, in recognition of excellence in undergraduate teaching, graduate teaching, undergraduate academic advising, professional academic advising, as well as excellence in research, professional service and librarianship. In addition to the annual awards of $2,000, faculty members are eligible to receive an additional $5,000 in their base salary through one or more of the following programs: Teaching Incentive Program that for 2011-12 sponsored 40 awards; Scholarship of Teaching and Learning Awards Program that for 2012-13 will sponsor 10 awards; and the Research Incentive Awards Program that for 2012-13 will sponsor up to 20 awards (UCF, Faculty Excellence Awards, 2012). Clearly the level of awards the UCF provides for excellence in teaching far
exceeds that of Duke University which provides a one-time award of $5,000 for a small number of faculty members.

A faculty member explained that UCF’s Faculty Awards Program sets the institution apart from others. “We’re unique in the sense that we have awards that recognize scholarship in teaching and research,” said a faculty member. UCF’s Teaching Incentive Program (TIP) began in the 1990s and was funded by the state for the first two years. When the state stopped funding the program, UCF’s president decided to continue the program. To be eligible for the TIP award, faculty members have to teach beyond the median class size for their respective discipline. As the number of students a faculty member can teach is greater in on-line courses, there is a high correlation between faculty who receive the TIP award and those who completed the development course for on-line teaching. UCF’s Teaching Incentive Program aligns nicely with the institution’s mission of providing access.

Central to UCF’s strategy for advancing technology enhanced teaching and learning is the ongoing development of its faculty and incentives for change. While other institutions have attempted to develop a business model for on-line education, many have failed, which Joel Hartman suggests is often associated with one or more of the following reasons: the administration got too far ahead of the faculty and the faculty never got caught up, resulting in backlash; the institution assumed that individuals would want to buy their product, but there wasn’t a market for the product; and some combination of underestimating the cost of producing quality courses and overestimating the need for marketing.
Lessons Learned

UCF has experienced tremendous growth over the last 20 years, having more than doubled student enrollment, making UCF the second largest university in the United States. The University’s rapid growth has resulted in an underlying tension between the administration and faculty. University administrators facing decreased financial support from the state are charged with meeting ever increasing enrollment demands. As the faculty has little say in determining course sizes, which continue to exceed 200, 300 and 400 students, they are finding it even more challenging to ensure academic quality and rigor. Faculty members fear that the growth in enrollment made possible through larger course sizes that are increasingly on-line will damage the University’s academic reputation, as its teaching practices become synonymous with that of for-profit institutions, such as the University of Phoenix. Unlike the University of Phoenix, UCF provides the full features of a university and its faculty has greater control and say over the curriculum and teaching practices. While it is unlikely that UCF is becoming synonymous with the University of Phoenix, it does face significant challenges with the largest student-to-faculty ratio (31:1) in the state of Florida. What remains to be determined is whether UCF can continue to provide a high-quality education through innovative approaches to teaching large course sizes, whether fully on-line, hybrid or face-to-face.

The factors influencing technology enhanced teaching and learning practices at UCF are unique to the institution’s mission and the student population it serves. As the “people’s university,” UCF’s primary mission is to serve the economic needs of its region
and state by providing a high-quality education that is both accessible and affordable. Unlike Duke University, UCF’s student population is largely heterogeneous with a reasonably large number of transfer students, many of whom commute to campus and attend college on a part-time basis. In order to improve access and extend the University’s reach, UCF established 10 regional campus locations, as well as a business model for delivering on-line education. With approximately 32% of credit hours delivered on-line in a given year, either through web-based or mixed-mode courses, about a third of instruction at UCF is provided online. For many of UCF’s colleges and departments, on-line courses are a fundamental strategy for serving their students. On-line education is a central component of teaching that enables the University to fulfill its mission.

Other factors believed to have influenced UCF’s advanced use of technology to support teaching and learning include the relatively young age of the institution, which was founded in 1963 as the Florida Technological University, and the University’s early adoption of on-line education in 1996. The sheer number of on-line courses that UCF provides necessitates a faculty that is capable of teaching in multiple course delivery modalities. While on-line education has extended the University’s reach, a large number of students taking on-line courses live on campus, suggesting that student choice and flexibility are also factors influencing the growth in on-line courses.

Unlike Duke University, UCF has made a deliberative effort to train a large number of faculty members for teaching on-line courses. Faculty members interested in teaching on-line must first complete a development course that requires a minimum of 80
hours to complete. Approximately 90% of UCF’s faculty has completed the development course for teaching on-line and nearly 50% of the faculty is teaching on-line. UCF has also developed an impressive Faculty Awards Program aimed at incentivizing faculty to teach on-line courses. In comparison to Duke, which provides an annual award of $5,000 for a small number of faculty members that demonstrate excellence in teaching, UCF’s Teaching Incentive Program (TIP) provides an opportunity for up to 40 faculty members to receive an additional $5,000 in their base salary. Faculty members have to teach beyond the median class size in their discipline to be eligible for the TIP award, which is frequently achieved through teaching large, on-line courses and also supports the institution’s mission of providing access. In addition to the TIP program, the University provides 50 annual awards of $2,000 for excellence in teaching and research.

With a total of 12 colleges that are unique in terms of programmatic requirements, enrollment demands, funding and future growth opportunities, UCF’s strategy for on-line education differs by college. The factors influencing colleges to provide on-line courses vary and include the ability to build capacity in high-demand, lower division courses that fill up quickly; the desire to improve access and extend the University’s reach, while more effectively utilizing limited institutional resources; and the ability to provide a greater level of flexibility and choice in how students complete courses. As the on-line strategy for each college is different and continues to evolve, the Vice Provost for Information Technology & Resources and Assistant Vice Provost for Distributed Learning meet with the dean of each college at least once a semester to discuss emerging needs, trends and future objectives.
Similar to Duke University, UCF is working with several faculty members to introduce team-based and active learning through the flipped classroom model. In addition to conducting research on the flipped classroom model, UCF is also renovating several of its classrooms to include flexible furniture meant to accommodate active- and team-based learning. Faculty members suggest that many of UCF’s hybrid courses already embrace the flipped classroom model of teaching by providing the lecture component of the course on-line and team-based learning in the face-to-face meetings. The challenge faculty face in introducing active- and team-based learning is the large size of many of UCF’s courses.
Chapter 4: University of California, Berkeley

Brief History & Overview

Regarded as one of the nation’s finest public universities, U.C. Berkeley is a highly selective, research university that is self-proclaimed as the “public Ivy.” Berkeley is the flagship campus of the University of California, which consists of ten campuses, serving more than 236,000 students (U.C., Statistical Summary, 2011). With a reputation for being a research powerhouse, Berkeley received $691 million in research contracts and grant awards during the 2010-2011 academic year, while also receiving 1,333 National Science Foundation research fellowships from 2001 to 2011, more than any other institution (Cal Facts Brochure, 2012). Berkeley’s faculty is recognized for its distinction and includes 22 Nobel Laureates, nine which are currently serving on the faculty (U.C. Berkeley, Facts at a Glance, 2013).

Founded in 1868 through the merger of two fledgling institutions -- the private College of California in Oakland, and a state land-grant institution, known as the Agricultural, Mining and Mechanical Arts College -- Berkeley was charged with providing both a practical and classical education (U.C. Berkeley, History, 2013). While the private College of California had little funding, it had land in Oakland and four miles north at a site that was named for George Berkeley, an 18th century Irish philosopher and bishop. The University of California opened its doors in 1869 in the town of Oakland with 10 faculty members and nearly 40 students. Four years later, the University, and
close to 200 students, would move to the new campus that was located in Berkeley (U.C. Berkeley, 19th Century, 2013).

Facing partisan politics and rampant corruption, the University’s Board of Regents drafted an amendment to the State’s Constitution in 1879 that would designate the University of California as a public trust, making it independent of all political and sectarian influence (Douglass, 1998). A turning point for the University occurred in 1899 with the appointment of Benjamin Ide Wheeler as president. Facing dire financial problems and increasing enrollment demands, Wheeler turned to the state for financial support. Having successfully convinced lawmakers to provide the first major contribution of state funding, Wheeler was able to increase enrollment, as well as the number of faculty. During Wheeler’s tenure (1899-1919), enrollment grew from 2,533 to 12,227, while the University attracted a higher quality of students through the establishment of more rigorous admissions policies (Douglass, 1998).

A bastion of contrariness and radicalism, U.C. Berkeley is known for its long history of activism. The Faculty Revolt of the 1920’s secured an unprecedented role for faculty in the shared governance of the Berkeley campus, and the Free Speech Movement of the 1960’s earned students the right to use campus facilities for political discussion and the dissemination of political literature (U.C. Berkeley, Activism, 2013). Today, Berkeley is the second largest campus in the U.C. system providing more than 9,600 undergraduate courses in 375 degree programs and producing more Ph.D.s annually than any other American University (Cal Facts, 2012).
Berkeley’s total enrollment for fall 2011 was 36,142, which includes 25,885 undergraduates and 10,257 graduate students (U.C. Berkeley, Facts at a Glance, 2013). Approximately 74% of undergraduates live off campus with a small percentage (3%) of students attending college on a part-time basis (U.C. Berkeley, Common Data Set 2011-12). Berkeley’s student-to-faculty ratio (17:1) falls between that of Duke University (8:1) and the University of Central Florida (31:1) (U.C. Berkeley, Common Data Set 2011-12). Favoring Duke’s hands-on approach to providing an undergraduate education, 76% of Berkeley’s undergraduate classes have fewer than 30 students (U.C. Berkeley, Undergraduate Profile, 2011).

The majority of Berkeley’s undergraduate students (82%) are from California with a small percentage of students from other states (9%) and other countries (9%) (U.C. Berkeley, Undergraduate Profile, 2011). Similar to the University of Central Florida, Berkeley serves a relatively large number of first generation college students, which represented one fourth (25.1% ) of the 2010 freshmen cohort (U.C. Berkeley, Facts at a Glance, 2013). Berkeley also has a number of students that come from low- to moderate-income families, with 35% of undergraduates receiving Pell Grants during the 2011-12 academic year (U.C. Berkeley, Undergraduate Profile, 2011-12). Berkeley’s 4-year graduation rate for the fall 2008 freshmen cohort was 72%, trailing behind Duke University’s completion rate (95%), while exceeding that of the University of Central Florida (33%), recognizing that UCF has a larger number of part-time students (U.C. Berkeley, Undergraduate Graduation Rates; Duke University, Quick Facts About Duke, 2012; UCF Common Data Set 2011-12).
After several consecutive decades of building a strong academic reputation, the University of California’s upward trajectory was derailed by the economic downturn of 2008. While most institutions have begun to recover from cost cutting measures that included mandatory furloughs, layoffs, hiring freezes and program consolidations, the U.C. system continues to face great financial challenges. Over the last five years, state funding for the University of California has been reduced by $900 million, roughly one third of the budget, while enrollment and operating costs have continued to increase (McMillan, 2013). Despite implementing a variety of administrative efficiencies to cut costs, approximately 38% of the budget deficit was met by tuition increases that were ensued by hundreds of angry protesting students (McMillan, 2013).

