GUIDELINES FOR USING MOBILE DEVICES IN HIGHER EDUCATION

by

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An executive position paper submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Education in Educational Leadership

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ABSTRACT

iPads and other mobile devices are increasingly popular in higher education, but making use of them in the educational environment and integrating them into existing pedagogy can be challenging. The literature has confirmed both the potential of iPads in education and the challenges with integration. Results of case studies conducted with three higher-education institutions identify both the opportunities and the challenges of iPad use. Findings include recognition that the iPad will be an important tool for improving the overall educational experience for both teachers and students. To realize the benefits of the tool, however, colleges/universities will have to address the challenges of implementation and adapt to a changing environment. This project recommends guidelines and strategies for iPad integration to help increase the likelihood of success in improving how instructors teach and students learn in the classroom. These recommendations highlight the importance of providing access to iPads, with incentives, and a commitment by instructors and students to fully utilize them in their educational activities. The establishment of funding sources to support iPad availability is critical. Key internal and external partnerships should be developed, and the need for instructors to use and promote use of the iPad as part of their curriculum and research activities is important. Communication, feedback, and sharing of success stories are seen as key elements to build support. Sharing an inventory of apps that will help improve student engagement and learning is a good model for success. Finally, a solid infrastructure to support successful integration of iPads into the educational environment and pedagogy must be built, including ongoing training and user support.

Chapter 1

INTRODUCTION AND BACKGROUND

Problem Statement

iPads and other mobile devices are increasingly popular in higher education, but implementing and making good use of them in the educational environment and integrating them into the existing pedagogy can be challenging. iPads differ substantially from the desktop computers and laptops typically used in colleges/universities. These differences include not only the operational characteristics of the device but also the networking, configuration, installation, synchronization, and security considerations that need to be addressed in a college/university's infrastructure. Researchers such as Henderson and Yeow (2012) and Manuguerra (2011) acknowledge that while the main strengths of the iPad are to provide easy access to information and facilitate collaboration, it is necessary to effectively manage them in both the classroom and administrative environments.

The goal of this EPP is to gain knowledge for educational leadership purposes in order to inform the making of plans for acquiring and implementing iPads and other mobile devices in higher education. Since iPads are a relatively new technology, the problem is how to integrate them into the educational setting. This project addresses this central problem and some of the other key administrative, management, and implementation challenges. This EPP is focused on the iPad because it was the exemplary mobile device at the time data was collected for this project, but the recommended guidelines and strategies resulting from this EPP are applicable to all types of mobile devices, not only iPads.

Organizational Improvement Goal

The goal of this project is to develop guidelines and strategies for integrating iPads in higher education curricula. The guidelines and strategies offered here are supported by findings from a review of the literature and also from case studies. The review of the literature and data analysis from the case studies have shown how innovative leaders in the educational technology field and instructors are using and promoting the use of the iPad to improve teaching and learning. The objective of this EPP is to learn from their experiences and take a leadership role to develop practical guidelines and strategies for colleges/universities to use when looking to integrate iPads and other mobile devices. The extent of potential improvements in teaching and learning resulting from the use of iPads and other mobile devices should not be underestimated as we are still in the early stages of a paradigm shift with respect to using mobile technologies.

Key Questions Guiding this Project

- Q1 – How are colleges/universities addressing key integration strategies and issues regarding iPad use?
- Q2 – Are colleges/universities experiencing success with improving student engagement and learning by using iPads in the classroom?
- Q3 – How are iPads being used as part of instruction and what is their pedagogical potential?
- Q4 – What are some of the key infrastructure considerations for colleges/universities to address to support iPad use?
- Q5 - What steps have colleges/universities taken to promote and support use of iPads?

Literature Review

The objective of this part of the project was to collect, review, and analyze key findings from a review of the literature on iPad use in higher education. The review focused on (1) the potential impact of iPads on teaching and learning, (2) administrator, instructor, and student attitudes toward iPads, and (3) warnings and challenges with integrating iPads. Marshall and Rossman (1999) suggest that a literature review can be used to support the importance of a study's focus, validate findings, and guide the analysis leading to conclusions.

Potential impact of iPads on teaching and learning

Findings from a review of existing literature suggest a positive potential impact of iPads on teaching and learning in higher education. For example, Banister (2010) notes that the capabilities of mobile devices have increased speculation about how teaching and learning may be energized by integration of these devices in the classroom. Also, Ireland and Woollerton (2010) suggest that teaching and learning may be "changed forever" by iPads. They foresee that the use of iPads may become a standard for students when entering colleges/universities. With this enthusiastic support of iPads and other mobile devices, however, it is important to note that while they may energize and motivate educators to use them in the classroom in the coming years, this excitement may likely wear off over time as has happened with other technologies of the past. The advantages that iPads and other mobile devices now have in education may be temporary due to the rate of technology changes, in general.

Murphy (2011), in a study of early uses of iPads devices in higher education, also notes the "significant potential" for the iPad in facilitating and enhancing learning. Student and teacher surveys were generally positive in this study, and it was found that delivery of digital course materials was one of the major benefits of iPad use. Murphy warns that the full potential and

impact, however, has yet to be studied, as only limited pilot programs have been tried to date. Kolowich (2010) agrees with the potential and concludes that tablets such as the iPad will have a pedagogical use. He foresees that both teachers and students will immerse themselves in a more engaging learning environment. Brand and Kinash (2010) seem genuinely excited about the potential of the iPad to revolutionize education in terms of access to "emerging knowledge" domains. They report positive feedback from student surveys and propose that continued incentives be used to encourage continued use of the iPad and other mobile devices in higher education.

Findings from the literature review also suggest that mobile devices, such as the iPad, are becoming more commonplace and should not be viewed as only applicable for personal and business use anymore. Beddall, Jabbar, and Al Shehri (2011) indicate that social media devices (SMDs), such as the iPad and iPhone, are now ubiquitous in society, given their communicative capability and rich functionality. The mobility, portability, and multi-functionality of these devices offer the potential to eliminate the need for single-purpose, "immobile" devices. Their unique capabilities allow SMDs to cross boundaries into areas such as higher education. In fact, successful application of iPad use in higher education has already been found. Henderson and Yeow (2012) explain how mobile devices, such as the iPad, have already been tested and used successfully in the classroom. They show how iPads provide the ability to access and examine data in a larger context. The increased availability of educational applications provides unique opportunities for implementation of the iPad in the classroom. The authors also note how utilization of social applications could be of great benefit in qualitative research. Franklin (2011) observes that the *Horizon Report* each year describes areas where emerging technology will have

a significant impact on higher education; the iPad and other mobile devices are examples of such technologies, as they are increasingly accepted as the norm in everyday life.

Additional findings from the literature review support the pedagogical potential of mobile devices, such as the iPad. Kress and Pachler (2007), for example, studied the pedagogical potential of mobile learning devices, in general. The questions they addressed were: (1) "How do mobile technologies support learning?" and (2) "What does this mean for what learners actually do?" Their findings identified a large range of learning activities that could be supported with mobile devices. These activities include:

- Exploring and investigating real physical environments
- Collaboration and discussion with peers, synchronously and asynchronously
- Recording and capturing data
- Modeling of data using digital tools
- Sharing data and models
- Testing and adapting models over time

Kelly and Schrape (2010) identify "success stories" with mobile applications, focusing on the most common functionalities, such as note taking, browsing the web, sharing information, and storing files. They point out that even users with no experience using an iPhone had no problems using the iPad "out of the box," especially since mobile applications can be accessed and transferred quickly to the iPad. The group in their study was in the process of developing an inventory of best apps for educational and productivity purposes. The authors note that their Centre for eLearning will continue to study the use of Blackboard Mobile Learn for the iPad, for which they see considerable potential. Marmarelli and Ringle (2011), in a comprehensive study of iPads at Reed College, were able to compile some meaningful results and valuable feedback

from participants. The many strengths of the iPad identified in their study included legibility, quick response of touch screen, portability, battery life, durability, paper savings, multi-functionality, switching between texts, searching within texts, highlighting, and annotating.

Administrator, instructor, and student attitudes toward iPads

Research suggests that attitudes toward new educational technology devices, such as the iPad, are an important factor in their adoption. Attitudes can be either a roadblock or a springboard to exciting opportunities. Survey results published by Parker, Lenhart, and Moore (2011) indicate that new mobile technology is being more readily accepted as part of the broader educational environment. More than half of recent college graduates (57%) say when they were in college they used a laptop, smartphone, or tablet in class at least once. Liaw, Hatala, and Huang (2010) also studied student attitudes toward mobile learning. The researchers concluded that students had positive attitudes toward use of iPads in the educational environment. This is especially true when the curriculum is designed for autonomy to facilitate self-managed learning, which is highly interactive.

Parker et al. (2011) based their study on an online survey of college/university presidents conducted by the Pew Research Center. The survey was performed in association with the *Chronicle of Higher Education* to measure the attitudes of presidents of 1,055 two- and four-year colleges/universities toward the impact of new technology in education. Some notable results of the survey were:

- Leaders of the nation's colleges/universities are a tech-savvy group. Nearly nine-in-ten (87%) use a smartphone daily, 83% use a desktop computer, and 65% use a laptop. They appear to be ahead of the curve on some of the newer digital technologies.

- Nearly two-thirds of college/university presidents anticipate that ten years from now, more than half of the textbooks used by their undergraduate students will be digital.
- 41% of college/university presidents said students were allowed to use laptops or other portable devices during class. 56% of colleges/universities allowed individual instructors to make the decision. Only 2% of presidents say the use of these devices is prohibited.
- Nearly half the colleges/universities in the study allow use of a tablet computer, such as an iPad, at least occasionally. 42% allow an e-reader such as a Kindle or Nook.

It seems clear that the college/university presidents in this survey recognize the importance of new technology in higher education and accept the fact that it will become an important part of the education environment in years to come. Both presidents and students appear to be embracing technology tools, such as the iPad, as part of their normal education experience.

Warnings and challenges with integrating iPads

While the potential of the iPad has become apparent, warnings of the challenges with integration into the classroom and technology infrastructure of colleges/universities have also come to the fore. Banister (2010) warns that caution must be taken regarding the management and implementation of these devices. Brand and Kinash (2010), while recognizing the potential of the iPad, also understand that it is a nascent field of study, and there still are significant opportunities for additional research.

Henderson and Yeow (2012), while acknowledging that the main strengths of the iPad are to allow easy access to information and to support collaboration, say that it is important to understand how to manage both the teaching and administrative environments. Marmarelli and Ringle (2011), in a balanced study, also note some weaknesses in using the device. These are related to PDF handling, filing systems, and keyboarding. Even with the noted weaknesses, some students reported that they hoped to continue to use the iPad in their coursework and even suggested that they will encourage their friends to use it for academic purposes as well.

Ireland and Woollerton (2010) warn that it will be a huge effort for teachers to change their own concepts of teaching methods and predict that many will not be happy with the change. However, they also assert that colleges/universities must adapt to the new technologies to be competitive with other institutions when competing for top students. While Murphy (2011) sees the potential of the iPad in education, he also notes the challenges to universities struggling with how to incorporate the device into existing programs and curriculum. Henderson and Yeow (2010) explain how the changes to the education environment highlight the need to further investigate the impact of mobile devices in the classroom.

Has the time come for a major step forward for iPad use in college/university classrooms? Franklin (2011) theorizes that use of mobile learning devices, such as the iPad, in the educational environment is at a tipping point. He warns that educators are gradualists by nature and generally oppose radical changes in the educational status quo. He says that educators like progress to be steady and want time to study impacts and examine outcomes. This type of attitude may prove to be an obstacle and challenge for colleges/universities looking to implement the new iPad technology in the near term.

Attempts to derive links between learning and use of mobile devices are in the beginning stages, and there is limited evidence to date that these links exist. For example, Park (2011) asserts that mobile learning is still "under-theorized" and "immature" with respect to technological capacities. Brand, Kinash, Mathew, and Kordyban (2011) found that while students were positive about mobile learning, many were unconvinced that it made an overall difference in their own academic achievements. The researchers concluded that mobile learning should not be viewed as independent of curriculum design and student engagement.

Students, in general, are technology savvy and are excited to have the iPad added to their educational experience. They like the interactive nature of the iPad technology as well as the fact that it can be used autonomously. Students' receptiveness to using the iPad technology is ahead of the curve, while teachers' acceptance appears to be lagging. This is consistent with how the younger generation accepts and embraces newer technology. Teachers, however, often need to be given incentives and training and need to be convinced that mobile technology will benefit their students and themselves.

Chapter 2

METHODS

This project used the case study format to collect, evaluate, and analyze data to assist in developing a set of guidelines and recommendations for integrating iPads in higher education. Three separate and distinct cases were selected. The intent was to provide variation in the types of colleges/universities selected to obtain a range of situations for analysis.

Data were collected using semi-structured interviews with technology leaders and instructors from three institutions. Interview questions were tied to the five key questions guiding this project, to obtain a direct and personal perspective on how iPads have been implemented in these colleges/universities. (See Appendix A for the interview questions used in the study, including the general themes tied to the major questions driving the project.)

Rationale for the Case Study Design

The case study qualitative research design was selected because of its potential to provide meaningful data that could lead to the development of practical solutions of problems associated with integration of iPads in higher education. Merriam (2002) indicates that in applied fields such as education and management, qualitative research is the method of choice for improving practice; further, case studies support an inductive strategy leading to results that are richly descriptive. Marshall & Rossman (1999) observe that case studies link specific research questions to larger contexts, thereby illuminating those contexts.

According to Merriam (2002), case studies are appropriate when the primary interest of the researcher is to understand the phenomenon in question. The objective of the researcher is to describe the phenomenon in such a way as to extract meaning and draw conclusions about the particular unit of analysis. By using guiding questions in interviews that are both exploratory and investigative, the researcher sought to understand the extent to which the colleges/universities selected for the study have used iPads in their educational environments, how successful iPads have been in making a positive impact to teaching and learning, and the concerns that have emerged for both instructors and students.

Stake (2000, p. 435) suggests that a case study is more of a choice of *what* is to be learned than of how a study ought to be designed. The unit of study is a bounded system. For example, in this project there are a small number of cases and participants, but there is "thick description" of the phenomenon within these bounds.

Merriam (2002) supports the idea that a case study should start with the purposeful, rather than random, selection of the case or cases to be studied. This selection should be done with an understanding of why the individual case would be good for study and analysis. Much can be learned from each case through the researcher's narrative description and analysis. The selection should be based on what is to be learned and its significance for improving practice.

Stake (2000) notes that there are a number of options available for the case write-up, including how much of the report will be used to tell a story and how much will be used for comparison with other cases. Regardless of the write-up options, the findings should be descriptive. Case researchers pass along to their readers some personal reflections and note relationships with other cases reported in the literature. The ultimate aim is to provide effective solutions to the problems motivating the study.

Merriam (2002) supports the idea that collecting a variety of data can be an effective strategy, which can be accomplished by selecting, evaluating, and comparing multiple cases. The intent is to provide a greater range of situations for analysis and interpretation and to enlarge the researcher's ability to draw conclusions relevant to a larger context. Another, related strategy is to provide some variation in the types and levels of personnel to be interviewed. The combination of the diversity of cases and types of personnel interviewed aids in drawing conclusions and making recommendations for improvements of practice.

Merriam (2002) also outlines a design process for qualitative research that provides the theoretical framework for this study. The major components of this qualitative design process are as follows: (1) shaping of a research problem; (2) selecting the type of qualitative research to use; (3) selecting subjects from which to collect data; (4) selecting the primary method and designing the tool for collecting data; (5) performing data collection and analysis; and (6) writing up the findings.

The study should begin with something that the researcher is curious about and is recognized as a problem, as defined by a problem statement. The problem is often something that the researcher has observed in everyday life and has some objective is to uncover meaning in a situation and understand how things have happened (processes).

The first step in qualitative design is to decide on the type of qualitative research method to use. According to Merriam (2002), the methods available to the researcher include basic interpretive study, phenomenology, grounded theory, case study, ethnographic study, narrative analysis, critical qualitative research, and postmodern research. Decisions then have to be made regarding the selection of research subjects from which data will be collected. These decisions should be driven by what can be learned through the research process. If the case study design is

chosen, the selection of a case should anticipate an "information-rich" context from which to learn the most about the issues identified in the problem statement. After the case has been selected, a decision must be made regarding the primary method or tool to be used for collecting and analyzing the research data, such as a semi-structured interview protocol. Data analysis is performed simultaneously with the data collection process as well as at the end of the process when the data are summarized and categorized. The final step is the write-up of the findings, which should be descriptive, focused on the project's goals, and tailored for the targeted audience.

Procedures

Based on gaps in the review of the existing literature on iPad use in colleges/universities and the concomitant need to collect additional data from real-life cases, case-study research design was selected for the present study. To provide some variation and diversity in the data collected, three separate and distinct cases were selected, based on the potential significance of the data that could be obtained from technology leaders and instructors at the colleges/universities. The institutions selected all had experience with iPad technology.

knowledge about. In crafting the problem statement, the researcher moves from general curiosity to potential solutions to the questions driving the study. The questions asked are the key to the qualitative study; they drive the study from beginning to end.

Marshall and Rossman (1995) suggest that qualitative research should be designed to describe processes, describe poorly understood phenomena, explore differences between realities and stated policies or theories, and discover unspecified contextual variables. The overriding

The procedures used are summarized as follows: (1) identify and select the colleges/universities to be used for the case studies; (2) select key technology leaders and

instructors from each college/university to be interviewed; (3) select the method and tool design to be used to facilitate collection of relevant data from the participants in the study; (4) collect, analyze, summarize, and categorize the data; (5) summarize findings and develop a set of recommended guidelines and strategies for using iPads in higher education; and (6) state a conclusion.

Case Selection

Cases for this study were selected based on prior knowledge of iPad use at the college/university and also from discussions with and recommendations from instructional technology specialists who had some knowledge of how iPads were being used at these institutions. Information obtained from presentations made at educational technology conferences was also used to select the cases. The following summarizes the process of selection for each college/university.

For case #1, a small private college was selected. This college was chosen because of its relatively small size, liberal arts focus, urban setting, innovative technology, and small class sizes. The researcher was familiar with the college and knew about some of its technology initiatives relating to the iPad, but did not have a detailed understanding of what had been done to date. There was noticeable excitement within the college community about some of the iPad pilot projects. The researcher felt that this case could provide meaningful data and meet the objective of providing some diversity in the overall study.