At long last, there is a glimmer of hope on the horizon, as California’s Governor Jerry Brown proposed a state spending plan for the coming fiscal year (2013-14) that would provide a modest boost to the University’s operating budget, although U.C.’s President, Mark Yudof, appears guardedly optimistic. Charged with entrepreneurial ingenuity, U.C.’s Board of Regents was encouraged by the Governor to “think big, and not get imprisoned by paradigms of the past that are now obsolete,” when considering future sources of new revenue (McMillan, 2013).

Yudof announced he will be stepping down from his position in August 2013, while at the same time, Berkeley’s Chancellor, Robert Birgeneau, resigned from his position, effective December 2012. Whether Berkeley’s glass is half full or half empty is anyone’s guess, but one can predict with some level of certainty that the University will continue to do more with less, while searching for new streams of revenue. One of those
sources is a renewed focus toward on-line education. What remains to be determined is whether there is a market for on-line education and to what extent the University can develop a faculty and the instructional resources necessary to provide high-quality on-line courses.

The Culture of U.C. Berkeley

Berkeley’s long history of shared governance is an important factor in leading institutional change, explains a Vice Provost. “We have a very strong tradition of shared governance on the Berkeley campus, which means our Academic Senate is very powerful.” Berkeley’s Academic Senate has full autonomy over the curriculum, new degree programs and approval of courses. There are many areas within the academic portfolio that require support from the Academic Senate in order to influence institutional change and move new initiatives forward. Another powerful source at influencing institutional change at Berkeley is the College of Letters and Sciences (L&S), which has 75% or more of the undergraduate student population.

With an organizational culture best described as multifarious, it comes as no surprise that Berkeley’s Employee Development and Training Office once provided a workshop on “Deconstructing the Berkeley Way.” An employee within Human Resources described Berkeley as “a campus whose love of debate thwarts attempts to collaborate,” suggesting Berkeley employees have been known to take themselves so
seriously that even functions as informal as an office picnic can become controversial (Hunter, 2000).

Many of the core values for faculty – academic freedom, debating issues and working independently – make leading change efforts difficult, if not impossible, for senior administrators. Faculty members describe the University’s culture as ground-up and very distributed, while senior administrators are self-professed as “enablers” for the faculty. A dean explains that her leadership style is to enable the faculty to do what they want. “These are great scholars and teachers,” said a college dean, “I don’t see my job is to tell them what to do, I see my job as to enable them to do what they want to do.”

Berkeley has traditionally been a research and graduate-student oriented university. “It used to be that undergraduates would hold onto the coattails of graduate students and were happy to be along for the ride,” explained a senior administrator, who was also a professor and graduate of Berkeley. Within the last 10 to 20 years, senior administrators suggest the University recognized it had gone too far in its quest for excellence in research, notably at the expense of undergraduate students. As a result, the campus made a collective decision to place greater emphasis on the evaluation of teaching in the annual review of faculty performance. Similar to Duke University and the University of Central Florida, the end-of-semester course evaluation is the primary tool for evaluating teaching at Berkeley.

A senior administrator explained that students attend Berkeley, because it isn’t “The Farm,” the endearing nickname for Stanford University. “They want an urban, edgy experience,” and “they come here to get exposed to culture and civilization,” said a
college dean. Likened to an amalgamation of New York University and Stanford University, senior administrators suggest that Berkeley is not a hand-holding institution that suffers from grade inflation, which allegedly occurs at many of the upper echelon research universities. Berkeley’s faculty is described as being tough on undergraduates, as it expects students to work hard to earn a passing grade.

A socially and ethnically diverse student population, where English is not the first language for a large percentage of students, new faculty members are coached on how to communicate effectively in the classroom. A college dean explained that in order to become a successful teacher at Berkeley, faculty need to learn how to communicate with a largely heterogeneous student population, while at the same time, learn how to leverage diversity as an advantage to the learning experience. “They don’t know what it’s like to walk into a classroom where there’s a single mom with her kid in the back, there’s a veteran, and there’s a kid who grew up with a silver spoon in his mouth,” said a college dean. The challenge of teaching at Berkeley isn’t about how smart the students are, but rather, how to connect with students that have very different social backgrounds and educational experiences.

Operating within a highly distributed environment, Berkeley’s senior administrators face significant challenges building cross-departmental communication and collaboration for a faculty that is accustomed to working independently and primarily operating out of silos. With limited resources for supporting broad-based experimental teaching initiatives, the majority of change happening on Berkeley’s campus appears to be the result of grass roots efforts where faculty members are taking it upon themselves
to experiment and innovate with their teaching. Part of the charge for Berkeley’s Center for Teaching and Learning, a new unit that was established in August 2012, is to spotlight those faculty members who are introducing new and innovative teaching practices, enabling others to learn from their experiences.

**Teaching: With or Without Technology**

A staff member in Educational Technology Services (ETS) suggests that while department chairs and deans are encouraging faculty to use more technology in their teaching, the reasoning behind this encouragement isn’t readily apparent. Faculty members frequently contact ETS for help in learning how to use a specific technology, explained a staff member. “I want to teach with Twitter, or I think I might want a Facebook page for my class, and what tools [technology] should I be using,” are questions commonly asked by the faculty, explained an ETS staff member. Moving the conversation away from technology, at least initially, instructional designers begin by having a discussion with the faculty about their teaching goals and learning outcomes. After the support specialist has established what the faculty member wants the students to learn and be able to do, the next step is building digital literacy. “I feel like there needs to be first some computer literacy, before we can get to digital literacy, before you can get to innovative teaching and using technology to support your learning activities,” said a support specialist.
The faculty’s use of technology in the classroom, and view on whether it actually improves the teaching or learning experience, differs greatly. In a small group discussion with several faculty members, two individuals with opposing viewpoints on providing podcasts debated the pros and cons. The faculty member speaking against podcasts suggested that recording lectures only encourages students not to show up for class and also makes faculty vulnerable to having something they’ve said taken out of context and put up on the Web for eternity. “Some right wing wants to make a video about how leftist Berkeley is, well, let’s just find a clip where it misleadingly looks like I’m brainwashing students,” said a faculty member.

A faculty member who routinely provides podcasts for his courses offered a different perspective. “I haven’t noticed a decrease in class attendance,” said the faculty member, while also suggesting the recordings have been helpful for students who need to go back and review what was said during the lecture, especially non-native English speaking students. “Occasionally, even I’ll go back to check what I may have said in the lecture, especially when I’m going over what’s going to be on the exam,” said the faculty member. Another noted advantage to providing podcasts is the ability to accommodate students who have legitimate reasons for being absent from class, such as illness and religious holidays.

A faculty member participating in the same group discussion described how technological innovation, from his perspective, consists of three categories. First, there is the type of innovation that enhances current teaching practices, which might include the use of PowerPoint slides rather than the blackboard. Second, there is the type of
innovation that transforms current teaching practices, such as the use of “clickers” [polling response system] to engage students in the lecture. Third, there is the type of innovation that alters what a faculty member does in the classroom, de-emphasizing the classroom encounter in favor of activities that are more directly interactive or allow for flexible scheduling, such as the flipped classroom model and on-line learning.

The faculty member who provided the categories of technological innovation was self-described as a slow adopter of technology. He was most enthusiastic about the first category of innovation, citing the advantages of using PowerPoint for enhancing his lectures. He also noted that while he finds the other types of innovation intriguing, he simply does not have a desire to transform the feeling of lecture-based courses. “As long I’m giving lectures, I want the class to be about a real encounter, a real group encounter” said the faculty member.

Offering yet another perspective on teaching with technology, a faculty member who developed a hybrid course for teaching composition, which may be the only class of its kind at Berkeley, shared her reasons for experimenting with technology. “Partly, I was curious about what sort of infrastructure Berkeley had to support that [hybrid courses], especially with all the talk about online teaching, which does interest me,” said the faculty member. Acknowledging that the on-line world is a paradise for writers and for teaching writing, the faculty member used the time she met with students in the classroom to talk about the readings, where the on-line component of the course was used for brainstorming activities and display of the students’ work.
As far as lessons learned in teaching a hybrid course, the professor explained that she had to initially lower the stakes for students, as many of them had expressed resistance to working with technology that they didn’t know how to use. “It was really a wonderful learning experience for me, this sort of resistance that many of them had to working with things that they didn’t know how to use -- how do you learn if you don’t try,” said the faculty member. The second challenge was more of an administrative issue as the Registrar published the course as being taught one day in the classroom and one day via Skype, which wasn’t true. “I’ve never taught on Skype, and I never said I would teach on Skype,” explained the faculty member. The Registrar advertised the course that way because the professor wanted the students to reserve a specific day and time for synchronous on-line activities. The Registrar’s lack of experience and policies for scheduling hybrid courses was perceived as a small, but annoying challenge, especially when the faculty member was informed that she wouldn’t have a classroom to teach the course.

Resources also make a difference when it comes to teaching, especially in deciding whether large lecture-based courses should have discussion sections. The decision to provide discussion sections is driven by departmental budgetary planning and the allocation of graduate student resources. It’s not the case that faculty can simply request Graduate Student Instructors (GSIs), explained a faculty member. “We can refuse GSIs, but we can’t demand them, and if we want them, that’s not the end of the story.” While the faculty suggests that discussion sections are truly beneficial for large
lecture-based courses, they also believe that discussion sections obviate the need to incorporate active learning and other student engagement activities within the lecture.

Similar to Duke University and the University of Central Florida, Berkeley’s faculty members have become more likely to integrate technology into their teaching as general assignment classrooms became better equipped with technology. In 2005, Berkeley’s Chancellor made a campus commitment to improve the physical learning spaces along with installing audio-visual technology in 100% of the classrooms by 2012. In 2010, Educational Technology Services reported that 88% of general assignment classrooms, or 193 classrooms, had been equipped with audio-visual technology (Farmer, 2010).