For case #2, a medium-sized state public university was selected. This university was chosen because of its position within a larger state university system, its location near a large metropolitan area, its innovative technology initiatives, and its strong educational technology

leadership. The researcher became aware of this university through industry conferences and from recommendations by technology leaders

For case #3, a large national public university was selected. This university was chosen for its location in a small-town environment, its national status, its resources available for technology initiatives, large class sizes, demonstrated leadership and progressiveness in educational technology, wide variety of educational programs, and ability to generate funding through educational grants. The researcher also had first-hand knowledge of many of the technology initiatives currently under way at this university and knew many of its technology and education leaders.

Participant Selection

Key technology leaders at each institution were selected for interviews. Table 1 below provides a summary of the technology leaders selected and a background for each including their title, role, and experience. They were selected because of their in-depth knowledge and/or experience with the iPad implementations. Subjects had to have an excellent understanding of the iPad technology and how it was used at their college/university. For each of the cases, one technology leader was selected to participate in an initial exploratory (level 1) interview.

Table 1

Technology Leader Interview Participants

#	Institution	Title	Role	Experience
1.	Small Private College	CIO	Responsible for the college's technology infrastructure, which includes services to enhance scholarly and administrative collaboration on technology.	Has approximately 20 years of experience with instructional design and academic technologies. This includes approximately 3 years of experience with iPads and 5 with mobile technologies, in general.
2.	Regional Public University	Instructional Technologist	Serves as a technology specialist in the College of Education and Honors College. He is a recognized instructional technology leader in the college and has presented at various educational	Has approximately 15 years of experience as an educational technology consultant. This includes approximately 3 years of experience with iPads and 7 with mobile technologies, in general.

			technology conferences.	
3.	National Public University	Academic Technology Services Manager	Oversees the Academic Technology Services area of the university. Closely involved with the university-sponsored IT transformational grant program, which supports innovative uses of technology.	Has approximately 18 years of experience in academic technology services in higher education. This includes approximately 3 years of experience with iPads and 5 with mobile technologies, in general.

Follow-up (level 2) interviews with more probing questions were conducted with three instructors from each institution. See Table 2 below for a summary of the instructors selected and a background for each including their title, discipline, and experience. These instructors had to have used iPads in their teaching and not be primarily teachers of technology. They were selected based on recommendations from the technology leaders previously interviewed. The focus in these follow-up interviews was on obtaining specific information on how iPads were being used in the educational setting.

Table 2

Instructor Interview Participants

#	Institution	Title	Discipline	Experience
1.	Small Private College	Professor of Legal Studies	Has a legal and business background and teaches a Law, Ethics, and Society course as well as advanced elective courses such as When Law Goes Pop and Corporate America. His interest is primarily in understanding how to best utilize iPads in the liberal arts environment.	Has approximately 15 years of experience in higher education focusing on teaching business and law, most recently in the liberal arts environment. This includes approximately 2 years of experience working with iPads and 3 with mobile technologies, in general.
2.	Small Private College	Professor of Spanish and Linguistics	Has a teaching background in Spanish, but has taught Linguistics and Grammar courses, as well. Current research involves aspects of fluency, accuracy, and complexity in foreign language writing as well as blended learning.	Has approximately 25 years of experience in higher education focusing on Spanish and Linguistics. This includes approximately 2 years of experience working with iPads and 3 with mobile technologies, in general.
3.	Small Private College	Assistant Professor of Chemistry	Has a teaching background in General Chemistry and Inorganic Chemistry. She is planning to teach Material Chemistry.	Has approximately 10 years of experience in higher education focusing on Chemistry. This includes approximately 2 years of experience working with iPads and 3 with mobile technologies, in general.

4.	Regional Public University	English Instructor	Has a teaching background in reading, writing and educational technology. Research interests are in mobile pedagogy, reading comprehension (digital and traditional), and figurative language.	Has approximately 6 years of experience in higher education focusing on educational technology and English. This includes approximately 3 years of experience working with iPads and 6 with mobile technologies, in general.
5.	Regional Public University	Education Professor	Has a teaching background in educational technology, assessments, and research methods. Primary area of research is assessing attitudes toward and use of educational technology in education.	Has approximately 8 years of experience in higher education focusing on education and technology. This includes approximately 3 years of experience working with iPads and 5 with mobile technologies, in general.
6.	Regional Public University	Learning Assistance and Resource Center Director and Instructor	Has a teaching background in stewardship and civic engagement, peer-assisted learning, and writing. Also manages the college's Learning Assistance and Resource Center.	Has approximately 7 years of experience in higher education focusing on education and technology. This includes approximately 2 years of experience working with iPads and 4 with mobile technologies, in general.
7.	National Public University	Associate Professor of Education	Has a background in teaching Literacy and educational technology courses. Focused on the integration of technology into the curriculum.	Has approximately 15 years of experience in higher education focusing on education and technology. This includes approximately 3 years of experience working with iPads and mobile technologies.
8.	National Public University	Chemistry Professor	Has a background in teaching General Chemistry for Biology and Engineering majors in honors program. She has a strong focus on collaborative learning and believes that technology ties in well with chemistry education.	Has approximately 8 years of experience in higher education focusing on chemistry education and technology. Has approximately 3 years of experience working with iPads and mobile technologies.
9.	National Public University	Communications and Political Science Professor	Has a background in teaching courses in Communication Research Methods, Political Parties and Interest Groups, and Voting and Elections. Utilized mobile iPad technology in his Road to the Presidency course.	Has approximately 6 years of experience in higher education focusing on communication and political science. Has approximately 3 years of experience working with iPads and mobile technologies.

Interview Protocols

A semi-structured interview procedure was used as the primary method to collect data, based on standardized questionnaires. Two sets of structured questionnaires were developed. One was used for the technology leadership interviews (level 1), and the other for the instructor interviews (level 2). The questionnaires were used to guide the interview process and allow the interviewees to expand on their answers to provide additional insights for each case, where

necessary. Technology leaders were interviewed first; they were able to provide background and context for iPad use at their college/university. Instructors were interviewed next and were able to provide more in-depth information on how iPads were being used in their classes.

The standard questionnaire in Table 3 below was used for the technology leader interviews and was constructed using 20 specific questions developed to address key project objectives. These questions were designed specifically for technology leaders who had a high-level understanding of the direction the college/university was taking with iPad technology and what had been done to date with iPad use and integration.

Table 3

Technology Leader Interview Questionnaire

#	Question
1.	How would you describe your school's receptiveness to integrating iPads into the curriculum?
2.	What are some of the challenges and implementation issues with using iPads at your school?
3.	Can you describe any successes, large or small, with the use of iPads in the classroom?
4.	Has your school established any guidelines or procedures for successful use of iPads in the classroom?
5.	Have you developed and conducted training classes for educating professors and staff on the benefits of using iPads?
6.	Have you conducted any pilot or test programs for use of iPads in the classrooms? If so, how successful were they?
7.	Have certain segments of your educational environment been targeted for iPad use? Do you feel certain educational areas or settings would be better than others for iPad use?
8.	Do you have successful logical or situational models established for using iPads in the classroom?
9.	Are iPad apps used in as part of the curriculum in any areas of the school? If so, where are they used most successfully?
10.	Do you believe that there are certain types of classes offered at your school that would benefit most from use of iPads?
11.	How do you gauge the pedagogical potential for use of iPads at your school?
12.	Have teachers currently made good use of iPads and related apps in their pedagogy? If not, do you know of plans to do so?
13.	Have iPads had an impact on the technology infrastructure at your school? If so, is there an effective model for the technology infrastructure needed to support iPad projects?
14.	If iPads are made available at your school, how are they being rolled out and controlled in your environment?

15.	Can you provide an estimate of the percentage of faculty using iPads in the classroom? For the ones who are using the iPad, do you know how they are using it?
16.	Are iPads part of the long term vision and/or technology strategic plan for technology at your school?
17.	How do you currently secure iPads and data contained in them?
18.	Is there support from school administration for use of the iPad technology in the classroom?
19.	Have benchmark studies been performed with other higher education on successful use of iPads?
20.	Have you measured student attitude toward iPad use? Do you know if your students would be receptive to using this type of technology in the classroom?

The standard questionnaire in Table 4 below was used for the college/university instructor interviews and was designed specifically for instructors who had experience with using the iPad in the classroom. It was constructed to obtain more in-depth data on how iPads were actually being used in the classroom. An exploratory tool was also used to ascertain how instructors felt about use of the iPad for pedagogical purposes.

Table 4

Instructor Interview Questionnaire

#	Question
1.	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?
2.	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?
3.	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?
4.	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?
5.	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?
6.	Are there any models of success you have developed for the iPad that could be used by you or others in the future?
7.	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?
8.	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?

9. Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?
10. Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?
11. Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?
12. How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?
13. How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?
14. How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?
15. How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?
16. What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?
17. Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?
18. Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?
19. Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?
20. Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?

Data Collection

Interviews were scheduled with the technology leaders and instructors. Each participant was sent an Informed Consent form providing a summary of the project objectives and expectations of the interviewer. The Informed Consent form was approved by the Human Subjects Review committee at the university. One-hour interviews were planned with each participant, with the potential for follow-up questions and clarification of answers. The total time for each subject's participation was targeted to no more than two hours. The interviewee was given the option of an in-person interview or one that was conducted over the phone or in a video conference. The preferred medium was an in-person interview, but this was not always possible.

Notes were taken during each interview and hand-written on a copy of the questionnaire that included an area for interview responses. Data collected from the interviews were recorded and summarized on a Word document for each participant.

Data Analysis

Data collected from the interview process were recorded, reviewed, analyzed, and summarized for each case. Data collected from the interviews of each technology leader can be found in Appendix C and each instructor in Appendix D. In Chapter 3, a description of individual case studies was made to provide context for the overall study. Merriam (2002) supports the view that data analysis in case study research should consist of making a detailed description of the case and its context. A background and description of the setting for each case is included along with a section on participants' perspectives. Also, a summary section is presented in each case to provide additional context and perspective for the study. This summary section is intended to be descriptive and presents findings that have emerged from the analysis from each case study.

Merriam (2002) also supports the idea that data analysis should include the search for relevant meaning in the data relating to the problem statement and questions driving the project. The data analysis began with the researcher's initial observations during the interview process to uncover and search for meaning from the participant's responses and was refined during the data collection process as patterns and themes began to emerge from the data. The analysis then included cross case comparisons to compare and contrast findings from each case study. Common themes across case studies were uncovered and these were described and documented. The themes uncovered related to integration, classroom success, pedagogy, infrastructure, and

support. Refer to Appendix A for a matrix that categorizes the project's key questions mapped to the five major themes and to specific interview questions used to collect data in the case studies.

The data analysis continued with a search for meaning in the data collected for each of the major questions driving the project. The discussion section in Chapter 4 addresses each of the major questions and summarizes major findings relating to each question. Throughout the data analysis process, key decision points also emerged which can serve as a practical guide for colleges/universities to use when pursuing iPad integration. Chapter 4 includes a section describing the key decision points for supporting iPad integration. A Key Decision Matrix (Table 5) was also developed which summarizes how the college/university in each of the cases addressed the key decisions. Coding was used as a data analysis technique to uniquely identify the findings for each case.

The final stage of the data analysis was to develop recommended guidelines and strategies to address the problem statement and major questions driving this project. A summary of each guideline/strategy was included in the recommendations section (Chapter 4). Recommendations were supported by references to specific findings in the literature review and/or case studies, where appropriate. The coding in the Key Decision Matrix was also used to reference and support recommended guidelines and strategies. Recommendations were grouped for instructors, administrators, and technology support personnel. A conclusion section was included at the end of the study to summarize major findings.

Chapter 3

FINDINGS

Description of Individual Case Studies

Case #1 – Small Private College:

Background and Description of Setting

This is a small residential college located in a dynamic urban environment. It seeks to inspire its students of diverse backgrounds to read, write, and think critically and work independently and collaboratively. The college, established in the late 18th century, has a rich history and tradition. It has approximately 2,300 undergraduate students. The average class size is 19 students, and the student-faculty ratio is 9:1. The college emphasizes the "life of the mind" and encourages learning by doing.

The college has recently undertaken some studies and research into how mobile technologies, including the iPad, can be used to support teaching, learning, and research. The studies were initiated as a response to the growing impact of mobile learning in and out of the classroom and the growing trend of mobile-device use on campus. The initial plan was to create pilot programs that blended technology innovation with pedagogy. In the first pilot program, faculty were provided with the iPod Touch to use over the course of two semesters. At the end of the pilot, surveys were administered to obtain feedback on the usefulness of the mobile device. The positive feedback supported further exploration and study, which resulted in a follow-up study of iPads.

Building on the lessons learned in the initial study, an iPad pilot project was initiated. This study expanded on the methods used in the initial study and looked to put iPads in the hands of both instructors and students in three different courses offered over two semesters. The overriding goal of "learning more about the potential of multi-purpose tablet technology for curricular use" was achieved. The overall experience of using the iPads was positive for instructors and students. The students were engaged with the devices and were genuinely appreciative that the college invested in the technology for them. The faculty saw the use of the iPads as an opportunity to enhance their pedagogy through a more collaborative learning environment.

Participants' Perspectives

The first interview at the college was targeted to a technology leader who understood the technology environment and could see the potential of iPads in the classroom. The technology leader is the chief information officer at the college. He has a graduate degree in instructional media and a doctorate in instructional technology. He led the studies of mobile technologies and headed the committee on instructional technology. He has been employed at the college for over 25 years. Currently he is responsible for the college's technology infrastructure, which includes services to enhance scholarly and administrative collaboration on technology. A summary of his interview responses can be found in Appendix C.

Instructor #1 has been at the college for approximately 20 years. He has a legal and business background and taught at other business schools before coming to the college. He participated in the college's iPad pilot project. His interest is primarily in understanding how to utilize iPads in the liberal arts environment. He teaches a basic Law, Ethics, and Society course as well as advanced elective courses such as When Law Goes Pop and Corporate America. His

current focus is on how iPads can be used for storytelling to construct a narrative or craft an argument. He believes that there are better ways for students to communicate than writing a standard essay. A summary of his interview responses can be found in Appendix D.

Instructor #2 has taught at the college since 1989. She was part of the iPad pilot project at the college. Her focus has been on teaching Spanish and linguistics elective courses. She is interested in how students can take advantage of existing technology resources to allow them to become better learners. She recognizes that students are now using different media and technologies in their everyday lives. She has a primary interest in developing different models in her pedagogy to improve her students' educational experience both in and out of the classroom. She likes the interaction with and engagement of the students using new technologies such as the iPad. She is looking forward to a paradigm shift in higher education where iPads and other mobile devices are used to a greater degree, but she recognizes that many instructors are not yet comfortable with these newer technologies. A summary of her interview responses can be found in Appendix D.

Instructor #3 has been teaching chemistry for five years at the college. She is interested in how newer technologies such as the iPad can be used to enhance her teaching methods. She participated in the college's iPad pilot project. She sees the iPad as useful in her classes mainly for presentation purposes and creating an interactive learning environment. She often uses the iPad as a tool to present problems and cases. She would like to have students use iPads in her classes but understands that it is not currently feasible because of resource constraints at the college. A summary of her interview responses can be found in Appendix D.

Summary of Case 1

These interviews suggest that the college is still in the early stages of iPad use in the classroom. The college had very positive pilot programs which encouraged further investigation and study. Communication and sharing of information among participants in the pilot program was excellent, although the initial offering of iPads was limited to only a few teachers. Being a small college with limited technology resources does present some obstacles to expanded use of iPads. There also are difficulties in obtaining funding for a large-scale rollout of iPads in the classrooms. Teachers and students who have used the iPads in the pilot project, however, are supportive of wider availability.

When the iPad was integrated into specific classroom activities, students were very positive. Feedback regarding the potential use of the iPad in "fieldwork" was positive. The iPad was seen as a tool that will open up new possibilities for student projects. The iPad was also seen as a potential transformative tool for promoting digital literacy.

Challenges for wider implementation included the following:

- Helping faculty to be more comfortable using the iPad
- Creating a more integrated environment between faculty and students
- Instructors perceiving iPads as distractions
- A need for a training and technology infrastructure to support iPads
- A lack of institutional policies and procedures for iPad use

Case #2 – Regional Public University:

Background and Description of Setting

This is a medium-size state-sponsored public university located in a rural community. It was founded primarily as a teachers' college in the late 19th century. It has evolved into a comprehensive university and now has approximately 13,000 undergraduate students. It also

offers a range of graduate programs. The university excels in teacher education, business, health, natural and social sciences, music, and the arts. It offers more than 100 undergraduate and graduate programs. The student-faculty ratio is 18:1. The university is seen as a leading resource and partner in fostering the region's economic, social and cultural vitality. It is committed to providing access to resources and serving the educational needs of a diverse student body. Students receive hands-on training in current technologies at state-of-the-art facilities on campus and via external internship programs.

Participants' Perspectives

An initial interview was conducted with a technology leader at the university who was recommended for his in-depth knowledge and experience with instructional technologies, including the iPad. He has a Ph.D. in educational technology; his research focus is on technology integration in education. He has published books and scholarly articles relating to technology leadership for teacher education. He is a recognized instructional technology leader and has presented at various educational technology conferences. He serves as a technology specialist in the College of Education and for the Honors College. He has been recognized as an Apple Distinguished Educator and serves on the college's curriculum and policies committee. A summary of his interview responses can be found in Appendix C.

Instructor #1 teaches the Department of English and is a leader in the use of technology in the classroom. He has taught at the university for approximately five years. He holds a Ph.D. in curriculum and instruction and was named an Apple Distinguished Educator. He is a strong advocate of iPads in the classroom and sees the iPad technology as transformative with respect to his teaching. His interests are in mobile pedagogy, reading comprehension (digital and traditional), and figurative language. He focuses on ways to integrate iPads into the curriculum

because of the potential impact it can have on his teaching and his students' learning. He has published articles in such journals as *The Reading Teacher*, the *California Reader*, and the *Journal of Technology, Teaching, and Learning*. He has also presented at local and national educational technology conferences. A summary of his interview responses can be found in Appendix D.

Instructor #2 has a Ph.D. in research and testing and a master's degree in research and statistical methodology. He has been teaching at this university for seven years. His primary area of research is in assessing attitudes toward the use of technology in education. He teaches courses in evaluation and measurement, introduction to educational technology integration, research methods, and assessment for counselors. The research methods course is for graduate-level students. He teaches both online and hybrid courses. As part of his introduction to technology class, he works with prospective teachers on how the iPad can be used in their courses. In the last five years, he has been involved with evaluating mobile pedagogy with other colleagues in the College of Education. He has not yet fully integrated the iPad in his classes but sees its potential for improving teaching and learning. A summary of his interview responses can be found in Appendix D.

Instructor #3 has been teaching at the university for about seven years and is currently the director of the Learning Assistance and Resource Center. She teaches courses in stewardship and civic engagement and peer-assisted learning as well as courses in writing. She has a master's degree in higher education focused on pedagogy. She is receptive to the idea of integrating the iPad into her teaching and tutoring programs. She has a keen interest in learning how students learn. Her goal is to teach students how to develop methods that correspond to their individual learning styles to help them succeed in college. She wants to help students become independent,

active learners and believes that educational technologies can have a role in their development. A summary of her interview responses can be found in Appendix D.

Summary of Case 2

This university has been aggressive in the rollout of iPads, especially in the College of Education. The iPads that were provided were well received and integrated relatively quickly into the education environment and curriculum. "Buy-in" for the iPads was readily obtained in the College of Education and benefits were realized almost immediately. Good sources of funding for iPad projects were available in the College of Education. The faculty and students are supporters of the iPad and are looking for new and exciting ways to integrate them into their education activities. Excellent technology support is provided in the College of Education, including training and professional development opportunities. Strong partnerships have been formed with administrators and instructors in the College of Education and with Apple, Inc.

Challenges include:

- "Buy-in" for iPad use is limited in the institution as a whole.
- The university is primarily a Microsoft PC environment.
- Integration iPads into the broader university curriculum.
- There are limited network capabilities.
- There is no large impact on technology infrastructure at the university.

Case #3 –National Public University:

Background and Description of Setting

This is a large national public university located in a small-town environment. It was founded in the mid-18th century as a private academy and later evolved into a state-assisted university in the late 19th century. Its current enrollment is approximately 17,000 at the

undergraduate level and 3,000 at the graduate level. It has a geographically mixed student body. Various degree programs are offered in the Colleges of Agriculture, Arts and Science, Business and Economics, Engineering, Health and Nursing Sciences, Human Resources, Education and Public Policy, and Marine Studies. It is strategically located on the east coast megacity corridor. The student-faculty ratio is 15:1. The university is focused on providing an enriching education led by faculty working closely with student mentors who provide ongoing assistance to students as they adjust to college life. Faculty emphasize an interactive learning environment and encourage class discussion. The goal is for all students to discover a greater depth of learning through one of the wide-ranging signature academic programs and an award-winning technology network.

Participants' Perspectives

An initial interview was conducted with a leader in instructional technology employed in the academic technology services area of the university. He was recommended for interview because of his strong background in technology along with his in-depth knowledge of instructional technologies, including the iPad. He is closely involved with the university-sponsored IT transformational grant program, which supports innovative uses of technology. This program has provided access to iPads for instructors to use on a wide range of projects. It accepts project proposals and funding requests encouraging applicants to help define next-generation technologies. A summary of his interview responses can be found in Appendix C.

Instructor #1 teaches in the School of Education and has been at the university for approximately ten years. She has a Ph.D. in education and teaches literacy education and educational technology courses. Her research has focused on the relationship between Internet technologies and reading and writing. She has used multi-literacies theory as a framework for

examining the multi-modal nature of digital environments. She has recently applied for and received two IT transformational grants supporting her research of iPad use in education. The focus of the grants is the influence of mobile applications on literacy development. She also has focused implemented mobile applications in a pre-service teacher differentiating instruction course. A summary of her interview responses can be found in Appendix D.

Instructor #2 has been teaching at the university for approximately five years. She holds doctoral degrees in both chemistry and educational technology. She is currently teaching general chemistry for biology and engineering majors in the honors program. She wrote a grant proposal and received acceptance for funding for use of iPads in her classes in 2012. She has a strong focus on collaborative learning and believes that technology ties in well with chemistry education for rapid visualization of data and modeling of concepts. She believes that mobile technologies can benefit students by increasing interactivity and comprehension. She has been using iPads in her classes for over a year and sees them as one tool among many for improving learning in her area of expertise. A summary of her interview responses can be found in Appendix D.

Instructor #3 is a professor of communications and of political science and has been with the university for approximately three years. His work examines political communications and public opinion. He has insight into news media coverage of politics, public opinion, media framing of political issues, political campaigns, entertainment media and politics, and political comedy. He taught the "road to the presidency" course in 2012 and also teaches courses in communication research methods, political parties, interest groups, and voting and elections. He wrote a proposal to use iPads in his classes, and funding was approved for his project. He initially applied for a grant for honor students to use iPads in his class, but then expanded the

focus to non-honor students as well. He is receptive to integrating iPads in the classroom and sees them as a way to improve interactivity and learning. A summary of his interview responses can be found in Appendix D.

Summary of Case 3

The overall attitude regarding the use of iPads at this university is very positive. Faculty and students are receptive to using the iPad in their day-to-day educational experience. The university helps faculty tap into a variety of funding sources for iPad use. iPads are available per semester, and feedback is provided by the instructors at the end of the semester. Project-based proposals have been made by interested parties to obtain available funding. Pilot programs have been initiated to explore iPad use in the classroom.

Challenges include:

- Only minimal training is available for rollout of iPads.
- There are no formal institution-wide guidelines and procedures for iPad use.
- There are no formal situational models to use.
- It is hard to measure the long-term effects of iPad use in the classroom.
- Availability of iPads is limited.

Cross Case Comparisons

Each individual case had its unique characteristics, which had an impact on how the iPads were rolled out and integrated into the environment. The major factors differentiating the cases are as follows: (1) overall funding opportunities available to support iPad use; (2) broad or limited technical support; (3) infrastructure to support iPad use in classrooms; (4) viewpoint regarding integration of technology in education; (5) incentives; (6) size of student body; (7) class sizes; and (8) type of education offered.

The largest school of the study, the national public university, had more resources available for rollout of the iPads, which were offered university-wide to all instructors. If an instructor could prepare a project proposal that included a strong argument demonstrating how iPads could have a positive effect on their teaching, they could obtain approval at the university level for using iPads in their classrooms on a semester basis. The university had a broad incentive structure in place: any instructor with a need for iPads could apply for a grant. This process was initiated at the administrative level, which is a key difference between this university's iPad implementation and that of the other colleges/universities. Available funding sources were also a key component of successful iPad implementation at this university. Broader technology support and the potential for increased scalability of the existing infrastructure helped enable this university to offer iPads to a wider audience.

By contrast, use of iPads at the medium-sized regional public university was driven mainly by a particular college, the College of Education, which recognized the educational potential of iPads. The administrative led initiatives for funding of iPads for the instructors, who were receptive to trying new technologies to improve their teaching; they recognized that they were preparing teachers for a new environment, where technology would become an increasingly important part of their classroom experience and would provide additional opportunities to engage with students. There was recognition that students are more technology savvy and expect to have technology available to them not only in college but also when they begin their careers in the education field. There was a strong network of instructors who supported each other in the use of iPads and encouraged discovery and sharing of ideas on how this new technology could be put to use for their students' benefit. The success they had with using the iPads to impact their teaching and students' learning was seen as an opportunity to garner more support at the

university level. Since the university is primarily a PC-driven environment, there were some challenges with integration of iPads throughout the institution.

The small liberal arts college, in contrast to the two larger universities, had limited resources available, which prevented it from rolling out iPads on a large scale. The college leaders decided to have small-scale, targeted pilot programs involving only a few instructors to allow for close study and analysis. The individualized support that the instructors received went a long way toward making the pilot studies a success relating to how the iPads were used to positively impact teaching and learning. The pilot study results encouraged further study of iPad use in the classroom. An instructional technologist from the technology department at the college was assigned to each of the instructors, so they had immediate personal support available to them. The technologist not only provided technical support but was able to assist in selecting appropriate applications for the instructors to use in their courses. The smaller rollout provided an opportunity for instructors to discuss and share experiences in a small group setting, which resulted in targeted feedback and an informative report of the findings disseminated to the college as a whole.

The study of the iPads at this college was mainly driven by the instructional technologists, who saw a need to research and evaluate how mobile technologies can affect teaching and learning. The college accepted their proposal and provided the initial funding. The college also provided incentives for instructors and students to use iPads by offering discounts on purchases of iPads after the pilot programs were completed.

Common Themes Across Case Studies

In general, the participants in this study seemed genuinely excited with the opportunities presented by iPads at their respective institutions. All saw and believed in the potential of the

iPad, not only for enhanced learning, but also for potential competitive advantages in the higher-education marketplace. Most believed that iPads and other mobile devices will become a part of the education environment but were unclear as to when this may come about.

The college and universities in this study were in the relatively early stages of rollout and analysis. Some were further along with implementation than others, but all were interested in further study and expansion of existing programs. Student feedback was highly favorable and instructor attitudes were generally positive. Proper training and support as well as a robust technology infrastructure were seen as important to instructors using iPads.

Institutional leadership for implementation of iPads has not always been clear, and in two of the cases initiatives were driven from the "bottom up." The technology leaders and instructors were looking to build support based on the positive impacts on teaching and learning experienced in their pilot programs and positive feedback from faculty and students. Demand for iPads was generally seen to be driven by the student body and faculty. If iPads proved to be a useful technology tool in the pilot projects, then support from the "top" was believed to be forthcoming.

The following sections discuss the common themes among the three cases.

Integration

In general, college/university leaders and instructors felt that the iPad was an educational technology tool that could be integrated into the classroom environment, and that it has created new opportunities for instructors to improve the overall classroom experience and provide new models for instruction and learning. For example, as demonstrated by instructor #2 in case #3, the capability to record entries in online lab journals and online notebooks created a new medium to collect data and share information. Students used the iPad to keep records of what they were

doing in lab, take pictures of what they are seeing, and email notebook entries, as needed. The mobility of the iPad was a seen as key benefit for students in the lab. The instructor felt that the iPad has made the lab notebook part of her class a lot stronger and satisfied an unmet need.

The iPad's provision of a wide variety of applications produces a multi-modal learning environment which may provide support for increased integration in the classroom. Instructor #1 in case #1 described how the iPad can help create this type of multi-modal learning environment. He stated that the iPad allowed his students to present better arguments by using aural and visual media. He said that his students would traditionally tell a story or craft an argument using one standard written essay format. Now they can take advantage of the multi-modal capabilities of the iPad and utilize multiple digital formats for presenting arguments. The instructor integrated the iPad as part of his "Corporate America" class as a tool for his students to do digital storytelling. He required his students, as part of his lesson plan, to use the multi-modal capabilities of the iPad to create a storyboard to construct a narrative and craft an argument. With the iPad, his students prepared videos of interviews to support an argument and connect more effectively with their intended audience. According to the instructor, it satisfied a previously unmet need and provided a positive impact on student engagement and learning.

The main areas where integration of the iPad in the classroom can have an impact are in content delivery, productivity, and presentations. Some of the other distinguishing features of the iPad that will help promote more integration in the classroom over time are its portability, rich set of educational applications, ability to engage students, and functionality to facilitate sharing of information. The iPad is becoming more popular among students because it is seen as a single device that can be used for most everything they need. Instructor #1 in case #2 noted that students embraced the iPad for its portability and ability to access a variety of useful apps. The

iPad provided new unanticipated opportunities with its ability to tap into a wide range of apps for content in a single, seamless learning platform. The instructor also gave his students the freedom to explore and find new apps.

The iPad encourages interaction and allows for more immediate feedback in activities. For example, instructor #3 in case #3 noted that the iPad helped engage students in real-time political activity in his political science class. Students were required to bring the iPads to class and use them for interactive polling. At the same time as it was being used for this activity, the iPad was also used to access other information that was available on the Internet to supplement the learning objectives. The instructor felt that the mobile nature of the iPad combined with available social media brought forth increased student engagement and an exceptional learning experience for his students in class.

In summary, the major features and benefits of the iPad that will help drive its integration and make a difference in higher education are: (1) its portability; (2) the fact that it is an all-in-one device; (3) its provision of educational applications and digital content; (4) its interactivity; (5) its ease of use; and (6) its ability to enhance communication.

Classroom Success

Although still in the early stages of integrating iPads in the classroom, the college and universities in this study reported that their iPad pilot programs received positive feedback from instructors and students. The excitement and enthusiasm demonstrated by instructors and students as well as the portability and ease of use of the device seemed to facilitate learning or at least engagement in the subject matter. The iPad was seen as another good tool that can be added to the mix of available technology. The best use of the iPad seemed to be when it was targeted to a specific task or exercise in the classroom. Many instructors were comfortable with selecting the

applications most useful to them for their teaching. For example, instructor #1 in case #3 noted how iPad apps, such as "Show Me," can be used to enhance reading and writing skills in students. The introduction of useful apps in the literacy class was well received by students and improved student engagement. The instructor explained that teachers should have a clear understanding of the iPad device and its apps and what impact the apps can have on teaching and learning. A full understanding of apps and their capabilities to enhance content delivery, productivity, and presentation is critical.

Real-time feedback was viewed as a significant benefit of the iPad for instructors, who have used the iPad to gather responses to questions, exercises, and surveys, both anonymously and from identifiable students. Whereas in the past they may have had difficulty connecting with or getting responses from students, the iPad now has provided them with a way to facilitate interaction and solicit feedback for more successful engagement with students. Improved student engagement came up multiple times during instructor interviews and was seen as a measure of success with the iPad. Instructor #3 in case #2 indicated that the iPad helped improve the overall classroom experience for herself and her students. She believes teachers can lose some learners with a straight lecture format. She feels that the iPad can benefit kinesthetic learners by keeping them more engaged in the subject matter. She also feels that it can be used to help keep the visual learner engaged, as well, with graphics and videos. She believes that it was successful in her classroom because different types of learners can now use one tool to help improve their learning. She also noted that iPads are especially good for small group work as group members readily engage with the iPad as part of their project work.

The small size and portability of the iPad was also seen as a factor for successful student engagement. Instructors felt that use of the iPad created a more open educational environment as

students could not easily “hide” behind their laptop or desktop computer screen or bury themselves in their notebooks. Instructors were able use the iPad as a portable tool during their instruction to transfer course materials to an overhead projection screen. The mobile nature of the device allowed them to project to the screen while moving around the classroom and interacting with students. Instructor #2 in case #1, for example, used the iPad for a variety of classroom activities with her students. She believes that the iPad’s relatively small size encouraged more student engagement and interaction compared to a larger laptop. Her goal is to transition to a classroom environment where the iPad is integrated for everyday use for herself and her students. An example of an app that could be used for everyday activities is called “Notability”. She stated that this app met a need and was selected to help students to transition away from paper. She felt it allowed the students to write very simply. She also used the “iPoll” app which provided polling anywhere capabilities to assess student attitudes. She believed that the size and portability of the iPad helped create a more open environment that had a positive impact on student learning. For her, this was an indication of classroom success.

Increased acceptance of the iPad as a mainstream technology tool will be a driver for its wider use as a classroom device for teachers and students. Per instructor feedback, students seemed to be ready to accept iPads as part of their activities in the classroom. Instructors were increasingly willing to accept the device once they understood how it could be used and how it could benefit them and their students. Training and professional development was a key for instructor acceptance.

College/university administrators did not yet fully accept the iPad but did recognize its potential for competitive advantages for their institution. Their support for pilot programs and provision of incentives for using the iPad has encouraged experimentation by instructors. The

acceptance of the iPad institution-wide may ultimately be driven by professors and students who consistently demonstrate the positive impacts to teaching and learning, respectively. Open-mindedness and receptiveness to change from college/university administrators will be important factors for iPad integration institution-wide.

Pedagogy

The iPad was seen as a technology tool that has changed or potentially will change instructors' pedagogy. It can be used for delivering course content over a wide range of applications, which could be transformative. Instructor #1 in case #2 is representative of this view and sees the iPad technology transforming his pedagogy. He indicated that the iPad and use of related apps have enriched his pedagogy and overall classroom teaching experience. He notes that some of the major benefits of the iPad include its flexibility, mobility, access to "new worlds" and instant access to educational materials. The iPad fulfilled an unmet need for him by providing a multi-modal learning environment. He feels that the iPad has provided new unanticipated opportunities with its ability to tap into a wide range of apps for content and productivity, accessed through a single and seamless learning platform.

Is the iPad more effectively used in daily classroom activities or for specific projects and tasks? None of the instructors interviewed have fully integrated the iPad into all of their daily classroom activities. Many instructors see great potential for the iPad when it is used in targeted circumstances. Most see the iPad as one tool at their disposal that can be used to continuously improve their teaching and provide a new way of thinking about teaching and learning. Instructor #2 in case #1, for example, feels that her experience with the iPad has allowed her to think more about her pedagogy. She believes the iPad has improved the overall classroom experience for her and would like to use it more in her pedagogy. She indicated that she had to think about what she

could do with the device that she could not do before. The biggest difference she found in her teaching with the iPad was the switch to a digital format. She felt that the immediacy of accessing information on the web was a big plus, allowing her to apply her ideas quickly.

One of the challenges going forward for instructors will be how to take full advantage of the pedagogical potential of the iPad. It will take administrators and instructors who are true innovators to take the lead in this area of technology. Many will prove to be late adopters. Attitudes will have to change if there is a paradigm shift, which appears likely as use of iPads and other mobile devices becomes more widespread on college/university campuses.

Infrastructure

Data suggest that the college and universities in this study have an adequate level of technology infrastructure for iPad use but will need upgrades in the infrastructure to handle increased future use. Inconsistent wireless capability was a common issue noted by instructors in the case studies. Instructor #3 in case #3, for example, uses the iPad to project to an overhead screen and noted that it did not work well, at times. When this occurred he transitioned to projecting from a laptop using traditional wiring. He believed such issues caused by a faulty wireless infrastructure could detract from his teaching and student engagement. While some classrooms were set up for high-end wireless connectivity, other classrooms were not as well supported. Instructor #2 in case #1 indicated that there were "pockets" in the campus where wireless access was slow. She noted that access was sometimes slow when her students took quizzes on the iPad. She believes that some classrooms should have better wireless capabilities.

The institutions in this study have not yet formalized the policies and procedures needed for iPad use, yet institution-wide management of iPads will become increasingly important as they are rolled out on a larger scale and security issues come to the fore. Instructor #1 in case # 2

noted that policies and plans at the university level to buy more iPads would be a boost for teachers and would most likely be seen as favorable by students, based on his experience. He believes that use of iPads could be perceived by some administrators as a competitive advantage for the university in the future. Instructor #3 in case #3 stated that the university has a broad technology plan, but was not familiar enough with the plan relating to iPads. He believed that it would be a good step for the university to develop a plan for using mobile devices, not specifically for iPads. He also felt that the university could better address how new technologies could impact the classroom.