With the majority of classrooms designed to support lecture-based instruction or seminars, Berkeley has recently renovated one of its general assignment classrooms to support active learning. The classroom includes flexible furniture (table and chairs on casters), portable display screens for digital presentations and sufficient writable surface that supports small group learning activities. “We’re using this as a test place to learn from this room in how to scale out some of the technology, the practices, and move that out into general assignment classrooms,” said Brenda Farmer, Senior Learning Environment Designer, Educational Technology Services (ETS). ETS staff members are also observing courses being taught in the active learning classroom to determine what attributes and elements of the design are most conducive to teaching and learning.

In order to create an active learning classroom that allows students to easily reconfigure the furniture to work in small groups, the allotted space per student has to be
increased. While architects understand this logic, the challenge comes in convincing senior administrators that you have to reduce the number of students you can accommodate in the classroom in order to support active learning. “When you’re creating an active learning classroom, you’re losing about 15% of the number of seats,” said Farmer, which reduces enrollment. Introducing this level of change becomes political and often requires a strong faculty voice to help further the cause. A senior administrator suggests that another strategy at influencing change at Berkeley is to compare the campus’s learning spaces to peer institutions, while also preparing a logical argument about the advantages of active learning.

Creating experimental learning spaces and opportunities to introduce new teaching practices is helpful, as long as faculty members are given the freedom to experiment without fear of repercussion from poor course evaluations. While faculty members acknowledge that they value constructive criticism, they have serious concerns that negative feedback from introducing new or innovative teaching practices could work against them. A faculty member explained that this is even more of a concern for non-tenured faculty. “I think you’d probably find that faculty would worry more about trying something new before they have tenure. I know there would be more worries about poor teaching evaluations and so on.”

If the faculty believes there is too much risk involved in introducing new teaching practices, the likelihood of successfully leading experimental teaching initiatives is greatly reduced. A faculty member explained how he attempted to alleviate the challenges that can occur from receiving poor evaluations when introducing something
new. “When I went in that room [the new, active learning classroom] I just told the students right up front, if you like the look of this room, and if you want more rooms like this at Berkeley, just be careful about your evaluations.”

Berkeley’s process for completing course evaluations varies by department, although almost all departments are using paper copies as opposed to an electronic form that can be completed on-line. There are only two questions that are required campus-wide, so the way that departments are collecting data is of little value for conducting any institutional assessment, such as student perceptions of teaching in large, lecture-based courses. As Berkeley looks into moving its course evaluations on-line, there is some hope that the campus will be able to revamp the questions and begin to introduce some level of standardization without losing the uniqueness that its faculty so highly values. While some progress has been made with on-line evaluations, including conducting a pilot with several faculty members, senior administrators suggest they’ve received a great deal of pushback from the Academic Senate, which has slowed down the process for change.

Glenda Hull, a professor in Berkeley’s Graduate School of Education and Chair of Berkeley’s Teaching Committee, suggests there are plans to revisit the way that teaching and faculty are assessed, from course evaluations to annual performance reviews, in attempt to identify how the process might be improved. While course evaluations are just one mechanism for evaluating teaching, there are of other viable methods, suggests Hull, such as conducting peer reviews or building a teaching portfolio. Teaching portfolios would ideally include materials that show innovation in terms of curriculum
and teaching practices, such as examples of student work that was developed throughout the duration of the course.

A faculty member explained that it takes years to develop one’s teaching practices, suggesting excellence in teaching isn’t something that can be accomplished overnight. “At the end of the day, faculty should have the latitude to develop at their own pace. You know, you learn to teach over a career,” said a faculty member. An essential factor in faculty growth and development is recognizing that like most learning experiences, practice makes perfect, as long as the faculty is willing to try new things along the way.

**On-Line Learning: A Panacea or Cataclysm?**

The University of California is exploring on-line education as a method of cost reduction, system efficiency and generation of new revenue. The Governor’s proposed budget for January 2013 allocates “$10 million to both the U.C. and California State University systems and $16.9 million to community colleges for online education exclusively” (Rainey, 2013, para. 6). U.C.’s president suggests that efforts to increase the number of on-line courses could amount to as much as 11% of the University’s undergraduate curriculum being provided on-line over the next five years (Freeling, 2013). Much like the University of Central Florida, the University of California hopes to alleviate bottlenecks in high-demand, lower-division courses by providing more of these courses online. There is also hope that by improving access to lower-division courses the University will improve its four-year completion rate.
Having provided nearly 2,600 on-line courses to more than 90,000 students, the University of California is by no means a newcomer to the market of on-line education (Freeling, 2013). Although the University has experience in providing on-line education, the majority of courses it provides are to support three fully on-line, master’s degree programs, as well as professional certificates and specialized programs provided through the University’s Extension Center. In fact, the number of on-line, lower-division undergraduate courses available to students during the fall and spring terms is much lower at a total of 27 courses (Freeling, 2013). What remains to be determined is whether on-line courses at the undergraduate level will generate additional revenue and to what extent the faculty and students will embrace on-line learning.

A faculty member that participated in the study suggested there is great deal of controversy surrounding the movement toward on-line education. Berkeley’s faculty, which perceives on-line education to be a top-down initiative that is being mandated by the U.C. system, is at odds with the administration that is charged with identifying new revenue streams and reducing costs. The University’s decision to expand on-line education without adequate involvement and leadership by the faculty is diametrically opposed to Berkeley’s culture of shared governance. The faculty is upset because on-line education isn’t something that was discussed at the campus level and they are concerned for the students. A faculty member explained that a lot of individuals are afraid of online learning and not for the reasons people think, such as losing their jobs. “People are afraid that it's not good for students, that students need the contact, and that they need that interaction,” said a faculty member. With a great deal of conflict over on-line learning,
the faculty also suggests the University is sending mixed messages. “On-line education is presented as a moral imperative, but in fact, it's a money maker, except no one thinks it's actually going to make money,” said a faculty member. The faculty doesn’t trust the administration, nor does it believe the movement toward on-line education is what’s best for the students.

On August 30, 2012, Berkeley’s Provost and Vice Chancellor for Administration and Finance announced the appointment of Professor Armando Fox to serve as the Academic Director of the Berkeley Resource Center for Online Education, a new unit dedicated to supporting on-line initiatives and research (U.C. Berkeley, Public Affairs, 2012). Working under the guidance of the On-line Education Steering Committee, which is part of the Academic Senate, Fox will collaborate with the Dean of Berkeley’s Extension Center to build an infrastructure to support numerous and varied on-line initiatives. Fox is a professor in the Electrical Engineering and Computer Science department and has taught courses in both Coursera and edX, two of the leading providers of Massive On-line Open Courses in higher education.

Berkeley announced in July 2012 that it was joining forces with edX, a not-for-profit enterprise founded by Harvard University and the Massachusetts Institute of Technology (MIT) that features free and open on-line courses. Unlike Harvard and MIT that both brought $30 million to the edX project, Berkeley has been contributing technical expertise to the development of the edX on-line platform (Young, 2012). The platform is open source, making the software freely available to institutions, while enabling others to contribute to its on-going development.
Senior administrators suggest there is a great deal of angst by the faculty surrounding on-line education. “The anxiety surrounding on-line education reared its ugly head last year and it’s still here,” said an administrator. With the recent development of joint academic and administrative leadership to guide Berkeley’s on-line initiatives, there is hope that the faculty’s anxiety will lessen and the campus will gain some traction in expanding the number of on-line courses available for undergraduate students during the fall and spring semesters.

**Strategies & Incentives for Change**

One of Berkeley’s newest strategies at influencing new and improved teaching practices is the August 2012 development of a Center for Teaching and Learning (CTL). The CTL replaced the Office of Educational Development, a small unit that had one employee, who primarily supported faculty members that were referred as a result of poor teaching evaluations. A faculty member explained how limited the resources were for the Office of Educational Development. “One employee was responsible for supporting 1,600 faculty members. I mean that’s how pathetic [it was], and no one else will tell you that, but it's pathetic, it's embarrassing.”

Today, the CTL has two new senior consultants, armed with ambition, energy, optimism and newly earned Ph.D.’s. One of the biggest challenges facing the CTL is changing the cultural mindset that consultations regarding teaching are only for faculty members that have poor course evaluations. Emphasizing the benefits of continually
assessing one’s teaching, the CTL hopes to coordinate a series of forums and programs aimed at raising greater awareness and appreciation for innovative teaching practices and learning activities.

While still a relatively new unit, the CTL has made reasonably good progress, including the development of a group of faculty advisers that can speak to different areas of specialization, such as teaching large lecture-based courses or providing language instruction. The overall goal of the advisory group is to connect individual faculty members from various disciplines with those who have experience teaching at Berkeley. The CTL has also developed a year-long Teaching Excellence Program for new faculty members and continues to coordinate a Lecturer Teaching Fellows Program. To encourage participation in the Lecturer Teaching Fellows program, the CTL provides a $1,500 course improvement grant for participants. A participant in the program suggests the discussions cover a broad range of topics related to improving one’s teaching. “The discussions are really about how faculty members can up their game. “While some of the discussion is about technology, some of it is just about dealing with the mundane,” said a lecturer.

Finding alternative and convenient ways for faculty members to communicate and share information about teaching is an important strategy in supporting faculty development. One faculty member expressed that Teach-Net, an email forum restricted to Berkeley’s faculty and administrative staff, was a helpful resource when he was considering podcasting his lectures. “There was a discussion on Teach-Net about
podcasting, and it turned out be a great resource,” said the faculty member, who used Teach-Net to gather input from faculty who had experience with podcasting.

Another strategic initiative aimed at influencing faculty development is a seminar provided by Educational Technology Services entitled, “Awakening the Digital Imagination.” Bobby White, an Instructional Designer who developed the seminar, suggests the course was a big step forward from providing a one-time workshop on teaching with technology. The 12-week seminar meets for 1.5 half hours per week, and the philosophy behind the course is to build a digital literacy around key areas of social and new media. White explained that the primary intent of the seminar is for participants to use social and new media tools as learners. “I try to clearly articulate it’s not about learning to teach with these tools, it is about learning how to learn with these tools,” said White. White’s enthusiasm for her work is infectious, and despite the limited resources available within her unit, she remains upbeat and optimistic about inspiring faculty members to be innovative in their teaching, while expanding their use of technology.

Educational Technology Services (ETS) has also been working with several faculty members in the pilot of electronic textbooks (e-texts). The pilot was sponsored by Educause and Internet 2 and included several colleges and universities with the primary goal of exploring a new business model for providing students access to e-textbooks. Seven of Berkeley’s faculty members participated in the pilot and a progress report provided by ETS indicates that the faculty and students found e-texts, as they are currently available, to be an inadequate replacement for paper-based textbooks (Rothrauff,
2012). The challenges noted include technical bugs and poor interfaces that are neither intuitive or integrate well with other aspects of the student’s learning experience.

Similar to Duke University and the University of Central Florida, Berkeley has an annual faculty awards program that recognizes excellence in teaching. The Distinguished Teaching Award is given to a small number of faculty members (3-5) each year and includes recognition from the Academic Senate, as well as a cash award that one faculty member suggested is on the order of $10,000. The process for receiving the distinguished teaching award is fairly rigorous and includes two stages. The first stage consists of receiving a letter from the department chair or a colleague that summarizes the case, including teaching evaluations from at least two courses over a period of time and the grade distribution for the courses. The second stage includes a report on what the faculty member has been teaching, a statement from the faculty member, letters of recommendation from peers and students, and observation of the faculty member teaching in the classroom. “People love getting the distinguished teaching award because it’s such an honor,” said Glenda Hull, Chair of the Teaching Committee that evaluates faculty for the Distinguished Teaching Award.

While Berkeley has a variety of strategic initiatives aimed at influencing new and innovative teaching practices, senior leadership suggests the two most important factors for influencing change are faculty leadership and resources. Cynthia Schrager, Vice Provost of Teaching, Learning, Academic Planning and Facilities, explained that the nature of managing change on a campus like Berkeley doesn’t happen in a top down, straight arrow kind of way. It’s really about strategic partnerships, shared governance,
resources and faculty leadership, suggests Schrager. A lot of the resources that currently exist at Berkeley are the result of grass roots efforts. Speaking from memory, Schrager described how Educational Technology Services didn’t exist a little over ten years ago. There were a bunch of boutique efforts that involved technology across the campus, which were mostly faculty run, explained Schrager. Eventually, the faculty said “this is too important to just leave at this point,” so the campus made a strategic decision to pull those resources together and invest in building a comprehensive support unit that today is known as Educational Technology Services (ETS). ETS currently reports to the Vice Provost for Teaching, Learning, Academic Planning and Facilities.

**Lessons Learned**

While Berkeley has implemented a number of small-scale initiatives aimed at influencing new and innovative teaching practices, the most significant factor influencing change is the University’s current financial crisis. The pressing need to identify new revenue streams, while improving efficiency and reducing costs, has led the University to expand the provision of on-line courses at the undergraduate level. The state of California is providing financial support for the University’s expansion of on-line education, which Berkeley’s faculty perceives to be a top-down initiative that was mandated by the U.C. system. The underlying tension between the administration and faculty stems from the competing forces of economic necessity and shared governance.
Berkeley’s administration is charged with creating new revenue streams and reducing costs, while the faculty is charged with ensuring academic rigor and quality.

Much like the University of Central Florida (UCF), the U.C. system plans to offer an increasing number of lower-division, undergraduate courses on-line, which they hope will reduce bottlenecks in registration and improve the University’s completion rate. Unlike UCF, technology has not traditionally played a central role in supporting Berkeley’s teaching mission. Berkeley faces significant challenges in expanding on-line education, as the faculty doesn’t believe that the change is necessary or that on-line education is what’s best for the students. Berkeley’s faculty also hasn’t been trained in teaching on-line courses and the campus has scarce resources to support faculty in redesigning their courses to be taught on-line.

Berkeley’s ability to advance technology enhanced teaching and learning practices will require strong leadership by the faculty and sufficient resources from the administration. Initiatives that require change at the institutional level frequently result in the recruitment of individual faculty members to serve in leadership roles, such as the appointment of Professor Armando Fox as the Academic Director of the Berkeley Resource Center for Online Education. While grass roots efforts led by individual faculty members are considered a tried and true method for leading change, these initiatives are often on a much smaller scale, making their impact or significance difficult to measure. Further, those faculty members who have been willing to lead grass roots efforts don’t appear to be recognized or rewarded for their initiative, such as the faculty member who developed a hybrid course for teaching composition.
As Educational Technology Services strives to develop a higher level of digital literacy among Berkeley’s faculty, it’s equally important for college deans and department chairs to support these efforts. Establishing a shared understanding of the important role technology plays in supporting teaching and learning is an essential component in the development of new and innovative teaching practices. Faculty development efforts also require a time commitment by the faculty, as well as access to instructional technology resources and support services. Deans and department chairs need to serve as an advocate for instructional design and technology support services, while at the same time, encouraging their faculty to experiment in their teaching. Department chairs also need to provide greater leniency for poor course evaluations associated with experimental teaching initiatives.

With a long and tumultuous history of shared governance, the Berkeley Division of the Academic Senate has become a powerful source of authority with full autonomy over the campus curriculum, new degree programs and approval of courses. There are many areas within the academic portfolio that require support from the Academic Senate in order to advance institutional change and new initiatives. If Berkeley is to become successful at influencing new and innovative teaching practices through the use of technology, the change will need to be initiated from the faculty and supported by the administration through the allocation of sufficient resources.
Chapter 5: Key Findings & Concluding Remarks

Overview

The primary objective of this study was to identify how three very different universities, with a focus on research and teaching, are influencing technology enhanced teaching and learning practices, primarily in the Humanities and Social Sciences. More succinctly, the study sought to identify those factors that are believed to be influencing the growth in technology-based teaching at the selected institutions, while examining those strategies found to be helpful in leading change. The study focused primarily on classroom-based and hybrid courses, which include both face-to-face and on-line instruction. As there is a high degree of speculation that recent trends in open and on-line education will influence teaching in face-to-face courses, the study also explored how the institutions and faculty are responding to these trends.

The most effective way to learn about this phenomenon was through qualitative case study research that examined three universities with a reputation for promoting innovative teaching and learning practices through the use of technology either traditionally or out of recent developments. The selected sites include the University of California, Berkeley; Duke University, and the University of Central Florida (UCF). While the factors influencing change differed among the universities, there is a great deal that can be learned from studying both the differences and similarities in strategies across institutions.
The following chapter draws upon the case study research to answer the five research questions that guided this study. It also provides concluding remarks and opportunities for future research.

**Key Findings**

**Research Question #1**

What strategies (or actions) were most helpful at influencing technology-based teaching and learning practices?

Faculty members across all institutions suggest they have become more likely to integrate technology into their teaching as general assignment classrooms have become better equipped with technology. All institutions have equipped the majority of their classrooms to include technology that supports digital presentations with an increasing number of classrooms that also capture lecture materials such as audio, video and digital presentations. Earlier research suggests that making the technology accessible to faculty is an important first step at influencing change, but insufficient when it comes to transforming the way a faculty member teaches (Twigg, 2003).

A common theme across all institutions was the inherent tendency by faculty members to use technology simply for enhancing one’s current teaching practices. Despite this tendency, there are a number of faculty members who are exploring new or innovative teaching practices across all institutions and at varying levels. All institutions are actively engaged in efforts to advance active- and team-based learning, on-line education at the undergraduate level, and the provision of MOOCs through a variety of delivery platforms. While the level and rate at which change is occurring varies, those
strategies (or actions) that have been shown to advance technology enhanced teaching and learning include:

1. High degree of access to technology and support resources
2. High degree of instructional design resources and faculty development efforts
3. High regard for technology enhanced teaching and learning by senior leadership, especially provosts, vice provosts, deans and department chairs
4. The recruitment of faculty members and senior administrators with a track record of teaching innovation
5. Incentives that reward faculty for the innovative use of technology to support teaching and learning goals
6. Alternative and convenient ways for faculty members to share information about teaching with technology
7. The allocation of sufficient resources, including a reduced faculty workload, to support course innovation and curricular development through the application of technology
8. High degree of support for experimental teaching initiatives, highlighting lessons learned, while examining future applications

Research Question #2

How does the institution encourage and support faculty in developing new teaching practices for the advancement of learning?

All institutions have allocated resources, at varying levels, to support the faculty in developing new and innovative teaching practices. Faculty development efforts
commonly include: individual consultation services on a broad range of topics, from redesigning a course to developing a new approach for evaluating student learning; workshops designed to increase awareness about a teaching model or practice, e.g., team-based learning; seminars designed to improve digital literacy among the faculty; faculty fellowships that support a group of faculty working together on a curricular change, and course innovation grants designed to provide additional resources for faculty members to experiment with new teaching practices and the use of technology. While those units that provide instructional support services often have to encourage faculty participation through special programs and incentives, one institution actually requires its faculty to complete a development course. At the University of Central Florida, faculty members interested in teaching on-line must first complete IDL 6543, a development course, which requires a minimum of 80 hours to complete. Upon successful completion of the course, faculty members receive a stipend and access to the platform for teaching on-line courses.

While all institutions provide instructional design services, the level of support varies by institution. UCF’s Instructional Design Team includes approximately 13 staff members that primarily support faculty members teaching on-line courses. On-line education is an area of growth for UCF and plays an important role in fulfilling the institution’s teaching mission. Duke’s Center for Instructional Technology includes 18 staff members, 5 which are dedicated specifically to on-line initiatives. Berkeley has the lowest level of support with 3 instructional designers whose primary role is to support the faculty in their use of the Learning Management System. In comparison to Duke and UCF, Berkeley appears to be the least advanced in technology enhanced teaching and
learning practices, as there are few incentives for the faculty to change and scarce resources to support the faculty in leading these efforts.

An institution’s ability to allocate sufficient resources to support course innovation and curricular development is an important element in leading change. Faculty development efforts require a time commitment by the faculty, as well as easy access to technology and instructional support. Deans and department chairs need to advocate for instructional support services and encourage their faculty to experiment with new teaching practices, while providing greater leniency for poor course evaluations associated with experimental teaching initiatives.

**Research Question #3**

How have teaching practices changed through the use of technology?

For the vast majority of face-to-face courses, teaching practices haven’t changed through the use of technology. While faculty members suggest they have become more likely to integrate digital materials into their course lectures and seminar discussions, this change hasn’t necessarily led to new teaching practices. As efforts to advance active- and team-based learning gain momentum, with or without the use of technology, it is likely that the number of faculty who rely solely on lecture-based instruction for face-to-face courses will continue to decrease.

Recent efforts to advance on-line education at the undergraduate level and through the provision of MOOCs at both Duke and Berkeley may eventually influence new teaching practices in face-to-face courses. UCF began providing on-line education in
1996, and its faculty suggests their experience teaching on-line has led them to infuse more technology in face-to-face courses. Approximately 50% of UCF’s faculty is teaching on-line, and faculty members suggest they are increasingly using elements of on-line education in face-to-face courses. Approximately one third of all face-to-face courses at UCF have a web-based section, which relies on the same technology that is being used in the on-line environment.