Instructors, in general, reported that they had some concerns with the technology infrastructure because students could be distracted if technology failures occurred during class. The concern with the existing infrastructure could prevent some instructors from moving forward to fully utilize the capabilities of the iPad. In all three cases, however, the college and universities did have technology-enhanced classrooms that were equipped with the infrastructure needed to teach with iPads.

Training and Support

Data suggest that there is a minimal level of training and support needed for the initial and ongoing use of iPads by instructors. Instructor #3 in case #1 noted that she could use the iPad with minimal training and found it to be intuitive if you had a previous understanding of technology. She felt that it was good to have an instructional designer available for one-on-one training and support, when needed. No formal training was taken by her for iPad use. She was not willing to invest a lot of time for training classes. She would consider taking formal training, however, to find new ways that the iPad could benefit her in her classes.

Strong technological support is critical for successful integration of the iPad into the classrooms and curriculum. If this support is not provided, continued use of the iPad may come into question. Instructor #2 in case #2, for example, found strong iPad support in the College of Education and believed that this was a contributing factor for him to use and continue to use the iPad in the classroom. He did not see the university as a whole supporting iPad use in the classroom. He would like iPad support to be there for instructors in the future. In general, the college and universities in this study had some type of technical support available. Some instructors had an instructional technologist available to them who could help troubleshoot technical issues and provide support on how to use the iPad in their classes.

For instructors to expand their use of the iPad, benefits and practical applications must be seen and training and professional development available. Training and support will become increasingly important for obtaining buy-in from instructors and administrators and to ensure long-term adoption. The instructors interviewed were, for the most part, self-learners and not against trying new technologies. The college and universities in the study provided some basic training or other informal type of orientation sessions on iPad use to get the instructors started. The instructors took what was learned or what they already knew about the iPad and built on that knowledge. Most of them would be receptive to additional training sessions if they could see a benefit and if training were targeted to their purposes. There are many types of informal networks that the instructors use to share information and ideas on how the iPad can be used. Some use social networks and Internet sites to share information and learn from others. Many take advantage of education conferences and instructional technology seminars to continue to build on their knowledge base.

Chapter 4

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

Discussion

This study was designed to address five major questions concerning iPad use in higher education. The following discussion summarizes the findings of the study in relation to those questions.

How are colleges/universities addressing key integration strategies regarding iPad use? The data from this study suggest that colleges/universities may have different views on how to address integration strategies. Some of the differences depend on the overall philosophy at the college/university regarding the role of digital technology in education generally and the role of mobile tablet devices in particular. Depending on the environment, leaders have emerged to drive the effort to get iPads into the hands of instructors and students. In some cases, iPad use has been driven by individual instructors who are innovative in their use of technology in the classroom. Instructor #1 in case #1, for example, drove the use of the iPad in his classes by using it for student digital storytelling (Appendix D). He sees the iPad as being transformative to his teaching and students' learning. What interests him in using the iPad is "not simply the ability to mimic what we are already doing, but rather the ability to transform what we are doing". In other cases, technology leaders have encouraged use and have driven the initiatives for pilot programs.

In all cases it is recognized by technology leaders and instructors that there is a benefit to using newer educational technology tools in the classroom. Students and instructors have

become more technology savvy and expect newer technologies to be made available to them. This has resulted in pilot programs as well as funding for particular technology projects and other incentives to make increasing use and integration of iPads a reality. It was common for incentives to be offered to teachers and students for use of technological innovations, such as the iPad, in the classroom.

Are colleges/universities experiencing success with improving student engagement and learning by using iPads in the classroom? The answer to this question is an unequivocal yes. There is still debate on the optimal scope of iPad use in the classroom, but it was found that at least in targeted instances the iPad can meet real educational needs. In case #3, for example, instructor #3 targeted the use of the iPad to capture real-time feedback from students in his Road to the Presidency class (Appendix D). His students used the iPad along with the Facebook app to post comments on debates and other film clips shown in class. He found the best use of the mobile technology was when students were "having conversations about these events and videos as they were going on". He normally would have had to wait until after the event to have conversations, but now he could facilitate conversations in real-time. He found this to have a positive impact student engagement and learning.

Data collected from the case studies suggest that the iPad has gained enthusiastic support from instructors. The more knowledge gained on the benefits of the iPad and what it can do to improve the classroom experience, the more demand will grow by students and instructors. It is widely recognized that we are in the early stages of a transformational period with respect to the manner in which instructors teach and students learn. Strong leadership in the education field will be needed for iPads to be fully embraced in higher education. Reservations may still be

present among some instructors and administrators, but these reservations may be overcome as benefits are recognized and support continues to grow.

How are iPads being used as part of instruction and what is the pedagogical potential? Instructors interviewed in the study saw the benefit of the iPad in three major areas. First, they saw it as a tool to enhance presentation capabilities within the classroom. The wide variety of presentation applications available on the iPad gives the instructors flexibility on how they can best present materials to students. Second, the iPad provides the ability to deliver content to students in various formats, depending on the need. What used to be primarily paper-based delivery of course content can now be transformed to digital content that can be easily accessed by instructors and students and updated in real-time. The real-time nature of content delivery and updating has provided instructors with more tools to engage students. Third, there is a wide range of productivity applications for the iPad that give instructors the ability work more efficiently and help them focus more on addressing student needs. Instructors often can be overwhelmed with routine educational tasks. Many of these tasks can now be streamlined or automated with productivity tools available on the iPad. The experience the instructors have had with the iPads has convinced them to continue to find and explore applications that can help them in them in their teaching.

Instructor #2 in case #1 discussed how she integrated the iPad as a part of her instruction in a Linguistics course and believes it improved the overall classroom experience for herself and her students (Appendix D). Using the iPad in the classroom environment has allowed her to rethink her pedagogy and she is interested in integrating the iPad further into her classes in the future. She has demonstrated the use of the iPad for content delivery, presentation, and productivity purposes. The device has allowed her to deliver course materials online for

immediate access by her students. It has also allowed her to update these materials in real-time, when necessary. She was able to project course materials on an overhead screen for presentation purposes and to mark-up these materials in classroom exercises and discussions. She and her students used the "Notability" app for improved productivity when scripting and sharing class notes. She believes that the iPad has pedagogical potential but states that "teachers must think about new paradigms for teaching" when using these new technologies. She warns that the focus should not be so much on the machine, but on good teaching.

What are some of the key infrastructure considerations for colleges/universities to address in order to support iPad use? Even though some classrooms do not yet have fault-free wireless connectivity, administrators at the colleges/universities recognize the importance of connecting instructors and students and are providing the infrastructure to allow access to and use of state-of-the-art educational technologies. Technology-enhanced classrooms have been made available at the college and universities in the case studies to allow instructors who are on the leading of edge of educational technology to experiment with and explore new devices such as the iPad. E-learning labs are also being made available to enable instructors to work closely with instructional technologists.

Many instructors have a fear of technology failing in the classroom. This can, at times, detract from the quality of the instruction they provide their students. For example, if an instructor has trouble projecting material on an overhead screen or the connection to the Internet is unreliable, students will often hold a negative view on the instructor and the class, which could have an impact on the student's evaluation of the instructor. A consistent and reliable technology infrastructure must be in place, and of course the devices must be configured properly so that they can be used as intended in the classroom. Instructor #3 in case #2 supports this view and

noted that classrooms do not have a consistent setup to support the use of educational technology. She mentioned that iPads and other mobile devices often fail to work properly (Appendix D). She believes that classrooms should have consistent and reliable wireless capabilities because of the negative impact it can have on teaching and learning with mobile devices. She feels that the importance of the issue has been recognized by the administration and states that the "university is trying to push more to having every classroom be similar with the equipment".

What steps have colleges/universities taken to promote and support use of iPads?

Steps taken by a college/university to promote and support iPads often depend on the size, background, and attitude of the administration and faculty toward technology in education. Incentive programs have been put in place at some colleges/universities to promote technology from the top down. In contrast, support for technology such as the iPad is frequently promoted from within by instructors, students, and technology leaders. Instructor #2 in case #2 notes, for example, that the use of iPad has been promoted and supported primarily by the College of Education (Appendix D. The university does not discourage use of the iPad, but it is not a priority at the institutional level. This instructor feels that the College of Education Technology Center is fully engaged in the use and support of iPads in the classrooms. He believes that the "College of Education is far in advance of the rest of the university when it comes to educational technology". Many colleges/universities may be in the early stages of discovering how to take steps to promote the right mix of technology. Pilot programs and limited rollouts of iPads are common, and small steps are taken to review and evaluate the impacts the iPad can have on the way instructors teach and students learn in the classroom and to assess attitudes from instructors

and students. Large “leaps of faith” for using iPads in the classroom do not appear to be common.

The college and universities in this study recognize the critical importance of technology support for teachers and students. Technology leaders at the college and universities have worked to set up support structures that range from individualized training to large targeted focus groups. iPads often become personal devices for instructors, and informal networks are used by instructors and students to share information. Formal networks such as Twitter, Facebook, and LinkedIn are accessed over the Internet to share information regarding the iPad. Professional conferences also serve as support networks for instructors, as they can gain an understanding of what others are doing with iPads from presentations and discussions.

Decision Points for Supporting iPad Integration

In any organization that is looking to bring forth positive change, leaders should identify key decision points that must be addressed. Based on data collected in the present study, key decision points have been identified for colleges/universities to use when looking to integrate iPads in their educational environment. The matrix in Table 4 identifies 13 such decision points and summarizes how each college/university participating in this study addressed these decisions.

Data for this analysis was gathered during the interview process with technology leaders and instructors. During the data analysis phase, it became apparent early on that certain key organizational decisions had to be made by colleges/universities to address the main problem and questions driving this project. The organizational improvement goal was to develop practical guidelines and strategies for integrating iPads in higher education curricula. Consistent with this goal, the key decision matrix below was developed to help guide this process by first showing

the key decision points that were derived from the data analysis, summarizing how the colleges/universities in the cases were addressing each key decision point, coding the summarized data from the cases, and finally using the coded data as a reference to support many of the key guidelines and strategies documented in the recommendations section of this project that follows.

Table 5

Key Decision Matrix

Decision Points	Case #1	Case #2	Case #3
D1 - Infrastructure investment	**C1.1** - Results of the iPad pilot project have initiated decisions to be made on infrastructure changes to enhance classroom spaces to support mobility. Technology enhanced rooms were available but general classrooms were lacking.	**C1.2** - No big decision has been made on changing the overall technology infrastructure at the university. The College of Education is attempting to model a successful infrastructure.	**C1.3 -** Key infrastructure decisions have been made to provide access to iPads and iPad carts. Classrooms were enhanced with wireless capabilities to support iPad use. Instructors would like to see improvements in network and wireless capabilities.
D2 - Pilot Programs	**C2.1** - A successful pilot using iPads in 3 classes was completed in July 2012. Decisions were made to expand pilot programs and set up discussion groups for iPad use.	**C2.2** - Decisions were made to support very successful iPad pilot programs in the College of Education. iPads have proven to be very good tools for education research.	**C2.3** - Grant funding decisions were made to support pilot projects. Projects are set up by semester. iPads were available to everyone with proper justification. Innovative instructors have taken advantage of the opportunity.
D3 - Incentive Structure	**C3.1** - Students were given free use of an iPad for their class and an incentive to purchase it at a discount. Broader incentives are being considered.	**C3.2** - Free iPad carts were available for use by faculty. Students were provided 24/7 access to iPads for a small fee. Access to iPads was well received by faculty.	**C3.3** - It was decided to provide students with an incentive to use the iPad free for a semester. Students had to sign an agreement.
D4 - Funding Streams	**C4.1** - Funding was provided by the college for a limited rollout. No formal funding plans are in place yet. Funding could be potential roadblock to additional deployment.	**C4.2** - The College of Education decided to provide primary funding for iPad use in their area. No other formal funding streams are available to instructors at this time.	**C4.3** - Grants for iPads are available based on approval of a written project proposal. Innovative and visionary instructors have taken advantage of funding available through grants.
D5 - Scope of Rollout	**C5.1** - A limited rollout was decided for use in 3 classes in the Spring 2012 semester.	**C5.2** - It was decided to rollout pilot iPad programs only in the College of Education.	**C5.3** - A broad deployment approach was decided for the initial semester. The broad approach is continuing with the positive impacts to teaching and learning experienced by instructors using the iPad.

D6 - Policies and Procedures	**C6.1** - No formal procedures are currently in place. The initial evaluation phase will be completed before decisions are made on formal policies and procedures.	**C6.2** - Limited guidelines and no formal procedures are in place. The college is looking to make decisions on guidelines for enhancing the wireless network. Instructors are not generally using formal guidelines for iPads at this time.	**C6.3** - No formal policies and procedures have been decided on. Policies are in place, but limited, for iPad and iPad cart use.
D7 - Training Opportunities	**C7.1** - No formal training classes have been offered. An educational technologist was assigned to each class for support.	**C7.2** - It was decided to provide professional development and training for instructors. The training and professional development opportunities have been well received. Instructors share knowledge gained in training or in the classroom with each other.	**C7.3** - It was decided to provide minimal training for instructors. Training included informal 1-on-1 sessions mainly focused on selecting apps. Instructors are for the most part self-learners.
D8 - Surveys and Feedback	**C8.1** - It was decided to provide surveys for feedback. Students were found to be very receptive and appreciated the iPads.	**C8.2** - It was decided to use pre and post surveys for faculty and students. Surveys have been very positive. Feedback from instructors using the iPad has been favorable.	**C8.3** - It was decided that it was important to use course evaluations and student surveys for feedback in the first semester of rollout. Instructors give a de-brief presentation on their experience after the project is over.
D9 - Partnerships	**C9.1** - No formal partnerships or segments of the college were being targeted at the time of the study. Informal partnerships between the instructors and technology support areas were seen.	**C9.2** - It was decided to establish strong partnerships with the Apple, Inc. and the College of Education. It was seen that the instructors formed a strong internal partnership to support each other in making a commitment to using the iPad device in their Education classes.	**C9.3** - No decisions were made on specific formal partnerships. Instructors in the areas of Political Science, Education, and Chemistry feel there is a good informal partnership with the internal technology support group. Positive impacts on teaching and learning were found with using iPads.
D10 - Pedagogy Changes	**C10.1** - Based on the initial pilot, the pedagogical potential was evident when iPads were integrated in activities in and outside the classroom, where unique benefits were found for research. It was seen where the multi-modal capabilities of the iPad allowed the instructor to work with students to create multi-dimensional presentations using audio, video, or pictures.	**C10.2** - Faculty embraced the iPads and were strong advocates for their continued use, when provided proper training and support. Students were excited with the potential of iPads to enhance their learning environment.	**C10.3** – Initial results have been positive. No decisions for major changes to pedagogy seen. Instructors are finding the iPad useful for specific activities. Multi-modal capabilities were noted and were seen as positive. iPads were used for presentation, productivity, and content delivery purposes.
D11 - Security	**C11.1** - No formal decisions on security have been made. There is no formal tracking and security over the devices. Not considered a major issue this time.	**D11.2** - Key decisions on security were made. Each student signed an agreement and is required to replace the iPad if lost or damaged. The "Find my iPad" software has been used for control of iPads.	**D11.3** - Key decisions on security were made by the university. iPad carts are secured after each class. The "Find My iPad" software is being used to track the location of all iPads. All iPads are registered.
D12 -	**D12.1** - No strategic planning	**C12.2** - No strategic planning	**C12.3** - No strategic planning

Administrative Support	decisions were made. It is believed that support will increase with the demonstration of continued positive impacts on teaching and learning and positive acceptance by instructors and students.	decisions were made at the institution level. The college is looking to build support through positive impacts to teaching and learning in the classroom. Planning and support is primarily handled by technology leaders in the College of Education.	decisions were made for iPad use at the university level. The university is currently looking to external sources for funding support.
D13 - Technical Support	**C13.1** - It was decided to provide educational technologists to support each instructor. When assigned to the instructor for consultation and troubleshooting, there is an increased likelihood of a positive experience.	**C13.2** - It was decided to provide primary technical support for the iPads in the College of Education at this time. As iPads are rolled out university-wide, global support is anticipated.	**C13.3** - It was decided to provide 1-on-1 support to all instructors and students requesting assistance. The technical support area is also available for troubleshooting and technical assistance.

Recommendations: Guidelines and Strategies for iPad Integration

iPads and other mobile devices will become a major part of the higher education environment over time. Colleges/universities will have to adapt to a changing technology environment or be left behind. The competitive nature of higher education—i.e., the competition for students—will help drive integration of iPads in the higher education environment. Colleges/universities that are early adopters will most likely gain a competitive advantage in the education marketplace, and these institutions may become increasingly popular with students. Whether used as a content provider, a productivity or presentation tool, or a stimulating device for enhanced interactive learning, iPads are poised to move into the mainstream of higher education; if mainstreaming is not driven "top down" by institutional administration, it will surely be driven "bottom up" by students and faculty. Whatever positive impacts on teaching and learning are seen and demonstrated at the classroom level will of course help drive broader acceptance of the device over time.

"Buy in" for using the iPad must be obtained from instructors and college/university administrators and the benefits must be proven to this audience before actual situational models

can be established and take hold. In case #2, models of successful impacts on teaching and learning were starting to be built in the College of Education. Students and faculty in this college were stimulated by the use of the iPad and saw great potential for it as a learning tool. Instructors experienced practical applications for the iPad and were able to see its potential for improved teaching and learning.

The aim of this EPP is to help ensure successful iPad integration in higher education. Based on our findings for the three institutions participating in the study, we offer the following recommended guidelines and strategies that colleges/universities can use in their quest to integrate iPads in their educational environment. The recommendations below are grouped for instructors, administrators, and technology support personnel, in the order of relative potential impact on higher education.

Recommendations for Instructors

1. Integrate iPads for use within curriculum and lesson plans. It was found that iPads were most beneficial when they were integrated into specific activities in the classroom. iPads should be used by instructors and students for purposeful activities, as part of the curriculum and lesson plans. In case #1 (Table 5 - C10.1), positive impacts on student engagement and learning were achieved in the pilot when the iPad was integrated by the instructor in the specific activities within the classroom. Kolowich (2010) also supports this view and sees the use of the iPad becoming "second nature" to students and teachers through daily classroom use.