The faculty’s use of technology in the classroom and view on whether it actually improves the teaching or learning experience differs greatly across and within the institutions. What most faculty members tend to agree upon is that the use of technology is primarily influenced by three factors: the discipline, course needs and individual teaching preference or style. In some cases, the discipline, such as composition, lends itself well to the on-line format for teaching as students are often required to review and critique the work of their classmates. In other cases, the sheer size of the course may require that it be taught on-line as opposed to face-to-face. There are some faculty members who suggest that teaching a large course on-line is better than teaching a large course face-to-face as the level of student engagement is greater in on-line courses. An individual’s teaching preference or style is by far the most difficult factor to change, as faculty members who have been teaching for a significant amount of time become comfortable with a particular method of teaching. Without a sufficient reason to change, it is unlikely that faculty will adopt new teaching practices. Efforts to advance on-line education may encourage more faculty members to teach in multiple course delivery
modalities; however, the question that remains is whether this will result in new and innovative teaching practices.

A faculty member teaching at Berkeley suggested that technological innovation in teaching includes three distinct levels of change. First, there is the type of innovation that enhances current teaching practices, which might include the use of PowerPoint slides rather than the blackboard. Second, there is the type of innovation that transforms current teaching practices, such as the use of “clickers” [polling response system] to engage students in a lecture-based course. Third, there is the type of innovation that alters what a faculty member does in the classroom, deemphasizing the classroom encounter in favor of activities that are more directly interactive or allow for flexible scheduling, such as the flipped classroom model or on-line learning. The level at which the majority of faculty operate within this framework of technological innovation is often influenced by the level of instructional resources the institution provides, as well as incentives for change.

**Research Question #4**

What considerations or factors should be taken into account when attempting to introduce technology into the curriculum?

When integrating technology into the curriculum, an important first step is for faculty members to identify the teaching and learning goals for the course. Instructional designers often begin conversations with faculty members by asking: What do the students need to know and be able to do, and how do they best learn? The next step is reexamining current teaching practices to determine how technology might further support the student’s learning experience. Introducing technology into the curriculum
requires both an interest and willingness by the faculty in reexamining current teaching practices to improve student learning. This level of change often requires support from department chairs and deans through the allocation of additional resources and reallocation of faculty time.

Based on the case study research, the institution that provides the best model for introducing technology into the curriculum, specifically for classroom-based courses, is Duke University. Duke is using digital visualization technology to transform teaching and long-term research initiatives in the study of sculpture, urbanism and painting. Five faculty members spent a year reexamining current teaching practices to identify possible ways to improve the student’s learning experience. The end result was a new approach to teaching and the development of a course entitled “Wired – New Representation Technologies.” The course engages students in the learning process by having them explore how to record and communicate complex sets of visual and physical data from historical buildings and archeological sites, developing new methods of interpretation and representation through visual technologies. A substantial amount of resources were invested in the development of this course, as five faculty members from different disciplines came together to reconsider and redesign the way undergraduates are taught historical material culture. Today, the course is offered on a team teaching basis and continues to evolve in a variety of different ways, blurring the lines between teaching and research.

In order to advance technology-based teaching and learning practices, the institution as a whole needs to recognize technology as a central part of the curriculum,
rather than an optional element. Senior leaders need to consider whether they’ve invested sufficient resources in supporting the exploration of new teaching practices through the use of technology. Finally, when institutions assess the quality of teaching, there are various aspects of technology that should also be evaluated. How does the faculty’s use of technology promote student learning and engagement both inside and outside of the classroom? Does the faculty’s use of technology to provide course materials and relevant resources improve the delivery of the course? None of the institutions studied appear to be evaluating the faculty’s use of technology at an institutional level and from a teaching and learning perspective. The primary tool for evaluating teaching across institutions is the end-of-term course evaluation. The course evaluations don’t appear to be an effective method for assessing teaching or the use of technology, nor do they provide data that supports institutional assessment, for example, the application of technology in large lecture-based courses.

**Research Question #5**

How does the view on technology-based teaching and learning practices differ, if at all between senior administrators and faculty members?

In all cases there is an underlying tension that exists between the administration and the faculty. For Duke University, the administration has great aspirations to expand the use of educational technology, but even the best-intended strategies haven’t resulted in broad-based change. Duke’s faculty isn’t necessarily convinced that change is necessary and also suggests there are few incentives to improving one’s teaching. For the University of Central Florida, the tension stems from administration’s desire to meet ever
increasing enrollment demands through larger course sizes, which are increasingly on-line, and the challenges the faculty face in maintaining academic rigor and integrity for large courses. For U.C. Berkeley the tension stems from administration’s efforts to expand on-line education at the undergraduate level in order to reduce costs and generate new revenue, which the faculty perceives to be a top-down initiative that is being mandated by the U.C. system. Berkeley’s faculty doesn’t trust the administration, nor are they convinced that on-line education is what’s best for the students.

As public institutions face unprecedented growth in enrollment coupled with decreasing financial support from the state, institutions are increasingly turning to on-line education as a method to improve access and efficiency, while reducing costs and generating new revenue. This is certainly true for the University of California, where state funding over the last five years has been reduced by $900 million, roughly one third of the budget, while enrollment and operating costs have continued to increase (McMillan, 2013).

For the University of Central Florida, senior administrators consider on-line education to be a central factor in supporting the University’s teaching mission and in serving its students. UCF is largely driven by its mission to serve the economic needs of the region and state by providing a high-quality education that is both accessible and affordable. During the fall 2011 semester, over 27,000 students enrolled in at least one web or video-based course and over 6,200 students took only on-line classes (UCF, Center for Distributed Learning, 2012). On-line education has become the University’s business model for course delivery, as opposed to something it does on the side.
For Duke University, senior administrators view technology-based teaching as an opportunity to foster active, inquiry-based learning, maximizing opportunities for students to learn both inside and outside of the classroom. Recent efforts by Duke to expand on-line education appear to be influenced by the need to keep current with peer institutions, as many of the Ivy League institutions have recently entered the market for on-line education. Efforts to advance on-line learning are also seen as an opportunity to provide added flexibility and convenience in how students complete courses. While Duke is a newcomer to on-line education, the University recently announced efforts to expand on-line education in November 2012 through a consortium of 10 prominent institutions known as Semester Online. Shortly before this initiative was due to launch, the faculty voted against on-line education and the University withdrew from the consortium. The key difference is that Duke’s faculty is innovative in its teaching by choice, versus innovative by necessity.

When it comes to the faculty’s view on technology-based teaching and learning practices there is little uniformity of opinion within or across the selected institutions. For the University of Central Florida, where technology plays an important role in fulfilling the institution’s teaching mission, the faculty appears to share a greater appreciation of the advantages that technology provides from a teaching and learning perspective. For faculty teaching at Berkeley and Duke, the view of technology-based teaching appears to be associated primarily with enhancing one’s current teaching practices and improving efficiency.
Both Berkeley and Duke have recently engaged in the provision of MOOCs and efforts to advance on-line education. In light of these developments, it will become increasingly important for these institutions to invest sufficient resources in developing a faculty that is capable of teaching in multiple course delivery modalities. Berkeley’s faculty initially appeared to have the greatest concern in the growth of on-line education, which the administration has attempted to resolve with the recent appointment of Professor Armando Fox as the Academic Director of the Berkeley Resource Center for Online Education. If Berkeley and Duke are to become successful at influencing new and innovative teaching practices through the use of technology, the change will need to be initiated from the faculty and supported by the administration through the allocation of sufficient resources.

Concluding Remarks

The findings of this research study suggest that the factors influencing the evolution of new, technology enhanced teaching and learning practices, primarily in the Humanities and Social Sciences, differ among institutions. The strategies that have been shown to advance technology-based teaching also vary, and are in many ways, influenced by characteristics unique to the institution’s mission, history, culture and the student population it serves. While there isn’t a one-size-fits-all solution to advancing technology enhanced teaching and learning, an institution’s ability to successfully lead change often relies on a shared understanding of why change is needed, including how it
will benefit the students’ learning experience. Change efforts require a willingness and interest by the faculty in exploring new teaching practices, as well as sufficient resources and support from senior leadership to advance experimental teaching initiatives. Incentives aimed at advancing the innovative use of technology to support teaching and learning goals also play an important role in advancing faculty development efforts.

Senior leaders all too often come into an institution and attempt to lead change based on their experience at a former place of employment. The findings from this study suggest that institutional characteristics, such as history and culture, play an important role in shaping the faculty’s teaching practices. Leaders need to become familiar with the unique characteristics of an institution before making decisions about how best to advance technology enhanced teaching and learning practices. Senior administrators also need to partner with the faculty to determine the best approach for leading change efforts.

Research conducted in 2008, sponsored by the New Media Consortium, suggested that technological innovation would have a major impact on teaching methodologies over the next five years (Glenn, 2008). It is now 2013, and the most significant innovation to occur in teaching over the last five years has been the development of Massive On-line Open Courses (MOOCs). Higher education has experienced what some have described as an explosion in on-line education as many of America’s most prestigious institutions have entered the market for on-line education. As a result of the increasing trend toward on-line and open education, faculty members will be increasingly expected to teach in multiple course delivery modalities, while infusing more technology in face-to-face courses. New questions about teaching with technology have emerged, such as, is a good
teacher likely to be a good teacher in every modality and how will the recent trend toward open and on-line education shape the future of teaching and learning in higher education. The answers to these questions will likely become increasingly apparent over the next five years.

**Opportunities for Future Research**

Given the rapid pace by which many of America’s leading universities are advancing efforts to expand on-line and open education, both at the undergraduate level and through the provision of MOOCs, there is increasing speculation about how these efforts will shape the future of teaching and learning in higher education. One potential opportunity for future research would be to conduct a study in approximately 3-5 years on those institutions that have recently advanced efforts to expand on-line education at the undergraduate level to determine how teaching and learning practices have changed. Rather than focus on faculty teaching in a specific discipline, the research should be comprehensive, noting similarities and differences found across disciplines and institutions. Will those institutions that have advanced efforts to expand on-line education notice an improvement in time to degree completion? What are the potential benefits and disadvantages associated with the expansion on-line education, and how does the view differ between faculty members and students? What type of technology and support resources will become increasingly important in supporting faculty teaching in multiple course delivery modalities?
Another related and potential opportunity for future research would be to conduct a study on how institutions are assessing the quality of teaching and learning for on-line courses? How is the assessment of teaching and learning for an on-line course different from face-to-face or hybrid courses? To what extent are institutions conducting assessment on teaching at an institutional level, for example how is technology being used to support teaching and learning goals in large lecture-based courses? Finally, how has the institution and faculty benefitted from efforts to advance institutional assessment of teaching with technology?
Appendices

Appendix A: Literature Review

Introduction

Reports suggesting that colleges and universities are discovering new and exciting ways to use technology are plentiful. As technology has become increasingly central to how academics conduct their work, most institutions have invested a significant amount of resources in updating their technology infrastructure. Yet, as Carol Twigg suggests (2003), most campuses have simply bolted new technologies onto a fixed plant, a fixed faculty, and fixed notion of classroom instruction. Despite increasing efforts to make technology more reliable and readily available, there are those who argue that not much has changed in how the faculty teaches, where they teach, whom they teach, and who teaches (Davidson & Goldberg, 2010). The challenge for most postsecondary institutions is identifying how best to explore new ways of teaching that don’t require the stable infrastructure of a classroom, teacher and books (Thomas & Browne, 2011). The potential for technology to serve different types of learning cannot be fully exploited by an academic community that clings to traditional teaching practices.

Although institutions have discovered new and exciting ways to use technology, most of the emphasis has been on selecting the “right” technology, rather than redesigning the teaching and learning process (Hartman, 2008). A review of the literature suggests that technology does not in itself cause changes in learning, but rather, it is how the technology is used that matters most (Ehrmann, 1997). With a good
understanding of those teaching and learning strategies that work best, educators and technology specialists can begin to identify technologies that would best support those strategies (Ehrmann, 1997; Laurillard, 2002). An institution’s ability to successfully integrate technology into the teaching and learning process requires faculty members that are willing to reexamine the curriculum in terms of what they teach, in addition to how they teach it (Miller, Martineau & Clark, 2000).

In order to foster innovation in teaching, there must be adequate incentives and resources for change, and the selection and integration of technology must be accomplished in a manner that is consistent with the institution’s mission and strategy, so that learning is improved, while organizational priorities and identities remain intact (Miller et al., 2000; Bonk, Cummings, Hara, Fischler & Lee, 2000). Although faculty support has been identified as a critical factor in the successful integration of educational technology, most institutions continue to underestimate the level of support necessary to successfully lead change efforts (Moser, 2007; Miller et al., 2000). Finally, institutions need to develop a systemic approach for technology-based teaching that provides many of the essential elements for success, sustainability and quality (Hartman, 2008).

The Changing Nature of Teaching and Learning

For most of the twentieth century America’s educational system has been designed on the assumption that teaching is necessary for learning to occur. A review of the literature suggests that a new culture of learning is upon us -- one that doesn’t require the stable infrastructure of the classroom, teacher and books, but rather, is happening all
around us, where technology is constantly creating and responding to change (Thomas & Browne, 2011). In “A New Culture of Learning: Cultivating the Imagination for a World of Constant Change,” Thomas and Browne (2011) suggest that learning is comprised of two elements, a massive network of information and a bounded and structured environment for unlimited agency to build and experiment within those boundaries. It is the interplay between these two elements when learning is believed to be most powerful.

This new culture of learning is viewed in terms of the environment within which it occurs, the boundaries that define it, and the students, teachers and information that coexist and shape each other (Thomas & Browne, 2011). The challenge for most institutions is identifying how to explore new ways of teaching and learning that involve the interplay between technology and pedagogy. While some progress has been made in advancing the evolution of new teaching practices through the use of technology, some argue that the changes to teaching have been modest (Davidson & Goldberg, 2010, p. 2).

Modes of learning have changed dramatically over the past two decades – our sources of information, the ways we exchange and interact with information and how information transforms and shapes us. But our schools – how we teach, where we teach, whom we teach, who teaches, who administers and who services – have changed mostly around the edges.

Designing learning technology models that are innovative, effective and address expectations of the knowledge industry is perceived by many to be an additional burden for academics, suggests Diana Laurillard, Pro Vice Chancellor, Learning Technologies and Teaching, The Open University. Laurillard argues (2002) that a “Conversational Framework” for learning offers a more progressive model than the transmission model.
and is more compatible with the requirements of the reflective practicum where students learn by doing. The conversational framework captures the essence of university teaching as an iterative dialogue between teacher and students operating on two levels: 1) the discursive, theoretical and conceptual level and 2) the active, practical and experiential level (Laurillard, 2002). Laurillard suggests (2002) that in taking the dialogic activities as the criteria for the reflective practicum and the learning community, educators can test how well some of the more ambitious uses of technology measure up to these requirements. The design of the course and use of learning technologies is generated from the learning objectives and aspirations of the course, rather than the capability of the technology.

Research supported by the John D. and Catherine T. MacArthur Foundation examined how young people learn, play, socialize and participate in civic life. In “The Future of Thinking: Learning Institutions in a Digital Age,” a key concept of the research was to better understand digital learning, or participatory learning, where many individuals contribute to the learning process. Unlike instructional technology that tends to be institutionalized and driven by a top-down approach, digital learning outcomes are customizable by the participants; and the interplay between composer, audience and technology leads to the co-creation of a final product. The following principles were presented as both challenges to, and general grounds upon, which to develop creative learning practices (Davidson & Goldberg, 2010, pp. 185-194):

- **Self-Learning**: Self-learning has bloomed across all generations. Online reading and writing have become collaborative, as has the composition of things.
• **Horizontal Structures:** Learning has become increasingly horizontal, peer-to-peer rather than teacher-to-student, and requires rethinking of learning institutions and their surrounding support apparatuses.

• **From Presumed Authority to Collective Credibility:** A major part of the future of learning is in developing critical methods, often collective, for distinguishing sources of good knowledge from those that for a variety of reasons are problematic.

• **A Decentered Pedagogy:** The opportunity and challenge now exist for leaders at learning institutions to adopt a more inductive, collective pedagogy that takes advantage of the extraordinary range of technological resources that are available.

• **Networked Learning:** In a world increasingly ordered by complex, multifaceted problems, the likelihood of working out solutions, resolutions, or workarounds is heightened by drawing on the intersection of different specializations and forms of expertise, rather than on the brilliance of a single know-all individual.

• **Open-Source and Open-Access Education:** The drive to produce and promote freely available applications, tools, and learning resources encourages their circulation and use. The more information can be easily accessed, the more likely it is to be vetted, tested, revised, and remixed to collective benefit.

• **Learning as Connectivity and Interactivity:** Notwithstanding open source and access, digitally enabled social networking applications make possible increasingly robust connectivity and interactivity that produces learning environments and ensembles in which participants both enable and elaborate each others’ learning inputs, practices and products.

• **Lifelong Learning:** Participatory learning suggests a different disposition to knowledge making, acquisition, and sharing that means there is no finality to learning. New technological developments and the rapid transformation in knowledge across almost every field make lifelong learning all the more a condition of contemporary life.

• **Learning Institutions as Mobilizing Networks:** Collaborative, networked learning consequently alters how one thinks about learning institutions and network culture alters how to conceive of institutions
more generally. The networks enable mobilization that stresses flexibility, interactivity, and outcomes.

- **Flexible, Scalability and Simulation**: Networked learning both makes possible and must remain open to various scales of learning possibility, from the small and local to the widest and most far-reaching constituencies capable of productively contributing to a domain, subject matter and knowledge formation and creation.

Any conversation about effective teaching should begin with an improved understanding of how students learn. Zull suggests (2002) that the way a faculty member teaches depends upon how they believe the mind works and how they understand student learning behavior. In “The Art of Changing the Brain: Enriching the Practice of Teaching by Exploring the Biology of Learning,” Zull argues (2002) that biology deepens one’s understanding of what learning is actually about and helps individuals understand more clearly why learning occurs. The “biology of learning” enriches teaching by making educational theory more real, by understanding how the physical process of learning occurs through the network of neurons and sensory experience (Zull, 2002). Based on this understanding, teachers should be less inclined to spend time trying to transfer ideas to students and more inclined to find out how they can help students build their own experiences and knowledge.

In “How Learning Works: Seven Research-Based Principles for Smart Teaching,” researchers define learning as a process that leads to change, which occurs as a result of experience and increases the potential for improved performance and future learning (Ambrose, Bridges, DiPietro, Lovett & Norman, 2010). Founded on empirical evidence
from the science of learning, researchers developed seven principles for smart teaching (Ambrose et al., 2010, pp. 4-6):

1. Students’ prior knowledge can help or hinder learning
2. How students organize knowledge influences how they learn and apply what they know
3. Students’ motivation determines, directs and sustains what they do to learn
4. To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned
5. Goal-directed practice coupled with targeted feedback enhances the quality of students’ learning
6. Students’ current level of development interacts with the social, emotional, intellectual climate of the course to impact learning
7. To become self-directed learners, students must learn to monitor and adjust their approaches to learning

These principles are domain independent, experience independent, cross-culturally relevant and intended for anyone interested in understanding more about how students learn and in applying that information to improve instruction (Ambrose, et. al., 2010).

Armed with knowledge about how learning occurs and the principles necessary for smart teaching, faculty are more likely to be successful in their application of technology to support teaching and learning goals.

**Leadership & Organizational Change**

The fact that only a small number of colleges and universities have a senior position to lead academic technology support efforts is cause for concern. Those units designated to support the faculty in their use of technology are often staffed by individuals who are considered to be “weak” leaders in driving change, as they are not tenured faculty and in most cases, do not have direct access to a member of the executive
leadership team (Bates & Sangra, 2011). While academic technology has become increasingly recognized as a distinct branch of the IT profession, with its own unique attributes, requirements, and challenges for leadership, the idea of a unified organization that supports the faculty in their use of technology is a concept that has yet to emerge on most campuses (Albright & Nworie, 2008). The fragmentation of technology services across departments, such as the Library, Information Technology Services, Language Centers, Teaching and Learning Centers, and Media Services, has resulted in a diffusion of academic technology leadership and strategy. These departments often compete with one another for limited resources, which creates tension among the staff and often thwarts collaborative support efforts.

In the fall of 2005, Educause, a non-profit organization committed to the use of technology in higher education, conducted a national survey to explore the organization of academic technology services on a campus-wide basis. The sample included a total of 150 institutions that were randomly selected, with 50 institutions from each of the then-Carnegie categories of Doctorate granting institutions, Master’s Colleges and Universities, and Baccalaureate Colleges (Albright & Nworie, 2008). Through an examination of websites and direct follow up with institutions, the study attempted to identify a single individual with overall responsibility for instructional technology. The individual had to meet the following criteria in order to qualify:

- Administer support for both physical and virtual learning environments, as well as some form of instructional development of faculty development and training services
• Responsibilities were dedicated to academic technology and did not have significant responsibilities in other areas, such as staff workstations, non-academic software licensing, and the IT help desk

• Position was no lower than two administrative levels of department heads reporting directly to the CIO, if the CIO was at a VP level

The survey identified leadership positions at only 10 percent or (15) of the 150 institutions that were studied (Albright & Nworie, 2008).