2. Model the use of iPads in the classroom. One of the best ways to integrate iPads is for instructors to embrace and use them in the classroom. In case #2 (Table 5 - C10.2), for example, faculty in the College of Education modeled iPad use for educational purposes and were strong advocates for its continued use. This advocacy, however, was developed over time, after the instructors received training and support.

3. Design curriculum to facilitate an autonomous, self-managed, interactive learning environment. Curriculum must be designed to facilitate an autonomous learning environment for the students. Liaw et al. (2010) concluded that students had positive experiences with the iPad when the curriculum was designed for autonomous study as well as interaction with the community at large. Availability of the rich set of iPad applications is also critical in the curriculum design. In case #3 (Table 5 – C7.3), the university recognized the importance of training instructors in how to select key applications for their curriculum.

4. Encourage and support multi-modal learning with the iPad. Participants in this study observed that one of the most significant benefits of the iPad was its ability to facilitate a multi-modal learning environment. In the past, a written paper or oral presentation were normally the only ways for a student to present an argument or support a position. Now, with the capabilities of the iPad, a student can take pictures, develop videos, and create audio files to tell a story (storyboarding) and support a position or argument on a topic (see case #1**,** Table 5 – C10.1).

5. Build strong instructor partnerships, involvement, and commitment to using the iPad device. Any rollout of iPads in the educational environment will need strong commitment, support, and involvement by instructors. In case #2 (Table 5 – C9.2), the instructors formed a strong partnership to support each other in making a commitment to using the iPad in their education classes. These instructors met periodically to discuss how the device was being used and to gain feedback and perspective. This support group was seen as an important factor for achieving positive impacts to teaching and learning in the classroom.

6. Build support through demonstrating how iPads have positively impacted instructor teaching and student learning. Have faculty and students prove and demonstrate

the vast capabilities of the iPad and show how it was used to improve their educational experience. In case #2 (Table 5 – C12.2), the college was looking to build support through documentation of positive impacts to instructor teaching and student learning in the classroom. In case #1 (Table 5 – C12.1), participants believed that acceptance of the iPad would increase over time as impacts to teaching and learning were demonstrated.

Recommendations for Administrators

1. Provide widespread access to iPads for use by instructors, students, and administrators. If access to the iPad is limited and no incentives for use are present, wider integration and adoption will be more difficult. Availability through pilot programs and other technology initiatives will be critical for growth within the education environment. In case #3 (Table 5 – C2.3), it was demonstrated that open access to iPads at the institutional level for those interested contributed to a successful rollout.

2. Provide opportunities for iPad use in educational research. Some of the best uses found for the iPad were in the area of research, including remote field studies. For example, in case #1 (Table 5 – C10.1), iPads provided unique benefits in research inside and outside the classroom. Gaining access to information quickly and easily and providing an interactive environment for sharing research data was widely seen as a major benefit of the iPad. Portability and ease of handling in field research were also seen as strengths. Henderson and Yeow (2012) suggest that mobile applications can provide unique opportunities and tout the potential of social media in qualitative research.

3. Set up a project-based proposal process for initiating use of iPads by instructors. Provide a process whereby instructors can submit a project-based proposal for using iPads in their courses. In case #3 (Table 5 – C5.3), it was shown that a project proposal had to be submitted by the instructor and the use of the iPad justified before the instructor could gain

access to iPads for the semester. Solid arguments had to be made regarding how the iPads would be used and what benefits were foreseen. After the project was completed, the instructor had to make a presentation on how the iPad was used and what benefits were actually derived. Any challenges encountered were communicated in the presentation. Instructors saw this process as an opportunity to garner support for increased availability of iPads for themselves and their students.

4. Provide for and set up funding mechanisms for iPad project support. Provide faculty with opportunities through grant proposals or other funding mechanisms to demonstrate how the new iPad technology could be used in their teaching and research. Have faculty build and present cases showing how using the iPad can result in improved research methods and/or positive impacts on teaching and learning in the classroom. This will help build support from the administration for additional funding opportunities. In case #3 (Table 5 – C2.3), strong funding streams through the grant proposal process were provided to support pilot projects.

5. Establish key partnerships inside and outside the college/university environment. Key partners and "champions" who support and promote the iPad as an educational tool should be present on and off campus to spur use and deployment on a wider scale. Technology leaders must drive the marketing of the new technology to the larger education community and high-level administration. In case #2 (Table 5 – C9.2), it was found that the instructors valued the partnerships established within the College of Education and with Apple, Inc. This was thought to be a critical factor for their achievement of positive impacts to teaching and learning in the classroom.

6. Provide incentive structures for faculty and students to use and continue to use iPads. Faculty and students will be more apt to use the iPad if incentives are present. For

students, cost is frequently an issue; a loan or discount purchase program may be helpful to them. Provide faculty members with monetary incentives based on performance, innovation, and project-based demonstration of how they used the iPad to have a positive impact on their teaching and student learning. Brand and Kinash (2010) found student surveys on iPad use to be favorable, especially when incentives were used to encourage continued use. In case #3 (Table 5 – C3.3), the university demonstrated the importance of promoting the iPad by providing an incentive to the students for free access for a semester. In case #1 (Table 5 – C3.1), students had an opportunity to purchase iPads at a discount and many students took advantage of this opportunity.

7. Assign an individual instructional technologist to each instructor during rollout. When instructors begin using the iPad in their classes, there is an adjustment period which may result in some discomfort and anxiety. When an individual instructional technologist is assigned to the instructor for consultation and troubleshooting, there is an increased likelihood of an instructor having a positive experience with using the iPad. In case #1 (Table 5 – C13.1), instructors were happy to have an individual technologist assigned to them for support and to assist in the selection of appropriate applications.

Recommendations for Technology Support Personnel

1. Provide supporting infrastructure. A college or university's infrastructure must continue to be developed to enable optimal use of iPads in the education environment. When key infrastructure decisions are made to support the iPad, as seen in case #3 (Table 5 - C1.3) with the provision of iPad carts and wireless classrooms, the learning environment is enhanced for iPad use. Banister (2010) warns that caution must be taken regarding the management and implementation of these types of devices in the existing infrastructure. Security of the devices is critical, along with the establishment of stable wireless networks.

2. Provide ongoing training and support for instructors, students, and administrators. Students, instructors, and administrators must be provided with proper training and support for iPad use in order to understand how it can benefit them in their educational activities. In case #2 (Table 5 – C7.2), for example, it was found that training on the iPad was seen as important for professional development and was well received by instructors.

3. Develop communication avenues for sharing information on iPad uses. Build excitement regarding the potential of the iPad device. Promote communication and discussions between students and instructors on how the iPad technology has been and can be used in their educational experience. Kress and Pachler (2007) found that collaboration and discussion with peers was an important factor in successfully promoting the iPad. Sharing of data and models for using the iPad, for example, demonstrates the key benefits of using the device. Set up regular meetings and discussion groups on various topics related to iPad use. This was demonstrated in case #1 (Table 5 – C2.1), where decisions were made to set up discussion groups to build on the excitement generated during iPad pilot project.

4. Utilize ongoing feedback from surveys or other mechanisms to refine use of iPads. Ongoing and honest feedback from faculty and students regarding their use of the iPad will provide opportunities for assessment and help determine how to best plan for and implement iPads in the future. Allow participants in pilot programs the freedom to express their opinions in a balanced way. Use the feedback to help refine the use of the iPads in the education environment. Marmarelli and Ringle (2011) found meaningful results and valuable feedback from participants who used iPads in pilot programs. In case #3 (Table 5 – C8.3), the university provided course evaluations and student surveys to measure views and attitudes toward the use

of the iPad device. According to these evaluations, students viewed their experience with the iPad during the semester as positive.

5. Build an inventory of applications and show how they can be used to enhance learning. One of the benefits of the iPad is its ability to deliver and make available a rich set of applications that can be used to facilitate learning. Once faculty and students understand what iPad applications are available, they find practical ways to use them in the classroom. Kelly and Schrape (2010) note that the group in their study is developing an inventory of best applications for educational and productivity purposes. In case #3 (Table 5 –C.3), the focus of training and support was on one-on-one sessions to help instructors select appropriate applications for their curriculum.

Conclusion

Although colleges/universities are still in an early phase of integrating iPads and other mobile devices into the curricula, it is encouraging to see the positive steps being taken with pilot programs to study and evaluate how these devices can have an impact on teaching and learning. The data and findings from the case studies suggest an overall positive view of iPads by technology leaders and instructors. They recognize the potential for iPad and other mobile devices to transform education, while also recognizing limitations and challenges with integrating these devices at their institutions. For this potential to be realized, key organizational decisions will have to be made along with the development of practical implementation strategies. This project was intended to help guide this decision making process and offer specific strategies and guidelines to assist colleges/universities when looking to implement the use of mobile devices, such as the iPad, at their institution. The case studies' findings and recommended guidelines and strategies were documented here to address gaps in existing

research literature and add to the current body of knowledge on use of mobile devices in higher education, while recognizing the opportunities for further research to add to this body of knowledge.

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Appendix A

KEY QUESTION MAPPING MATRIX

Questions Driving Project	Theme	Technology Leader Interviews (Level 1)	Instructor Interviews (Level 2)
1. How are colleges/universities addressing key integration strategies and issues regarding iPad use?	Integration	• Have certain segments of your educational environment been targeted for iPad use? Do you feel certain educational areas or settings would be better than others for iPad use? • Do you believe that there are certain types of classes offered at your school that would benefit most from use of iPads? • Has your school established any guidelines or procedures for successful use of iPads in the classroom? • How would you describe your school's receptiveness to integrating iPads into the curriculum?	• What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not? • Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated? • Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies? • How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?
2. Are colleges/universities experiencing success with improving student engagement and learning by using iPads in the classroom?	Classroom Success	• Can you describe any successes, large or small, with the use of iPads in the classroom? • Do you have successful logical or situational models established for using iPads in the classroom? • Have you conducted any pilot or test programs for use of iPads in the classrooms? If so, how successful were these? • Have you measured student attitudes toward iPad use? Do you know if your students would be receptive to using this type of technology in the classroom?	• Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful? • Are there any models of success you have developed for the iPad that could be used by you or others in the future? • Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots? • Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?

3. How are iPads being used as part of instruction and what is the pedagogical potential?	Pedagogy	• How do you gauge the pedagogical potential for use of iPads at your school? • Have teachers currently made good use of iPads and related apps in their pedagogy? If not, do you know of plans to do so? • Can you provide an estimate of the percentage of faculty using iPads in the classroom? For the ones who are using the iPad, do you know how they are using it? • Are iPad apps used in as part of the curriculum in any areas of the school? If so, where are they used most successfully?	• Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad? • Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for? • Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes? • How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?
4. What are some of the key infrastructure considerations for colleges/universities to address to support iPad use?	Infrastructure	• Have iPads had an impact on the technology infrastructure at your school? If so, is there an effective model for the technology infrastructure needed to support iPad projects? • If iPads are made available at your school, how are they being rolled out and controlled in your environment? • How do you currently secure iPads and data contained on them? • What are some of the challenges and implementation issues with using iPads at your school?	• How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads? • How are iPads currently configured for your classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs? • How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads? • What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?
5. What steps have colleges/universities taken to promote and support use of iPads at their institution?	Support	• Have you developed and conducted training classes for educating professors and staff on the benefits of using iPads? • Are iPads part of the long term vision and/or technology strategic plan for technology at your school? • Have benchmark studies been performed with other higher education on successful use of iPads? • Is there support from school	• Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class? • Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment? • Are you aware of any strategic plan or long term vision for use of iPads in

		administration for use of the iPad technology in the classroom?	your classroom? What would you like to see addressed in your school's technology plan regarding iPad use? • Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?

Appendix B

EPP KEY QUESTIONS/FINDINGS SUMMARY

#	Question	Data Sources	Key Findings
Q1	How are colleges/universities addressing key integration strategies and issues regarding iPad use?	Literature; higher education technology leaders and instructors	• Define role of iPad technology. • Build support from instructors. • Provide funding opportunities. • Identify technology leaders. • Provide access to iPads. • Use instructional technology experts.
Q2	Are colleges/universities experiencing success with improving student engagement and learning by using iPads in the classroom?	Literature; higher education technology leaders and instructors	• iPads have met educational needs. • Support from instructors and students. • Benefits communicated and accepted. • Early pilots proved positive. • Improved student engagement. • Transformational to learning.
Q3	How are iPads being used as part of instruction and what is the pedagogical potential?	Literature; higher education technology leaders and instructors	• Used in 3 major areas by instructors. • Used for presentation, content, and productivity purposes. • Used as interactive tool with students. • Used for data collection and analysis. • Used for real-time feedback. • Significant pedagogical potential.
Q4	What are some of the key infrastructure considerations for colleges/universities to address to support iPad use?	Literature; higher education technology leaders and instructors	• Connecting instructors and students. • Wireless capabilities. • Security of iPads. • Network scalability. • Technology enhanced classrooms.
Q5	What steps have colleges/universities taken to promote and support use of iPads at their institution?	Literature; higher education technology leaders and instructors	• In early stages of discovery. • Incentive programs. • Pilot programs. • Use “bottom up” support. • Institutional level grants. • Establish communication networks. • Establish partnerships.

Appendix C

TECHNOLOGY LEADER INTERVIEW SUMMARIES

Technology Leader Summary - Case #1

#	Interview Questions	Response
1	How would you describe your school's receptiveness to integrating iPads in the curriculum?	Limited pilot program was used for 3 classes. Students were found to be very receptive and appreciated the use of the iPad in their classes.
2	What are some of the challenges and implementation issues with using iPads at your school?	Lack of familiarity with the device was noted as challenge for students and instructors in the Pilot. eBook's lack of a search function and lack of collaboration for sharing multi-media devices were noted as challenges.
3	Can you describe any successes, large or small, with the use of iPads in the classroom?	Yes. Success was found when the focus in the course was on integrating the iPad in everyday activities. Students used the iPads regularly and enthusiastically.
4	Has your school established any guidelines or procedures for successful use of iPads in the classroom?	No formal procedures in place currently. Currently in evaluation phase. Limited pilot was used for evaluation and plan for wider rollout is planned. .
5	Have you developed and conducted training classes for educating professors and staff on the benefits of using iPads?	No formal training classes have yet been established. An educational technologist was assigned to each class using the iPad.
6	Have you conducted any pilot or test programs for use of iPads in the classrooms? If so, how successful were these?	A successful pilot was completed in July 2012. A final report was written. Next steps include a wider rollout to instructors, enhancing classroom infrastructure to use iPads, and organizing series of events to support iPad use.
7	Have certain segments of your educational environment been targeted for iPad use? Do you feel certain educational areas or settings would be better than others for iPad use?	No particular segments are targeted at this time. A wider rollout to instructors is planned. Found most useful when integrated into day to day activities of classroom.
8	Do you have successful logical or situational models established for using iPads in the classroom?	A formal model is not currently in place. Integration into the day to day activity of one class was found successful and could be used as a model in the future.

9	Are iPad apps used in as part of the curriculum in any areas of the school? If so, where are they used most successfully?	iPad apps were used in the 3 classes selected for the pilot study with various levels of success. Apps need to be easy to use. If long learning curve is required then apps are not always readily accepted for use in the classroom.
10	Do you believe that there are certain types of classes offered at your school that would benefit most from use of iPads?	Cannot determine at this point. Wider rollout to more instructors in various classes is planned.
11	How do you gauge the pedagogical potential for use of iPads at your school?	Based on the initial pilot, the pedagogical potential is evident and suggests further study is needed.
12	Have teachers currently made good use of iPads and related apps in their pedagogy? If not, do you know of plans to do so?	1 of the 3 classes in the pilot study made good use of the iPad. Very good integration into the pedagogy was apparent by both student and the instructor.
13	Have iPads had an impact on the technology infrastructure at your school? If so, is there an effective model for the technology infrastructure needed to support iPad projects?	Results of the iPad pilot project have already initiated proposed changes to the infrastructure. An iPad student loan program is planned in addition to addition to enhancing classroom spaces to support mobility.
14	If iPads are made available at your school, how are they being rolled out and controlled in your environment?	Not currently available on a widespread basis. A student loan program is planned with a wider rollout to faculty.
15	Can you provide an estimate of the percentage of faculty using iPads in the classroom? For the ones who are using the iPad, do you know how they are using it?	Minimal use of iPads by faculty. Looking to expand faculty use beyond initial pilot study.
16	Are iPads part of the long term vision and/or technology strategic plan for technology at your school?	No formal strategic plan for iPad use and use will be driven by desire of faculty and students.
17	How do you currently secure iPads and data contained on them	No formal security procedures in place. Students in the pilot were able to purchase a reduced price. No formal tracking and security over devices.
18	Is there support from school administration for use of the iPad technology in the classroom?	Support will be increased with future positive acceptance by faculty and students. Still in the initial phase of garnering support with pilot programs.
19	Have benchmark studies been performed with other higher education on successful use of iPads?	No formal benchmark studies have been performed. Informal communication with colleges of similar size is being undertaken with technology consortium.

20	Have you measured student attitude toward iPad use? Do you know if your students would be receptive to using this type of technology in the classroom?	Yes. Student acceptance in the pilot program was measured as positive based on survey data.

Technology Leader Summary - Case #2

#	Interview Questions	Response
1	How would you describe your school's receptiveness to integrating iPads in the curriculum?	Very receptive by faculty and students in the College of Education. Tech support area in College of Education is heavily promoting the use of iPads. iPads "caught fire". The goal is to get an iPad in the hands of every student.
2	What are some of the challenges and implementation issues with using iPads at your school?	Not yet accepted in the academic computing area. They have a Microsoft PC/Windows based global infrastructure that is very difficult to change. Change will have to come with demand from faculty and students. Looking at Microsoft tablet – but has limited apps. Apple has over 800 apps.
3	Can you describe any successes, large or small, with the use of iPads in the classroom?	Very successful in pilot programs. Proved to be very convenient for faculty and students. The like the all-in-on device. Has proven to be very good tool in education research.
4	Has your school established any guidelines or procedures for successful use of iPads in the classroom?	Pretty much "on your own" with limited guidelines. Limited network and looking to improve "density of network." Can currently support large density of devices. Looking to establish guidelines for wireless network.
5	Have you developed and conducted training classes for educating professors and staff on the benefits of using iPads?	Yes, much professional development has been undertaken and it has been well received. "I tunes U" embraced by faculty. Looking to get iPads in every classroom. 1 to 1 goal for faculty.
6	Have you conducted any pilot or test programs for use of iPads in the classrooms? If so, how successful were these?	Yes, pilots were used with limited rollouts to faculty and students. 10 faculty, 25 students; 25 faculty, 30 students. 3 iPad carts in use.
7	Have certain segments of your educational environment been targeted for iPad use? Do you feel certain educational areas or settings would be better than others for iPad use?	College of Education heavy iPad users. Arts and Sciences and music have shown interest. Major funding has been made available by College of Education and looking at additional funding sources. There is a student fee for use of iPads.
8	Do you have successful logical or situational models established for using iPads in the classroom?	No formal models in place for iPads in classroom. Looking at establishing best practices at the college. Qualitative data is being used in establishing guidelines.