There are numerous studies that have examined the relationship between leadership and change. Countless change initiatives have failed because the process didn’t take a particular group into account or because leaders ignored the widespread fear that change engenders (Eckel, Green, Hill, & Mallon, 1999). A research project that examined the experience of a community college known nationally for its learner-centered approach to education, studied the interaction between technology leadership and organizational change (Owen & Demb, 2004). The leadership issues and aspects of leading change were discovered through interviews with those individuals experiencing the change, as well as through direct observation of related events and institutional documents. The study suggests that a diverse set of leadership strategies and techniques guided and supported the institution’s success in creating an institutional environment that values the innovative use of technology (Owen & Demb, 2004).

The president of the community college initiated a compelling vision for technology and communicated an ongoing commitment to advancing the use of instructional technology for an extended period of time that lasted nearly 10 years. The significance of collective leadership in technology implementation cannot be overstated.
Many leaders of technology emerged as the college community sought to integrate technology into the teaching and learning environment (Owen & Demb, 2004). The faculty, students, administrators, and technology specialists all led by example, sharing what they learned with their colleagues and continuing to take the lead in developing programs, classroom enhancements and distance learning initiatives. The executive leadership team became “the leadership, behind the leadership,” by providing the necessary financial support and opportunity to experiment with new methods of teaching (Owen & Demb, 2004).

For some institutions, the challenge in leading change stems from the organization’s understanding of the dividing line between management and leadership responsibilities for learning and teaching. A team of researchers from three Australian universities were interested in identifying how higher education institutions can better organize their infrastructure and systems to identify, support and develop individuals who are capable of envisioning a future for learning and teaching, in order to create the circumstances by which the institution’s vision can become a reality (Marshall, Orrell, Cameron, Bosanquet, & Thomas, 2011). The research provides a grounded understanding of the dividing line between leadership and management responsibilities for learning and teaching practices in higher education.

Interviews conducted with 36 academic staff members from eight Australian universities helped to determine what the terms leadership and management meant to practitioners and how these roles were understood in relation to learning and teaching.
practices. Even with a diverse set of understandings, the findings resulted in a number of key concepts (Marshall et al., 2011, p. 93):

Leadership Encompasses:

- Establishing a direction or vision for learning and teaching - including a sense of purpose, values, principles, strategies, outcomes to be associated with learning and teaching programs and processes
- Communicating that vision and aligning stakeholders, strategy and resources with that vision
- Establishing, motivating, and inspiring staff, students and other key stakeholders to participate in and contribute to the realization of the vision

Management Encompasses:

- Planning and budgeting to ensure the desired changes in learning and teaching can be realized
- Organizing and staffing to ensure that individuals with the knowledge, skills and dispositions to realize the desired change are available and appropriately deployed
- Monitoring and problem solving to ensure that efforts to change learning and teaching remain on track.

While defining clearly delineated roles for leadership and management is essential, colleges and universities also need to establish conditions for continued organizational learning that helps sustain institutional change. Leading organizational change is less about planning and implementation and more about developing and sustaining of new ways of seeing, deciding and acting (Boyce, 2003). Sustaining change in higher education is dependent upon sustaining the conditions of learning. Those institutions that are committed to successful institutional change will be “rigorous in inquiry, skillful in
dialogue and fearless in examining the institution in the context of its environment” (Boyce, 2003, p. 133).

Vision, leadership and a proactive approach to planning and management are all essential elements to leading organizational change efforts. While the literature suggests that developing a compelling institutional vision for academic technologies is an important strategy in leading change, few institutions have developed a vision, and those that have, were found to be too conservative in their goals (Bates & Sangra, 2011). Visioning is a technique that institutions can use to encourage individuals to understand the full range of possibilities that educational technology can facilitate, including the possible outcomes that might result from its implementation. By developing a shared institutional vision, individuals are more inclined to work together toward a common goal. The vision also provides a benchmark against which to assess different strategies and actions regarding the development of technology-enhanced teaching and learning (Bates, 1999).

Implementing Technology

The successful implementation of technology requires a strategic approach, one that addresses internal factors, such as leadership, resources, organizational culture, and faculty readiness, as well as anticipated degree of resistance and the degree of variance from status quo (Roberts, 2008). In order to increase the likelihood that faculty will adopt technology in their teaching practices, the literature suggests the selection and integration of technology must be accomplished in a manner that is consistent with the
institution’s educational mission (Bonk et al., 2000). A study of nine higher education institutions in the Boston metropolitan area suggests that if an institution’s strategy is to promote the use of educational technology, then that institution must establish an adequate framework for faculty to use technology. The framework must include a formal incentive structure, sufficient educational technology infrastructure, scalable support offerings, customized consulting and various support groups throughout the campus community (Moser, 2007).

For many institutions, the integration of educational technology is driven by competition with peer institutions, increasing student demands, technology competency and modernization of the institution (Roberts, 2008; Rogers, 2000; Bates & Sangra, 2011). While competition among institutions is a critical component in the use of technology, the real pressure for higher education to implement technology into the classroom comes from federal agencies and accrediting committees who are concerned about national technology competency standards (Rogers, 2000). But are these the right reasons to implement technology, and doesn’t this simply foster technology “bolted on” to a fixed notion of teaching?

One of the greatest barriers to transforming teaching and learning through the use of technology is the faculty’s strongly held beliefs about traditional teaching methods (Bates & Sangra, 2011). Other potential barriers to the adoption of technology include, lack of technological literacy or competency of the faculty member; fear on the part of faculty members that students are more adept at using technology then they are; inertia and comfort with traditional delivery methods; time constraints with learning how to use
technology, and a perceived threat to academic freedom and autonomy (Miller et al., 2000; Bjarson, 2003; Surry & Land, 2000).

Although faculty support has been identified as a critical factor in the use of educational technologies, many individuals involved in leading these support efforts fail to recognize the complexities of integrating technology into teaching (Moser, 2007). If sufficient support is not provided, particularly in competence development and course redesign, those faculty members who are seen as early adopters of technology will most likely achieve only mediocre results (Moser, 2007). The amount of time faculty spend working with instructional support specialists is essential to their overall success in the application of technology to support teaching and learning goals. Since faculty time is a precious resource, the consultative support is essential and has to take precedence over the many other activities that occupy a faculty member’s time and attention. The factors that influence how faculty members commit their time to teaching and learning with technology include both organizational incentive structures (extrinsic motivation) as well as individual incentives (intrinsic motivation) (Moser, 2007).

Organizational factors that have been shown to facilitate the adoption of educational technologies include (Roberts, 2008, p. 5):

- Support of technology by an authority figure such as department head or dean

- High regard and support of teaching within the institution. Organizations which provided for parity of teaching activities with research endeavors through the use of formal policies and maintenance of equity within the promotion and tenure process are more likely to experience a higher degree of adoption.
• High degrees of sharing and learning outcomes between colleagues and others in leadership positions

• Support of e-learning activities via allocation of resources in some manner

The successful integration of technology requires daily and continuous attention throughout the organization (Bates & Sangra, 2011). Flexibility and adaptability are also important considerations for technology implementation, although there should be a formal process and support structure in place for technology issues when they arise, especially as faculty and students become more reliant on technology. Institutions need to develop a systematic and comprehensive training program for their faculty; establish units to support learning technologies; and define a clear governance structure that involves key stakeholders (Lawless & Pellegrino, 2007). Another essential element of technology implementation is the development of a formal assessment process that allows institutions to measure how educational technology influences the teaching process and learning outcomes.

Assessment & Strategic Oversight

As educational institutions of all types are investing enormous amounts of effort, money, and risk at implementing technologies, the hope is that these investments will result in teaching strategies that improve students’ learning and overall efficiency in delivery an education. But are these investments yielding the intended results, and if not, what are the barriers to success? While assessing the functional aspects of technology is relatively easy, evaluating its impact on teaching and learning can be a complex and
challenging process. The Flashlight Project investigated five very different types of institutions with the goal of determining whether the institutions had similar results with the intended outcomes for technology implementations (Ehrmann, 1997). For example, three institutions might invest in the same computer conferencing software with very different results -- one might achieve improved collaboration among commuting students, whereas another finds disrupted classes and increased attrition, and yet another discovers no perceptible changes. The underlying assumption of the Flashlight Project and is that differences in outcomes essentially stem from choices made by faculty and students about how to use the opportunities offered by the technologies.

The Flashlight Project focused on whether faculty and students find the available technology to be useful or a hindrance when they try to implement each of the “Seven Principles of Good Practice” in undergraduate education (Chickering & Gamson 1999; Ehrmann 1997, p. 10):

1. Encourage student-faculty contact
2. Encourage cooperation among students
3. Encourage active learning
4. Give prompt feedback
5. Emphasize time on task
6. Communicate high expectations
7. Respect diverse talent and ways of learning

What most institutions have come to realize is that designing educational experiences around technology is a foolish chase, as you cannot possibly keep up with emerging technologies. The paradox in technology enhanced education is that technology changes very rapidly, yet human beings, and higher education in general, changes very slowly (Bates & Poole, 2003).
Research has shown that assessment can mean many different things to faculty, IT professionals, instructional designers and senior administrators (Spurlin, 2006). Some individuals are concerned with assessing students’ knowledge, while others are focused on program improvement. Some intend to assess needs or barriers associated with effective integration of technology, while others are concerned about the demands associated with regional accreditation standards. Some want to understand if learning outcomes vary based on face-to-face instruction versus courses that are completed entirely on-line. Since these concerns are often grouped together, it is important to clarify what the institution, senior administrators and faculty wish to assess.

As institutions of higher learning continue to experiment with new teaching and learning practices, assessment should be an on-going process that attempts to understand and improve student learning. It involves establishing student expectations through clearly defined learning outcomes and requires the institution to systematically gather, analyze and interpret evidence to assess how well student performance matches institutional expectations (Spurlin, 2006). Ideally, there will be a correlation between how the technology is used and whether the students have achieved the desired learning objectives (Ehmann, 2011; Spurlin, 2006). Assessing this connection is a critical part of the process and illustrates the difficulty in using traditional assessment techniques for measuring the effectiveness of technology-based teaching and learning practices.

Considering the substantial investment institutions are making in updating their technology infrastructure and support resources, assessment and evaluation have become increasingly important in making decisions regarding strategic priorities and allocation of
resources. Traditional institutions of higher education can no longer afford to ignore the impact or potential benefits of educational technology on the teaching and learning process. While college and university administrators need to manage technology strategically, governing boards also need to become engaged by providing the strategic oversight necessary to guide institutional policies (Pelletier & Skinner, 2010). For many institutions, this will mean that critical policy decisions about technology are not made by any one school or division, but rather, are made at an institutional level.

As technology has the potential to change the fundamentals of the higher education market, it also has the potential to change the nature of teaching and learning.

In a report published by the Association of Governing Boards, “Technology In Context: 10 Considerations for Governing Boards of Colleges and Universities,” Pelletier and Skinner (2010) suggest that institutional boards consider the following questions in regard to technology used in support of teaching and learning initiatives (p. 6):

- Does your institution invest adequately to ensure the students’ classroom experience benefits from technology’s capacity to enrich teaching and learning?

- Do faculty members and other staff members receive the training they need to make the most use of these new resources?

- Have your curriculum and academic policies evolved to reflect new ways of advancing learning through the use of technology, e.g., hybrid courses or student-directed learning?

- Is the institution taking advantage of technology to realize potential cost savings in instruction?

- Is the institution proactively assessing the potential long-term impact of on-line learning and subsequent changes to the educational landscape?
While technology is considered the medium, or means to an end, institutions need to be aware of the countless ways in which technology is having a transformative impact on operations, including teaching and learning. Boards need to weigh the implications of these changes and how they intersect and affect the institution’s strategy (Pelletier & Skinner, 2010). In order to lead transformative change efforts necessary for institutions to keep current with the fundamental changes in how academics conduct their work, there must be significant commitment and leadership from trustees, top administrators and key stakeholders, which includes the faculty.

Summary

While higher education institutions have developed a greater awareness and appreciation of the need to explore new teaching and learning practices, few have acquired the necessary resources and leadership to successfully lead comprehensive change. Most of the advances in teaching with technology have been incremental and through grass roots efforts, making the significance of these changes difficult to measure. Colleges and universities have invested in updating their technology infrastructure, yet few have invested sufficient resources in leading the exploration of new teaching practices through the use of technology. Since there is little empirical evidence that suggests technology actually improves the teaching and learning experience, it is difficult to establish best practices. Most colleges and universities underestimate the complexity of implementing technology into the teaching and learning process; struggle with
deciding how best to harness technology for an increasingly diverse and technologically adept population, and don’t have the leadership, vision, and organizational resources necessary to successfully lead change efforts.

Advances in technology and the science of learning; access to increasing amounts of data; growing demands for flexibility and choice; competition between institutions; and the desire to be recognized as a leader in technology, have compelled an increasing number of institutions to explore technology enhanced teaching and learning. The problem is that there is a limited amount of information regarding the strategies institutions have embraced to lead these change efforts, including how these techniques might be applied at other institutions. Considering the changing nature of how students learn, it’s surprising that most colleges and universities haven’t developed an institutional vision and strategic approach for advancing teaching and learning through the use of technology. While technology is widely recognized as an efficiency producer, it doesn’t appear as though most institutions are thinking about how technology might improve the teaching and learning process.
Appendix B: Research Methodology

Introduction

As evidenced by the literature reviewed, there is an increasing awareness across higher education of the need to rethink traditional teaching practices in order to fully exploit the potential benefits of technology. While numerous research studies have focused on factors influencing faculty adoption of technology or the effectiveness of technology for enhancing education, few studies have addressed the factors influencing the evolution of technology enhanced teaching and learning practices and those strategies found to be helpful for leading change. The primary objective of this study is to identify how three diverse universities, with a focus on research and teaching, are influencing the evolution of new, technology-based teaching and learning practices, primarily in the Humanities and Social Sciences. More succinctly, what factors are believed to be influencing a growth in technology-based teaching and learning practices at these institutions, and what strategies were found helpful in leading change. The study will focus primarily on face-to-face and hybrid courses, which include some level of face-to-face and online instruction.

Research Design

The most effective way to learn about this phenomenon is through a qualitative study of cases that examines how three diverse universities with a reputation for promoting innovative teaching and learning practices have successfully influenced change. While the strategies these universities are using differed based on strategic
priorities, financial resources and institutional characteristics, there is a great deal that can be learned from studying both the differences and similarities in strategies across institutions. The study also attempted to discern what tactics were most important in leading change efforts, for example, how were the strategies developed, communicated and inculcated into the culture.

**Research Questions**

The research questions that guided this study were exploratory in nature and the phenomenon under consideration had different outcomes based on the institution’s classification, size and funding model. Through qualitative research, the study provided an opportunity to gain valuable insight from faculty, senior administrators, and technology leaders regarding their experience in advancing, supporting or adopting technology-based teaching and learning practices. The research questions that guided this study are as follows:

1. What strategies (or actions) were most helpful at influencing technology-based teaching and learning practices?
2. How does the institution encourage and support faculty in developing new teaching practices for the advancement of learning?
3. How have teaching practices changed through the use of technology?
4. What considerations or factors should be taken into account when attempting to introduce technology into the curriculum?
5. How does the view on technology-based teaching and learning practices differ, if at all, between senior administrators and faculty members?

Site Selection & Study Participants

Three universities with a reputation for promoting technology-based teaching and learning practices, either traditionally or as the result of recent developments, were selected for the study. While all three institutions have a focus on research and teaching, they have very different missions and also serve different student populations. The selected sites include: University of California, Berkeley; Duke University, and the University of Central Florida. The University of Central Florida (UCF) is both the youngest and largest of the three institutions. UCF is also the only site that is a multi-campus university, which includes 10 regional campus locations in addition to the main campus that is located in Orlando.

Table 1. Overview of Research Sites

<table>
<thead>
<tr>
<th>Institution</th>
<th>Founded</th>
<th>Institution Type</th>
<th>Fall 2011 Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California, Berkeley</td>
<td>1868</td>
<td>Public, AAU</td>
<td>Undergraduate: 25,885 Graduate &amp; Professional: 10,257 Total Number of Students: 36,142</td>
</tr>
<tr>
<td>Duke University</td>
<td>1924</td>
<td>Private, AAU</td>
<td>Undergraduate: 6,526 Graduate &amp; Professional: 8,220 Total Number of Students: 14,746</td>
</tr>
<tr>
<td>University of Central Florida</td>
<td>1968</td>
<td>Public with growing research capacity</td>
<td>Undergraduate: 50,002 Graduate &amp; Professional: 8,696 Total Number of Students: 58,698</td>
</tr>
</tbody>
</table>
Data Collection

A mixed-methods approach was used for data collection that included documentation review, individual interviews, focus groups with faculty, and direct observation of learning environments. By using multiple sources of evidence, the study aimed to identify any converging lines of inquiry or commonalities through data corroboration. Multiple sources of evidence provided multiple measures of the phenomenon, as well as increased the overall construct validity and reliability of the study.

The researcher spent approximately 4-5 days at each institution to allow sufficient time for data collection. The study included a total of 49 participants. A total of 33 individual interviews were conducted across all institutions that included faculty, lecturers, vice provosts, deans, department chairs, chairs of the faculty senate or governance committee, technology leaders, instructional designers and technology support specialists. A faculty focus group was conducted at each site and included a total of 16 faculty members (across all institutions) who were teaching in the Humanities or Social Sciences.

While a set of general interview questions were developed in advance, the primary focus of the interviews and focus groups was to capture the stories of the participants and their experience in advancing, supporting or adopting technology-based teaching practices for the advancement of learning. The interview questions differed based on the individual’s responsibilities. The interviews and focus groups were approximately 60 minutes in length. All interviews were recorded, transcribed and ingested into NVivo, a qualitative data analysis software.
A variety of documentation was reviewed as a separate and alternative method for understanding the institution’s mission, organizational structure, and vision for teaching and learning with technology, including the following items:

- Institution’s mission, vision and strategic plan
- Documentation regarding programs or initiatives to support technology-based teaching and learning practices
- Organizational charts for departments that support the faculty in teaching with technology
- Information regarding programs and resources that support faculty in the expanded use of educational technology
- Campus media coverage that relates to technology-based teaching and learning practices

**Data Analysis**

The primary objective of the study was to identify how three diverse universities with a focus on research and teaching are influencing the evolution of new, technology-based teaching and learning practices. For the purpose of this study, successful strategies are defined as efforts that have fostered the expanded use of educational technology for teaching and learning.

The collected data was analyzed through qualitative research software. The researcher reviewed the transcripts for all interviews and focus groups and developed an initial set of categories (or themes) for sorting the data. A presumed set of causal links...
between the phenomenon and the collected data -- for example, the faculty’s perspective on technology-based teaching and learning practices -- was used to build explanations.

**Limitations**

The selected methodology relies on the ideas and opinions of administrators, technology leaders and faculty members from three distinct universities that were selected at the discretion of the researcher, so the study cannot by its nature reach general conclusions about the phenomenon. The transferability of the findings and conclusions are also limited because the cases have differing viewpoints and strategies based on institutional priorities, financial resources and climate.
Appendix C: Interview Protocol

Questions for All Participants
1. How important is teaching at your institution?

2. How have teaching practices changed over the past 10 years? What factors are driving this change?

Senior Administrators & Technology Leaders
1. How does your position influence the advancement of technology-based teaching and learning practices in the Humanities and Social Sciences?

2. The study is interested in learning about both successful and unsuccessful strategies for influencing new teaching practices. In your experience, what strategies worked or didn’t work and why?

3. How were the strategies for advancing technology-based teaching and learning practices developed, communicated, and inculcated into the institution’s culture?

4. Is there an institution-wide strategy (or set of initiatives) that has been established for teaching with technology? If so, what are the desired outcomes?

5. What do you believe are the biggest barriers in advancing technology-based teaching and learning practices?

6. What is your view on the advancement of technology-based teaching and learning practices? [Should it be a strategic priority for the institution?]

Faculty Focus Group
1. How have you used technology to advance teaching or learning in the course of your career?

2. Have you conducted any assessment on how technology may have improved learning outcomes?

3. What key considerations should be addressed when implementing technology into the curriculum?

4. How might senior administrators or technology leaders better support the faculty in teaching with technology? [How would you describe the impact of teaching and learning centers?]
5. What is your view on the advancement of teaching and learning through the use of technology? [Should it be a strategic priority for the institution?]

6. How is teaching quality measured at the institution, and what changes would you recommend, if any, to this process?
References


California Statutes. (1868, March 23). Organic Act: Chapter 244 of the statutes of 1867-134


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