9	Are iPad apps used in as part of the curriculum in any areas of the school? If so, where are they used most successfully?	Yes, in the special education area the iPads are part of the curriculum.
10	Do you believe that there are certain types of classes offered at your school that would benefit most from use of iPads?	Advanced master's level and postgraduate education can make the most use of the iPads. . Flexible. Use for people creating multimedia. Professional education use.
11	How do you gauge the pedagogical potential for use of iPads at your school?	Faculty and students in the College of Education who have used the iPad are very excited. Very well received and not happy if taken away. Faculty has "buzz' for the device. High potential in pedagogy, especially in literacy and use in the field. Excited for many useful apps.
12	Have teachers currently made good use of iPads and related apps in their pedagogy? If not, do you know of plans to do so?	Yes, absolutely. Faculty are keenly interested in apps available. The Support area is keeping an inventory of apps available for use. Helping faculty understand what apps are available and how they can help them. They don't know what they don't know.
13	Have iPads had an impact on the technology infrastructure at your school? If so, is there an effective model for the technology infrastructure needed to support iPad projects?	Not yet a big impact on the technology infrastructure at the university. The College of Education is trying to make an impact university-wide. Throwing money at it. It is anticipated that there will be impact.
14	If iPads are made available at your school, how are they being rolled out and controlled in your environment?	3 iPad carts are available for use. 24/7 student access if needed. Also offered on a class by class basis. Any faculty member who wants one will have one. Ongoing conversations with Apple are being held on how to best rollout.
15	Can you provide an estimate of the percentage of faculty using iPads in the classroom? For the ones who are using the iPad, do you know how they are using it?	80-90% used by faculty in College of Education. Offered to whoever wants one. Most are using it with some sort of professional development class.
16	Are iPads part of the long term vision and/or technology strategic plan for technology at your school?	No strategic plan is in place yet. Looking to build on positives and successes to influence more strategic visioning for the iPad. Voices of students and faculty will be heard.
17	How do you currently secure iPads and data contained on them	Each student signs agreement and will replace iPad if lost or damaged. Minimal accidental damage has occurred. They have proven to be very durable. "Find my iPad" app has been used to control and monitor use of iPads.

18	Is there support from school administration for use of the iPad technology in the classroom?	Trying to build through classroom successes. Driven by enthusiasm in use in the College of Education.
19	Have benchmark studies been performed with other higher education on successful use of iPads?	Benchmarks are being done with friends and connections with other colleges/universities. No formal benchmark studies.
20	Have you measured student attitude toward iPad use? Do you know if your students would be receptive to using this type of technology in the classroom?	Pre and post surveys are being used for faculty and students. Surveys have been very positive. Looking to use as competitive advantage in education marketplace to attract tech savvy students and faculty.

Technology Leader Summary – Case #3

#	Interview Questions	Response
1	How would you describe your school's receptiveness to integrating iPads in the curriculum?	Very receptive. Faculty is encouraged to take advantage of 35 grants that are available for innovative ideas such as iPad integration in the classroom. Grants range between $500-10,000. Proposals were submitted from various areas.
2	What are some of the challenges and implementation issues with using iPads at your school?	Fall 2012 was the 1st semester for roll-out of the iPads. The iPad was used in 30 classes and it was a challenge to do a lot of personal 1-on-1 support.
3	Can you describe any successes, large or small, with the use of iPads in the classroom?	The students readily embraced the iPads. Professors were able to find targeted apps that enhanced the learning experience, especially in Political Science as an election monitoring tool.
4	Has your school established any guidelines or procedures for successful use of iPads in the classroom?	Guidelines and procedures were used to a small extent. Students sign up for use and sign an agreement. Procedures were set up around the use of the iPad mobile cart.
5	Have you developed and conducted training classes for educating professors and staff on the benefits of using iPads?	Minimal training has been used for rollout to professors. Some 1-on-1 consultation with professors provided. Training mostly focused on how to select apps.
6	Have you conducted any pilot or test programs for use of iPads in the classrooms? If so, how successful were these?	IT Transformational Grants have been established to support iPad use in the classroom. Started with $110,000 in grants. Test programs were set up for the Fall 2012 semester.
7	Have certain segments of your educational environment been targeted for iPad use? Do you feel certain educational areas or settings would be better than others for iPad use?	No current niche is apparent at this time. Success in Political Science, Education, and Chemistry. A broad deployment approach was used for the initial semester.
8	Do you have successful logical or situational models established for using iPads in the classroom?	No established models currently. Models are new and developing. Models will be built and success and failures of each rollout. iPad cart model successful.
9	Are iPad apps used in as part of the curriculum in any areas of the school? If so, where are they used most successfully?	iBook author has been used to large extent in many of the classes. Instructors are still experimenting with certain apps.
10	Do you believe that there are certain types of classes offered	Broad spectrum of classes used the iPad in the Fall 2012 semester. It is still experimental at this stage to see if

	at your school that would benefit most from use of iPads?	certain types of classes would benefit most from iPad use.
11	How do you gauge the pedagogical potential for use of iPads at your school?	64 million dollar question. Hard to judge at this time. Initial results have been positive. Looking to make iPads more available and more feedback to determine pedagogical potential.
12	Have teachers currently made good use of iPads and related apps in their pedagogy? If not, do you know of plans to do so?	Yes. Most have put iPads to productive use. Embraced by self-motivated individuals. 5-10% of the people who have the vision for the device are on the leading edge. 90% are late adopters.
13	Have iPads had an impact on the technology infrastructure at your school? If so, is there an effective model for the technology infrastructure needed to support iPad projects?	Wireless infrastructure is already in place and supports iPad use. iPad TV and wireless video are in the plans and will add to the infrastructure.
14	If iPads are made available at your school, how are they being rolled out and controlled in your environment?	Students can sign up to use the iPad free for a semester. Advanced tracking mechanism in place at check out. iPad cart is available where iPads turned back in after class.
15	Can you provide an estimate of the percentage of faculty using iPads in the classroom? For the ones who are using the iPad, do you know how they are using it?	Approximately 5-10% of faculty are using it mostly for access to apps. Microsoft Surface is now a competitor. It has capabilities for USB port, advanced keyboard, and Windows 8 filing system.
16	Are iPads part of the long term vision and/or technology strategic plan for technology at your school?	No long term strategic plan in place. Instructors will drive extent of future deployment. Goal is to be responsive to faculty interests and for support in their teaching.
17	How do you currently secure iPads and data contained on them?	Security is not currently an issue. There is an application called “Find My App” which tracks where all iPads are. All iPads are registered.
18	Is there support from school administration for use of the iPad technology in the classroom?	They have support but constrained somewhat by funding. Looking at external sources and grant writer.
19	Have benchmark studies been performed with other higher education on successful use of iPads?	No specific consortium is known. There is a broader learning technology consortium. Benchmarks are considered ad hoc.
20	Have you measured student attitude toward iPad use? Do you know if your students would be receptive to using this type of technology in the classroom?	There are exit surveys that will be used but results have not been compiled yet for the Fall 2012 semester. Course evaluations will also be used for measurement.

Appendix D

INSTRUCTOR INTERVIEW SUMMARIES

Instructor Summary – Case #1 Instructor #1

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	He teaches basic "Law, Ethics, and Society" course. He also teaches advanced courses "When Law Goes Pop" and "Corporate America" electives. Yes, he has used it in "Corporate America" course in a digital storytelling project. Look at iPad to create a storyboard to construct a narrative or craft an argument. Must look at an argument from the verbal/conceptual level, the visual level, and auditory level. More powerful than a traditional essay.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, it was integrated in the "Corporate America" class as a successful tool for the students to do digital storytelling. Yes, met an unmet need. What interests him is "not simply the ability mimic what we are already doing, but rather the ability to transform what we are doing "
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	He did develop 2 formal policies. He had developed policies developed for "fair use" and for human subject research for the iPad digital storytelling projects. No policies related to the iPad specifically.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	One of the things he discovered with digital story telling training, there was an obvious engagement by the students when using the iPad. There was a love of the iPad. For the instructor, student engagement is a very important thing.

5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Yes, successful with qualifications. Project went well with storyboarding except for a few constraints. He noted that "iMovies" on the iPad was not as sophisticated as he would have hoped, editing-wise. Students wanted to go back and use "iMovies" on their laptops, because they could do more editing-wise. "iMovies" for iPad you can only do 2 or 3 transitions, while on the laptop you can do many more. They were often returning to their laptops.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Digital storytelling model is something professor developed and will be shared with others. With sharing he runs into some copyright considerations. Has put them on Google drives for other professors to use them, but not copy them. Looking at the iPad for a model for multiple framing which allows student to look at a subject from a variety of perspectives. Looks for iPads to promote the skill of multiple framing. Could add a whole new dimension that allows students to do something they have not done before.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	He was part of an iPad pilot program using his "Corporate America" course. This was part of a larger pilot program for 3 courses. Pilot was successful introducing him to the iPad for storytelling. Initially, it was communicated that the iPad was good for consuming content, but not creating content. iPads were given to the students for a semester with the option to purchase them at a discounted rate.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Yes. The students loved the iPad. The mobility, portability, and the number of apps available proved successful for professor and students. Students find it helpful for doing on-site interviews. Students liked the portability of the device for on-site interviews, and they used the picture and video creation capabilities.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, it has been integrated in the pedagogy and has improved the overall classroom experience. There is a difference between using the iPad for all the assignments in a course and for a special project. The question, pedagogically, is which approach is better? This question still requires exploration. The immersion

		approach has merit because it gets over students' fear of trying something new. Also, many believe the iPad works well for consuming content, not creating content. Professor does not "buy" this totally, as there is a lot that can be done for creating content within his pedagogy. Regarding teaching, he incorporated more visuals when teaching. Benefit to interpret and analyze images was huge, especially with business students.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Students used the iPad for traditional daily activities in the classroom, for note taking and term papers, for example. He sees the potential for iPads for delivering course materials and textbooks. The iPad was viewed as an add-on to traditional course as the course materials were delivered in a traditional way. Some students have downloaded textbooks electronically and are reading them from their iPads.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Used the "iMovie" app. Also used "Garage Band" which is used to create a musical soundtrack. Allows access to a number of instruments. Also used the "Photo Forge" app for creating images. He sees potential for more apps by individual professors. He found apps from Apple store and did searches. The instructional technologist also provided appropriate apps. He was provided Apple gift cards which he used to download apps for experimental purposes. The opportunity to experiment and play with apps is very important.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	He sees great potential for the iPads in the Liberal Arts setting. He especially sees a lot of potential for the iPads in digital storytelling and on site interviewing. There is still a question in his mind regarding what is better pedagogically, to use the Pad for all the assignments in a course or only for special projects.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	The infrastructure is very good. There is immediate support for what he is trying to do with iPads. The college uses the embedded instructional technologist approach where they assign one instructional technologist to support the professors' use of the iPad. He had the chance to experiment in an independent study format with a technologist. That was helpful. The eLearning lab is excellent, but other classrooms could potentially be enhanced to enable use of more advanced

		technologies.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	Standard apps were delivered to the students on the iPad. Other apps were recommended to the students that they could download themselves. There was not a large amount of bulk purchasing of apps. Originally tried to use Real Player for getting videos from the Internet, but ended up using Wondershare to do this task. He believes the licensing question should be explored by the college.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	The iPads are given out individually. Students were encouraged to secure their own iPads. The students had to sign an agreement, but if damage was not malicious, the college would replace the iPad.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Excellent tech support. Greater coordination between tech group and library personnel could be investigated. The challenge regarding balancing engagement with depth was noted for students. Can be so much fun that he must make sure that the students focus on their research or project, for example. You have to be sure that students are bringing the traditional requirements of a term paper, for example, to this new medium. If video editing capabilities of the iPad were better, that would help a great deal. That was proven to be a real challenge. He found it easy to use the keyboard.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	The embedded technologist program was great training. Any assignment or project was done by the professor first to find out what problems are run into. This training is done before it the assignment or project is used in class with the students. He is very receptive to training. Will be a part of a blended learning workshop.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	He feels the college as a whole supports and promotes the use of iPads in the classroom. Liberal Arts colleges have not traditionally been in the forefront of newer technologies. Not interested in teaching large number of students more efficiently. He is particularly interested in the transformational potential of the iPad in the classroom.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	Not aware of any formal strategic plans. His experience was very project focused for a specific goal.

20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	There is a lot of online material on the Internet for how others are using the iPad. The college technology area is developing a website to share information with others. Informal networks are used to share information. Social media is not used. He sees technology as extending the traditional methods of classroom instruction that he would be willing to share with others. Proponent of a blended learning approach.

Instructor Summary – Case #1 Instructor #2

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Instructor primarily teaches Spanish courses, but has taught Introduction to Linguistics, and Grammar courses. These are courses not directly linked to the major and minors in the curriculum. Yes, she is interested in integrating the iPad more into her classroom. She believes that teachers must think about new paradigms for teaching to engage students, using available technologies.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, she feels that the integration of the iPad as a tool can benefit herself and her students, but should not be perceived as a be all and end all. Some make mistake in thinking that there is "an app for that." How do we shift to the device and use it for something she was not able to do? The iPad is much less "clunky" and takes up less desk space for the student. Her goal was to transition to an iPad environment for everyday use by her and her students. A note taking app called "Notability" met a need and was selected to help students to transition away from paper. It allowed the students to write very simply. Used "iPoll" which allowed for polling anywhere and assess attitudes in students. Students used recording device for fieldwork. "iRecord" used as a standard app for recording during class.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	She has not yet developed formal guidelines and policies for using iPads in her classes. She used the iPad in her pilot class but does not have access the iPads for her students going forward.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	She feels like the laptop is relatively big and bulky and feels that some students may be perceived as hiding behind the laptop, where the iPad is smaller and encourages more engagement and interaction. It is hard to multitask because you cannot keep two app windows open at the same time. Had to accept that students may check other personal stuff on their iPad in class. She would prefer the iPad because of its low profile.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	The most successful part of using the iPad was that she felt the students were more engaged in her class. The students were impressed that the college invested in them by giving them the iPad and they were going to take advantage of it.

		She used the iPad to give quick quizzes online so that students got used to using the iPad right away. Within 2 weeks of the class the students knew what to expect. She put everything on the syllabus for the students to access from the iPad.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Must think about new paradigms for teaching, using available technologies. She has not developed models because there was no follow-up class after her pilot. Students did not have access to the iPads going forward. Problem that pilots are not followed up on. There won't be a good model unless there is follow-up and access to the iPads is available to all students their daily activities.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	She was part of the college's pilot iPad program two years ago. She was part of a pilot program using iPads in her Socio-Linguistics course. The iPads were provided to all the students in the class for the semester. The iPads were deployed for use in daily course activities. They were allowed to take them with them and were encouraged to use them. A series of surveys and focus groups were done with the students and they felt the iPad enhanced their educational experience by providing better access to information and additional tools (apps) to improve their engagement and learning. Students were able to purchase the iPad at a discount at the end of the semester, and many did.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Students generally were very excited and positive about use of the iPad. The liked the portability and found ways to integrate them into their day to day activities.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, it has improved the overall classroom experience and would like to use the iPad in her pedagogy. The iPad allowed the professor to rethink her pedagogy. The focus should not be about the machine, but on good teaching. Teacher had to think about what she can do with the device that she could not do before. She used it do update documentation for class using the "Keynote" app that student could get access to right away. She was a big supporter of using the stylist for the iPad which facilitated transition to the device. The biggest difference in teaching with the iPad is that she was able to switch to a digital format. Enabled her to think about how else she could use the tool in her classes. It provided a benefit of recording audio and video quickly, for example, and this capability could be used as by herself and her students as part

		of class. Allows her to a lot of things "on the fly." The immediacy of accessing information on the web is a big plus. Allows her to apply her ideas quickly.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Enabled herself and her students the ability to access course materials quickly online and other applicable websites. Allowed students to "mark-up" their documentation and bring it to class. Students accessed the LMS "Blackboard" system to access quizzes.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	The "Notability" app is the most useful for her class for note taking and recording. Can be used to "mark-up pdf files. Seen as a good writing tool. She used the "go-doc" app to share documents. She used the standard video recording and picture taking apps that come with the iPad. Used the "Slideshark" app for presentation purposes. She could not use PowerPoint. She likes "keynote" for presentations.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	Success for her is in how the students are reacting to the activity they are doing. Students are engaged and having fun with the iPad. The energy level was high using iPad in her class and she then knew that it is working for her. She believes that students now are learning in different ways and we should not neglect the new technology out there to better engage the students.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	There are pockets in the campus where wireless access was slow. Sometimes slow for quizzes. She had an educational technologist assigned to her for support in using the iPads. The technologist helped her find some of the apps. She was able to tap into the existing file sharing infrastructure at the college. Materials could be pulled from the college's file sharing system to the iPad. The students liked this capability. The professor used this capability to access files for committee work. She says that some classrooms could have better wireless capabilities.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	Delivered with basic apps. Also delivered students with "Go-docs, "Notability", and "Harbormaster" apps. Students were able to download other apps and took the responsibility of obtaining other apps for their needs. Students became invested in them because they had them personally. Students were able to share stories of how they were using the apps.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support	She does not have access to iPad carts. She believes that the students should have the personal "ownership" of the iPad to

	security of the iPads?	fully utilize its potential day to day. When they take it home they get comfortable with it. 80% of students got covers for the iPad. Some students obtained keyboards.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	The biggest challenge is that all of her students do not have access to the iPads for classes. She can't tell the students that they have to purchase an iPad. The iPad could not use the "Flash" software which proved to be a constraint, at times. Keyboarding can be a challenged. The professor has an external keyboard to use for typing. Professor would never write a paper on the iPad unless she was desperate. The IOS software is not always compatible with other web based applications such as Flash. Sometimes she could not play video from the web. She knows of "airplay" that be used for walking around the classroom and displaying on the screen, but she is aware of some challenges with that.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	No formal training classes were offered. Students did a pre-questionnaire so the professor had a baseline to start with for her students. They had a pre and post attitude assessment for the students and teachers. Professor was pretty much self-taught and students were able to learn how to use the device on their own. Formal training sessions would not help. This generation of students likes to experiment on their own with technology. Apple products are self-explanatory, for the most part. She would not be receptive to formal training.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	She feels the college is agnostic toward the use of the iPad in the classroom. Not enough thinking at the college level about the learning environments with the newer technologies such as the iPad.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	There is no long term strategic plan for the college regarding the iPad. Planning would be helpful at the college level for putting forth a roadmap for newer learning environments. There has to be a plan for accessing information at the higher level of the college.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	She uses the Internet for finding out what others are doing. The first step is finding out what others are doing digitally, versus what they used to do on paper. Has an interest in what others are doing with images to help their students learn, versus just using text.

Instructor Summary – Case #1 Instructor #3

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Professor currently teaches General Chemistry and Inorganic Chemistry. Taught an elective called The Chemistry of Solar Energy Conversion. She is planning to teach Material Chemistry. Yes, used iPad for presenting things in class. For example, she would use a PowerPoint which she can mark up. Uses the iPad for preparing course materials. Will narrate a solution to a problem on the iPad as she is writing it in class. Posted movies that she generated using the iPad. Would like students to do this, but does not have the ability for all the students to use iPads in class.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, it would be a benefit if resources were there to provide iPads to students. Overall, it has been a benefit to present things in class with real-time problem solving and mark-up. Meets the same need a transparency projector would, but it provides the ability to present in a nicer format on an easy to use, portable device, to use for mark-ups. This is the most important need that it has served.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	Students have not used the iPads to a large extent. iPads were passed around in class, but students found them cumbersome to use at first. Students would need familiarity built up before they should use the iPad in class. A general pool of iPads is not currently easily accessible by the professor. She would use the iPads for her students if they were more readily available. Would fill niches, if available.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	The iPad and the laptop would do different things. iPad used to present for mark-up and projection. For plain PowerPoint slides the laptop works well. Laptops provide more dependable projection. More specialty programs are available for the laptop. Specialty programs not always available on the iPad because may be computationally extensive. The projection from iPad not as dependable.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why	Yes, successful for real-time mark-ups and would use it

	it was successful?	in a similar fashion in the future.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	The presentation and interactive model is something that could be used in future class and shared.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Professor was not part of a pilot program. She would consider being part of a pilot program if it served the goals of her classes. The fear of technology is that it can be disruptive if it is cumbersome.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Students seem to like how the professor was using the iPad, but it was hard to gauge whether they would have a positive attitude towards using it themselves in class. They seem, surprisingly, to be not as good with technology as you would think.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Incrementally, the classroom experience has been improved by using the iPad in certain Chemistry lectures. When the technology fails, it can be distracting to the professor and her students. iPad will occasionally crash. Sometimes apps crash and sometimes wireless programs don't perform well. More reliable to hook laptop up to VGA cable. Teaching has not changed significantly.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Professor uses the iPad all the time for her daily activities. Her students do not. Professor types all her lecture notes on the iPad. She also has all of her scientific literature on the iPad. She reads from the iPad. When she prepares notes and develops solutions to problems, she does it on her iPad. Finds keyboarding and typing to be restrictive on the iPad. Uses MS word on her laptop.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Apps used include: "Dropbox" for sharing files, "2screen" used as good projecting app. It allows for importing and displaying pdf files. Can project from an iPad to the laptop which then projects to the screen. 6-month app hooks to Google calendar and enables calendar sharing in one source. Nice way of visualizing schedule. "Notes Plus" is her favorite app for note-taking using for preparing solutions. Will try for in class note-taking. Used the "Notability" app which has been a nice note-taking tool. "Vittle" is a good video app that she uses for taking videos for class. She mostly explored the use of these apps herself. She also grades

		lab reports on the iPad.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	iPad will be useful but not completely transforming her classes. It is a helpful tool. She needs to test it in a future class to see if she can fully integrate it in taking notes and showing visuals. Could eliminate using PowerPoint and notes on the board. She is holding back judgment on fully integrating the iPad.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	Getting help in using the iPad from the IT people is good. They go above and beyond what is required. Recently mirroring software from iPad to the laptop was recently set up for her. Widespread use of iPad is not currently supported in existing infrastructure. The wireless capabilities are sufficient as they were upgraded in the last few years.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	Sometimes iPads are shared with students and they are configured by the professor.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	Professor just uses the iPad for herself for class, primarily. It is the professor's personal iPad. There is some grant money that could be used by professors to purchase the iPads, if needed. Professors would need to ask permission to buy iPad with grant money.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Connectivity and connecting to servers can sometimes be a challenge. There are challenges with projection, because of newer technology. Crashing is more common with iPad than with the laptop. Can crash at various points, but when trying to project it can be a challenge.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	IT provided a learner to use. She found it to be intuitive if you understand technology. No formal training was taken. Be willing to take training on finding out the things the iPad can do for her in class. Not willing to invest a lot of time currently for training classes.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	The college has not promoted the use of the iPad, but it has not hindered her use in targeted situations. IT staff have helped her for everything she needed. It is up to the individual professor. Monthly sessions are offered for lunch meetings. Resources are there if needed.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see	Is not aware of any strategic plans for the iPad. For her

	addressed in your school's technology plan regarding iPad use?	personal use, there is nothing the college could do to enhance it further. If she were to use more in her classes, she would want her students to have consistent access to the iPads. She needs to explore future expansion on use off iPad. Students have to have consistent and reliable access and usage.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	She explores use of apps on her own and touches base with her colleagues. Very informal networks are currently in place for sharing.

Instructor Summary – Case #2 Instructor #1

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Instructor is currently teaching reading, writing and educational technology classes. He is a strong advocate of using iPads in the classroom. Very receptive to the idea of integrating iPads into the curriculum because the impact it can have on his teaching and to his students. Sees the iPad technology as transformative relating to his pedagogy.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, he believes iPads and related apps can provide significant benefits to teachers and students. Some of the major benefits of the iPad include its flexibility, mobility, access to "new worlds" and instant access to educational materials. The iPad fulfilled an unmet need by providing a multi-modal learning environment. It has specifically provided easy access to apps that have been used by students for creating digital video, pictures, and to obtain timely information. Students have embraced the iPad for its portability and ability to access a variety of useful apps. The iPad has provided new unanticipated opportunities by its ability to tap into a wide range of apps for content and other practical apps in a single, seamless learning platform.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	No formal guidelines or policies have been developed for students' use of the iPad. An open classroom approach has been used with no formal rules. A personal approach was employed and students were encouraged to explore different apps to find ways the iPad can help them in the educational experience. The iPad was used by the instructor to evaluate and study his existing pedagogy, spurring exploration and research.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	The distinguishing features of the iPad, compared to other technology devices, include its mobility, portability, seamless platform, and easy access to a wide range of apps. One of its limitations was the lack of a good keyboard for typing. Other limitations include word processing, storage, and access to certain systems, such as the university's learning management system Because of these limitations, the instructor would be

		more inclined to use a laptop for instructional purposes, especially with writing courses.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Yes, the iPad was used successfully in the classroom designing lesson plans for literacy classes. It was used by students to access movie trailers, create videos, and for digital file sharing. Students demonstrated increased motivation when given the freedom to use the iPad for a variety of educational purposes. It was a success in the classroom to the point where students were reluctant to give up their iPad after the semester. It was embraced as an all-in-one seamless educational technology tool.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	The instructor has no formal models currently in place for using the iPad in the classroom. Students have been provided the freedom to explore apps and use the ones most appropriate for them. A few apps have proved to be particularly useful for students for their classwork. These include "iMovie", "Pages", and "Keynotes". Use of iPads is still in the exploratory stage. Over time it is hoped that certain models will be developed by the instructor after a full understanding of apps and their capabilities to enhance learning. Use of iPads is still in the exploratory stage. The existing Samer model has been used as a guide by the instructor.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Yes. Participated as a principal investigator on pilot and test programs that explored the use of iPads for reading comprehension. In 2 pilot programs he participated as the instructor. The pilots proved successful in launching the expansion of use of iPads in the College of Education. The iPads were deployed for accessing textbooks and for reading and comprehension exercises in his classes. The pilots were used to evaluate where the iPads could be used to provide the most benefit in the pedagogy. Gaps were identified.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Definitely. Students liked the portability of the device and the increased ability to access a wide variety of resources for communication and sharing of information. Student evaluations were very positive regarding iPad use in the classroom. Students' use of the iPad is "refreshing" as they fully embraced the device as a part of their overall classroom learning experience.

9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, the iPad and use of related apps have enriched the instructor's pedagogy and his overall classroom teaching experience. He was able to connect better and have improved interaction with students, especially on one-on-one basis. He has used the iPad to show digital content and for its communication capabilities. One app cited to be particular useful was "iMovie".
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	The instructor used the iPad to deliver the textbook, course syllabus, course content, and assignments. The students used the iPad to access course materials for document sharing, note taking, taking photos, creating videos, and access to useful apps for content. The instructor described the use of the iPad in his class room as "open-ended."
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Yes, iPad apps were used as a major part of the pedagogy. iPads were used to access textbooks. "iMovie", "Pages", and "Keynotes" were found to be particularly useful for students. There were no dictated apps to be used going into a class. It was a process of open discovery and sharing of ideas by teacher and students. Specific apps were chosen by students based on individual project or assignment. Students were provided $25 credit to buy appropriate apps for their use in class.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	Use of the iPad was described as "totally refreshing" to the instructor's teaching methods and was seen as having great potential to enhancing overall pedagogy. The iPad provides a new way of thinking about teaching methods. Teaching with the iPad was described as "authentic" and facilitated "real learning."
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	The university does a good job of supporting the iPad, in general. It provides good support for mobile technologies. The College of Education provides access to the iPads and promotes and supports their use in the class. While the university as whole is still primarily PC based, it is moving toward an acceptance of Apple technology and devices. The use the iPad is not seen as requiring a lot of support. The iPad is seen as intuitive to use. Areas where university might improve are in providing more bandwidth and possibly installing towers for better and more consistent connectivity of the

		iPad device.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	iPads are "clean" when delivered to students and there is no special configuration performed. Students have the ability to install apps using a $25 credit. Apps are not bulk purchased for the students.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	iPad carts are available to secure iPads. iPads are password protected and students are allowed to take possession and take them home for the semester. Students are responsible for the iPad and insurance is taken out by the university for any damages incurred.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	There are still some naysayers at the university regarding Apple products. This can present a challenge, but can be overcome by providing research data and results of surveys and course evaluations. The bottom line is showing return on investment and providing evidence of success for wider use and support at the university level.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	There are some training and professional development classes available in the College of Education. The instructor is for the most part self-taught. Some of the training and support by Apple Corporation is taken advantage of, where appropriate. Most training is informal and experiences with the iPad are shared among colleagues. The instructor provides some training on use of the iPad, but it is not formal.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	Each college in the university is different regarding its use of technology. The College of Education definitely promotes the use of the iPad in its coursework. There are more potential uses of the iPad that could be promoted, and this should evolve over time.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	No. There is no strategic plan at the university or College of Education level. Use of the iPad is currently driven by the teachers. Policies and plans at the university level to buy more iPads for use would be a boost for teachers and most likely be seen as favorable by students, based on their experience. Use of iPads could be perceived by some administrators as a competitive advantage for the university.

20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	Review of existing research is undertaken to keep up to date with the iPad technology and its use in education. Ideas and successful experiences are shared using Twitter and other social networking sites.

Instructor Summary – Case #2 Instructor #2

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Teaches the undergraduate Introduction to Technology class in the College of Education. Also teaches Assessments and Research Methods. The Research Methods class is graduate level and he teaches and online and hybrid class. Works with prospective teachers at the college. Teaches how to use iPads as part of the Intro to Tech class. Has gotten involved with mobile pedagogy in the last 5 years with other colleagues in the College of Education. Yes, interested in integrating into classes. He has not integrated iPad in the class as much as he would have liked. He has integrated the iPad into his Introduction to Technology class.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	For the Assessment class, would like to use it as an assessment tool. He uses the iPad as a grading tool. The app is the D2L grading tool. Teaches how to use the iPad in the Introduction to Technology class. He is having students download apps and present them to the class. Yes, the previously unmet need is the mobile aspect of the iPad. The immediacy of grading, for example, is a great benefit. He has not yet fully used the potential of the iPad and has not created new opportunities yet.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	No formal policies or guidelines have been developed yet.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	His biggest concern or barrier for using the iPad more extensively is the limitation with keyboarding. The strength of iPad over the laptop is to use for mobile grading. It takes more time to experiment with new technology such as the iPad. Data collection is something he foresees using the iPad more for, especially in his research methods class.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	The biggest success was using the iPad for its mobility and the ability to facilitate grading in his classes.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Has not developed formal models yet for his classes. Currently learning full capabilities of the iPad.

7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	He was not involved in pilot projects rolled out in the last 2 years. Based on observation, professors are using for personal purposes and the challenge is to get them using it more in their classrooms. He recommends incentives and support groups to promote the use of iPads by professors. Professors need more of a comfort level with the iPad device. Professors not yet comfortable with current technology. Professors recognize risk of new technology failing and not doing well in student evaluations.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Uses an iPad cart which provides access to iPads to students and professors. Students are receptive to the iPads. They are very tech savvy. Students worked well in groups to learn and use iPad. Students in 3 credit class are not education majors, but students in 1 credit class are. Students used the iPad to show teacher alternative ways of using iPad, for basic use. He needs to talk to students more on what specific apps they are using.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	It has improved the overall classroom experience for the professor in how he grades. He has not fully in integrated the iPad in his teaching yet, but would like to in the future
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	He or his students do not use iPads or related apps for daily activities in the classroom.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	He has not used apps in his pedagogy, currently.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	He believes he could never put everything on the iPad and use the whole instruction with the iPad. He sees use of the iPad as a supplement in his classes. The idea of doing research by collecting data would be good. He would use it to evaluate group work activities. Sees it used more as an assessment tool. He relies on laptop to do projections, but if iPad had better keyboarding he could see using the iPad more. Uses iPad for mobility and access Internet and for presentation purposes. He would like to write a book regarding struggles with first year teachers to assess students. He wants to publish this book. Publishing on iPad would be a great benefit. iPad would be perfect venue for this.

13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	Yes, university supports the use of iPads, but the College of Education is far more advanced in iPad use than other areas of the university. The university was trying to get contract for clickers (response devices). College of Education is using the way to use iPads for this purpose. Does not see the university as a whole supporting the iPads in the way the College of Education is. A lot of support in the College of Education. "Smartboard" has response devices for students' immediate feedback. iPad could do the same. Could use for attitude measurements and answers to specific questions.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	iPads have a standard configuration of common apps when given to students. They can download other apps but cannot delete apps. The university buys the standard apps. Students have to present on the iPad. Apps include: "Mindmeister", "Comic Life", "Notability", "Screen Chomp", "Puppet Pals", "Dictation", "Pen Ultimate", "Pages" (word processor), "Numbers" (spreadsheet), "Keynote" (presentation), "iMovie", and "Mouse" (problem solving).
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	The iPads are secured on the iPad cart in a locked room in the Technology Center. Students are not allowed to take the iPads home.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Obstacles include non-incentives for iPad use. With the laptop it is easier to download applications for use, but the iPad is getting better by providing access to fee apps. The keyboarding a big obstacle. Time to learn the iPad is an obstacle to fully utilizing it.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	He has attended training workshops in the Technology Center. He is mostly self-taught, which is his style. He is receptive to attending future classes.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	The College of Education fully promotes use of iPads, but not a priority at the university level. "Smartboards" and projection systems are a higher priority. University does not discourage use of iPads, but it is not a high priority. Almost all classes have Smartboards.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad	Not aware of any strategic plan for using the iPad at the university level. The College of Education Tech Center is fully engaged in use of iPads in the classrooms. Not

	use?	aware of any written developed plan.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	3 years ago there were user groups put together for use of mobile pedagogy. A group was developed to purchase a variety of mobile devices. Developed an incentive program for use in classroom. There was a professor user group developed. Currently no support group is in place. Not using social media currently.

Instructor Summary – Case #2 Instructor #3

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Currently teaches Stewardship & Civic Engagement and Peer Assisted Learning classes. Manages the University Tutoring Center. Also will teach some writing courses. Yes, receptive to using the iPad in classes.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, quicker to give iPads to students to obtain content. The iPads are pre-loaded with apps needed. Easier to use in small group-work to look up information. Major benefit is to look up content for classes quickly. Yes, met an unmet need. Faster now to have students use tablet technology in class vs. going to a computer lab. For writing classes or peer-assisted learning, they are able use for real-time application. The immediacy and portability is key benefit for iPad.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	No formal guidelines and policies now. Used informally. Teachers have to "sign-out" for the iPads. There are policies that they have to be returned after the session. Apps cannot be downloaded by students. Apps are controlled and downloaded by IT representatives. Certain apps are requested by instructor to be downloaded by technical staff.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	iPads are more visual. Laptops are used if more typing is involved. iPad not used for extensive research. iPads used for quick and immediate research. Laptops are less portable, so it is easier to use the iPads. Would see using a lighter laptop which could do the same thing as the iPad. Tutors can do more hands-on activity and more engaged with the device.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Yes, used the iPad for mid-semester and end-of -semester evaluations. Also used for the available Chemistry and Biology apps. Students are using iPads to write proposals for non-profit organizations to obtain iPads for use. Major success factor would be able to get information a lot faster. Do not have to send students away to a computer lab and return. Get immediate knowledge on iPad. Helps students prepare for small projects.

6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Models for assessments are being developed, but nothing formalized as of yet. The university is moving towards more formalized models for using technology. If all students were issued an iPad, it would make things easier for everybody and standard models could more easily be developed.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Wrote a grant proposal for iPads, but university would not purchase them outright. The instructor developed her own pilot with iPads lent to her by the university. The pilot was successful in her view.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Students like the portability of the iPad device. Tutors sometimes rebelled initially, but were more receptive when they saw more and more student tutors using the iPad. In classroom, iPad technology is provided and students are generally receptive.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, it has improved the overall classroom experience. Improved the experience for the kinesthetic learner as it keeps them more engaged. The visual learner can use to engage visually. Different types of learners can use one tool. Teacher can lose some learners with straight lecture format. iPads are especially good for small group work.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Used the iPad to do a Ben Franklin proposal. Students were able to look through 225 grant proposals and choose the ones that came to the top and design PowerPoint presentations to give to their group. The presentation was done on the iPad and presented on the screen using a laptop in the room.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Instructor will select apps and get recommendations from tutors who work in the tutor center. Instructor selects apps and sends list to IT to approve and install on the iPads. University will not allow apps to be downloaded by instructors or students.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	Using the iPad 2's now. Would like a more updated version to do more with, such as connecting with the iPhones and Internet. Would like to have more connectivity with the iPads. It would improve overall teaching experience. New ideas are obtained from ongoing committee meetings.

13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	Verbally, the university supports the current infrastructure for the iPad. Each room does not have the same technological infrastructure to connect and upload. A standard set-up would be helpful for classrooms. Technology does not always work, wired and wireless, when teachers go into the classroom for class. The university is pushing each classroom to be similar relating to technology.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	Yes, a list of requested apps is given to IT area to configure on the iPads for class. Library and IT will bulk purchase a lot of apps and teachers will request specific apps for their classes. Instructors generally look up free apps to use for their class. Instructor has not had to buy any apps so far.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	The iPads are returned to an iPad cart and secured in a locked cabinet after class is completed. Any damages to iPads will be covered by IT. They will either fix or replace the iPads. Students are not responsible for damaged iPads.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Class size can be a big issue for using the iPads. There are not enough iPads to go around for a big class. It would be helpful to have iPads available to everyone in a larger class. iPads are currently used for only small group work, not individual work. Not enough funding for all students to have an iPad for them to take wherever they want.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	Introductory training for iPad use was provided at the university level. Mostly, the instructor was able to learn how to use the iPad on her own. She would be interested in taking more in-depth classes on how the iPad can be used.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	Yes, the university supports and promotes technology, in general. Try to show uses of technology and a technology recap conference at the end of the school year. At that time, they will run a session on iPads.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	Technology plan at the university is in place and is continuing to be refined. Plan for iPads is at the beginning stages. Technology plan is not widely disseminated. The instructor takes the initiative to use the iPads. Technology use, such as the iPad, generally is

		initiated from the bottom up. There is the distance learning center where an instructor can write up a grant proposal to secure use of iPads. In that respect, the university supports the use of newer technology, such as the iPad.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	Informal networks are used to share information. More formal sharing forums would be at both internal and external technology conferences. Online social networks not used to a large extent. There may be useful ways of using social networks in the future.

Instructor Summary – Case #3 Instructor #1

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Currently teaching Literacy and Educational Technology courses. Focused on the integration of technology into the curriculum. Very supportive of integrating iPads into curriculum and classroom. Strong proponent of using iPad apps for creating multi-modal environment for enhanced learning. Portability of iPads is a key benefit.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Yes, iPads and related apps provide a huge benefit in the classroom. Students embrace the iPad for its portability and ability to access a variety of useful apps. The iPad, with its related apps, provides a previously unmet need by creating a technology based multi-modal learning environment. iPads provide new unanticipated opportunities by providing the ability to tap into a wide range of apps for content, productivity, and presentation purposes.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	Students were provided with the iPads for a semester as a result of an approved grant. Students had to agree to general use and return policies. “How to” handbooks were developed for the students for learning how to use the content provided in the iPad apps. The technical use of the iPad was covered in another class by another instructor.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	Four distinguishing features of the iPad are: portability, rich set of apps, accessibility, and the ability to easily share information. The iPad apps provide the capability for differentiated instruction based on skill level. The “Show me” app is an example of a useful app that provides for enhanced interactive hands-on learning in the classroom with the iPad.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Yes, the iPad was used successfully in designing lesson plans in Literacy classes. It was demonstrated how iPad apps, such as “Show Me,” can be used to enhance reading and writing skills in students. The introduction of apps as an important tool for teaching literacy was well received by students.

6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	A successful model for teachers starts with obtaining a clear understanding of the iPad device and its apps and what impact apps can have on teaching. A full understanding of apps and their capability to enhance content delivery, productivity, and presentation is critical.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Yes. Participated in a pilot program during the spring 2013 semester. The pilot was very successful as student evaluations were very high for the Literacy class that used the iPad apps. All students were provided iPads free for the semester as the result of a university grant. They were also provided with a $25 gift card to purchase apps that they used in class.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	The iPads were well received by students and they enjoyed using them for the semester. The following are examples of how they were used. Students used them for developing lesson plans and presentations, accessing educational content, and using "iMovie" to develop educational videos and movies. iPads were also used in everyday activities such as note taking, accessing course materials and sharing information and documents.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, iPads were used for delivering course content. A keen focus was also on the use of a wide range of apps that are made available on the iPad. The wide range of available apps enhanced teaching by creating a multi-modal classroom environment.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	The instructor used the iPad to deliver the course syllabus, course content, and assignments. It was also used to demonstrate how to use apps for content, productivity and presentation. It was sometimes used at the start of class for a warm-up activity. Students used the iPad to access course materials, for document sharing, note taking, and access to useful apps used in class.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Yes, iPad apps were used as a major part of the pedagogy. Some of the apps that were found to be the most useful were Inspiration, "Show Me", "iMovies", "Poplet", "Pages", "Notability", and "Airplay". Finding apps is a continuous process of discovery. Sharing ideas for utilizing apps is sometimes done among colleagues.

		The iPad also has a search capability find useful apps.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	The iPad has great potential for improving teaching in the 21st century by providing the teacher with multi-modal capabilities for instruction. The iPad has been seen to provide a great benefit in teaching reading and writing skills in Literacy classes for pre-service teachers.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	With the iPad grant program at the university, the ability to access iPads for instruction has been greatly increased. The university has also provided a technology enhanced classroom set up specifically for instruction using state of the art technologies. Secure iPad carts are also available to allow access to iPads in the classroom. The School of Education has some limitations on its wireless capabilities. Some effects on instruction have become apparent when using iPad apps such as “Reflector” and “Airplay” to display and project material and images on larger classroom screens.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	iPads are "clean” when delivered to students and not configured specifically for any class. iPads are returned “clean” after the semester. Students have the ability to install apps with an iPad account set up for them. Each student has a $25 gift card to purchase apps for class.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	There is an iPad cart available and security software is installed by the university level to track location of iPads. No security is set up for data on the iPads. Students were allowed to take possession of iPad for the whole semester and were responsible for any damages.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	iPads are not required for all students to use for classes. iPads are available to teachers though a university educational grant program and are then distributed to students for use during the semester. The education grant was applied for and accepted for the instructor.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	The university has some training classes available, but the instructor did not use them for learning how to use the iPad. Apple training was used for learning. For the most part, the instructor was self-taught. The instructor does not foresee using university based training at this time.

18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	The university promotes use of pads in the classroom with its Grants program for which any teacher may apply. The School of Education does not specifically promote use of technology, such as iPads for use in the classroom. The initiative is taken by teachers who look to utilize existing technologies to improve their instruction. More incentives at the university and college levels could be beneficial for promotion of the iPad technology for wider deployment and use.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	No. There is no awareness of any strategic plan at the university or School of Education level. Planning and support for iPads and the associated technology infrastructure would be beneficial to teachers.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	Extensive review of existing research is undertaken to keep up to date on how other teachers are using the iPad. Ideas are shared among educational technology faculty.

Instructor Summary – Case #3 Instructor #2

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Currently teaching general Chemistry for Biology and Engineering majors in honors program. Yes, very receptive to using iPads for lab work. Wrote a grant for funding iPads and Labquest2 in Fall 2012. Using iPad for over a year. 10 iPads and 10 Labquest2 probe interfaces and an airport that allows all to communicate wirelessly.
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Under the view that iPads are not too unique or special. Just another technology tool that is available. Pros and cons. iPads used as lab notebooks. Currently have a limited use. Students keep a record of what they are doing and take pictures of what they are seeing, email themselves notebook entries. Was hard for TA to get around and inspect paper notebooks. Notebook could be legal document. Training someone to keep thorough notebook. Can do this with an iPad. Can carry them around, insert pictures. Use "Evernote" as note taking app. Has made the lab note booking part of the class a lot stronger. Met a poorly met need.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	Works with honor students. No need to be authoritarian with use of iPads. Uses keyboard for use of iPads. Informal guidelines for using iPads.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	iPads are easy to carry in lab. Vernier makes computer driven probes for science classes attached to laptops. iPads now used for Vernier labquest2 providing more bench space and allowing easy picture taking. App to communicate between labquest2 and iPad not very robust. iPad not used for this purpose. iPads used for lab book entries when collecting data. Ok, it would have been difficult to go back and forth between data collection app and notebook app.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Was successful in using iPad for lab notebook. 1st semester problem with Evernote not syncing correctly. Needed dedicated iPad. Each group was assigned an iPad
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Have shared model with ISE lab – Interdisciplinary

		Science Education laboratory. She demonstrated model for them.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Yes, Fall 2012 pilot program. Wrote grant for use in the ISE labs pilot program. Chemistry class was the pilot class for using iPads.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Mixed attitude. 50/50 apple vs. PC. For notebook, relative to using a paper notebook, students like the iPad much better. Like it for taking pictures on iPad. More positive than negative view of the iPad.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	For limited use, good. Used "Doceri" app, to control any program on laptop. Limitations because room has limited wireless access. "Doceri" could not be used. It needs a strong connection. iPads have limited ability to run animations. iPads have major limitations in not being able to run Java based programs. Always using laptop in instruction, much better.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Installed other apps. Periodic tables, molecular modeling apps. Class focused on lab skills. Did not use additional apps. These apps would be more suitable for general intro to Chemistry class. Would use iPad more for lower level class. Not used in daily classroom activities.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Has just used the Evernote app at this point in time. It was most beneficial at this time. She tried "Doceri" but it was not as useful.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	Dependent on the robustness of the app so we can use the Vernier probe ware. Use will remain limited in the short term. She may convert labs to iPads if the Vernier probe ware can be used. Easier at the moment to use laptop for instruction. Look at iPad as an additional tool for a limited purpose in labs. Course materials are delivered through web based course management system - Canvas LMS system. This is accessed from any device.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	Wireless capabilities are there but the strength of connectivity depends on the classroom you are using. If good wireless connectivity, then "Doceri" can be used. . If possible to put good router in room, good to go. The problem at the university is that the rate at which

		devices are connected to routers doubles quickly. Overload of devices is making system slow.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	The iPads already configured by IT person with standard apps, including Evernote. Airport that device speaks to is plugged into the Ethernet. All of the iPads have to be imaged one by one and are not configured by the students. Directs iPad to an IP address which has the standard configuration of the iPads. Students are not allowed to download other apps. Prefer if more safeguards on personal information. Leaving it open to students has drawbacks. Would like it more "clamped down."
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	iPads are secured in a locked cabinet. They are "clamped down" through the Airport that restricts them to certain websites. With the use of Airport, students can't get to Twitter, Facebook, email, etc.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Not able to use labquest2 on iPad. Wireless capabilities were a challenge. Get past wireless issue by having a dedicated router.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	Went to one training class when she purchased iPad on her own. This trained on basics. Had discussions with IT people.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	The university did support the use of iPads in the beginning to get them rolled out to professors and instructors. Support within the department has been very good.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	A long term plan for use in the ISE lab. Nothing on a broader base. They offer grant money on a yearly basis to instructors for technology related projects. Grants can be permanent or on semester basis. If small # of iPads requested, could be permanent. If larger number requested, it was usually on a semester basis
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	Go to conferences on Chemistry education. That is how she learned about "Doceri". Not hard search through app store. Not a big social media fan.

Instructor Summary – Case #3 Instructor #3

#	Interview Questions	Response
1	What types of courses do you teach and are you receptive to the idea of integrating iPads into your classroom? Why or why not?	Professor in Communications and Political Science. Taught "Road to the Presidency" course in 2012. Yes, receptive to integrating iPads in the classroom. Initially applied for grant for Honor students to use iPads in class but then rolled out to non-honor students, as well. Taught Communication research methods, political parties and interest groups, and voting and elections. Valuable experience in "Road to the Presidency"
2	Do you think the integration of the iPad as an education tool could be a benefit to you and your students? If so, how? Did the iPad fulfill a previously unmet educational need of yours? Did the iPad create new educational opportunities for you that you had not previously anticipated?	Loaned iPads to students at beginning of the semester and had them download a set of apps that the professor designated. Provided gift cards for students to purchase other apps as they saw fit. Students expected to post to Facebook. Students were required to bring iPads to class and used them for interactive polling. The most beneficial use of iPads was found when students used them for having real-time conversations on events in class as videos were shown on the screen. Mobile technology combined with social media brought forth an exceptional experience for the students in class. Teachers were posting conversations as well.
3	Have you developed any guidelines or policies for using iPads in your courses of study? If so, how did your use of the iPad drive these guidelines or policies?	Gave a brief tutorial. Talked about the apps that were to be used in class. The professor let the students explore what they could get out of the iPad.
4	How do compare the iPad to other types of technology devices (such as the laptop) that you have used in your classroom? Does the iPad allow an educator to do something that they could not do with previous technology tools?	Could have used the laptop. The more mobile nature of the technology was an advantage. iPad was more app based. Given the structure of the class, the iPad met a need.
5	Have you experienced success with using an iPad in the classroom? If so, could you explain how it was used and why it was successful?	Yes, the use of iPads was successful. The professor did immediate and more elaborate surveys in class after debates. Used polls for material for conversation. Quizzes were used. Used Blackboard LMS to deliver course materials.
6	Are there any models of success you have developed for the iPad that could be used by you or others in the future?	Model used in class can be used for future classes of this type. Should be used for specific kinds of classes. Should be used for special project or event based classes. The professor plans to write up and explain the

		model used.
7	Were you a part of any pilot or test programs for iPad use? If so, how successful were these pilots? How were the iPads deployed and used that demonstrated success in these pilots?	Applied for technology grant. This was viewed as a pilot program in the fall of 2002.
8	Have your students demonstrated a positive attitude and successful outlook towards iPad use? How did they specifically use the iPad that proved successful?	Most students indicated that it was a positive experience using the iPad. Some students were still tied to laptop. For most students it was a new experience using the tablet device. Saw in pre and post surveys, interviews, and general observation in class.
9	Have you made good use of the iPad in your pedagogy and has it improved the overall classroom experience? If so, how? What is different in your teaching with the iPad compared to teaching without the iPad?	Yes, used as an integral part of the course setup and syllabus. Teaching was changed. Had an opportunity to interact more with the students and for the students to interact with each other. It changed the nature of interaction including more open participation. Students became much more conversational.
10	Could you provide examples of how iPads are used in daily activities in the classroom? What activities are iPads particularly useful for?	Not used for note taking or day to day classroom tasks. They had their iPads and would often look up something relevant to share with class. Sharing big part of the experience.
11	Have you used the iPad apps as part of your pedagogy? If so, what iPad apps have you found most beneficial? How were you able to find and select appropriate apps for your classes?	Facebook, Twitter, news apps such as Washington Post politics app, audience opinion app for polling. Apps used in a meaningful way. The professors selected the apps for class.
12	How do you gauge the pedagogical potential of the iPad? Where do you see the iPad providing the most benefit in your pedagogy?	Sees big potential in targeted circumstances. Investment in resources was required but worth it. The professor had to perform more planning and setup work.
13	How do you feel the current infrastructure in your school supports your access to and use of the iPad in the classroom? Do you have any specific recommendations on how the infrastructure could be improved to support iPads?	The classroom provided had special wireless capabilities and worked well for the class. Wanted to project from iPad to projection. Did not work well at times. Ended up projecting from the laptop, at times. Used the laptop with traditional wiring to project.
14	How are iPads currently configured for you classes? Does the administration bulk purchase apps and install them on your iPads for you, or do you or your students take the responsibility of configuring the iPads for specific needs?	Yes, specific apps were purchased and the iPads were configured by the students in class. iPads were handed out to the students "clean." Gift cards were used by students to purchase other useful apps. No bulk purchases were made.
15	How do you currently secure iPads and data contained on them? Does your school infrastructure support security of the iPads?	Students were given a contract to sign for use of the iPads. Conditions of use were communicated and

		signed-off on. Expected to return them. Advised students against personal information on the iPads. iPads were returned "clean" after the semester. iPad carts are not used.
16	What are some of the challenges with implementing and using iPads in you classroom, if any? How did you overcome obstacles for iPad use in your classroom?	Downside (not big) is that iPad could be a distraction. Concerns from students about information overload. Challenges using the iPad for projection.
17	Have you been a part of any training classes at your school on how to use the iPad and the benefits of using such a device? If not, would you be receptive to attend a class?	The professor was self-taught with the iPad. Used the applicable apps as basis for class. Straightforward use of the iPad. Students explored new uses, such as screen capture, pictures, movies, etc. If training is available for some need, the professor would consider taking a class.
18	Do you feel your school promotes and supports your use of iPads in your classroom? What could your school do to improve promotion and use of iPads in the education environment?	Combination of university support and professors promoting the use in class. University supported and encouraged use of iPads with technology grant. Integrated use of technology in teaching grants.
19	Are you aware of any strategic plan or long term vision for use of iPads in your classroom? What would you like to see addressed in your school's technology plan regarding iPad use?	University has a broader technology plan, but not familiar enough with the plan relating to iPads. Attended committee meeting outlining some plans on technology needs. Be good to develop plan for using mobile devices, not specifically the iPads. It would be good to address how new technologies could impact the classroom.
20	Are you aware of how others have used the iPad in higher education and how you can leverage what others have learned?	More informal networks for sharing information. The university required a presentation on how iPads were used tied with the grant. Grant proposal was used as a basis for developing a paper for a pedagogical journal. The paper would be a formal way of sharing with broader audience.

Appendix E

IRB REVIEW DOCUMENTATION

Letter 1 – New Project Review

RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: October 31, 2012

TO: Robert Szczecinski
FROM: University of Delaware IRB

STUDY TITLE: [378284-1] Best Practice Guidelines for Using iPads in Higher Education

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: October 31, 2012

REVIEW CATEGORY: Exemption category # *2*

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.

Letter 2 – Amendment/Modification Review

RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
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DATE:	November 18, 2013
TO:	Robert Szczecinski
FROM:	University of Delaware IRB
STUDY TITLE:	[378284-2] Best Practice Guidelines for Using iPads in Higher Education
SUBMISSION TYPE:	Amendment/Modification
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	November 18, 2013

Thank you for your submission of Amendment/Modification materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.