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INSTRUCTOR TECHNOLOGY USE: A MIXED METHODS INVESTIGATION

by

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A DISSERTATION

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Under the Supervision of Professor Marilyn L. Grady

Lincoln, Nebraska

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INSTRUCTOR TECHNOLOGY USE: A MIXED METHODS INVESTIGATION

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University of Nebraska, 2011

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This mixed methods concurrent triangulation study was designed to examine instructional leaders' descriptions of their experience with integrating technology into their teaching. Seminal studies from the 1990s were found to remain true today—that teachers are not ready to incorporate technology into their teaching (Becker, 1999; Ertmer, 1999). In the decade since Becker's and Ertmer's findings, changes have been seen in select pockets of the university community. I was interested in exploring one of these "pockets" that has been identified through my work with online instruction and in consultations with faculty who are either beginning or are veterans at integrating technology into their teaching.

Although access to technology has become ubiquitous, that fact alone does not ensure technology integration. Other conditions are necessary to its effective integration. I explored ways that faculty in a college of education are using technology and the strategies they are modeling as they seek to pass on necessary skills to pre-service teachers.

The qualitative phase of the study revealed broad descriptions of instructors' technology integration. Instructors who confronted new technologies, their attitudes about technology, and the context in which they sought to use technology were examined.

The quantitative phase of the study focused on the technologies used and instructors' perceptions about teaching with technology. I wanted to see if there was a connection between the attitudes these instructors had toward technology use and how they integrated technology in their teaching.

Participants viewed technology as a necessity for their teaching process and daily life in general. Data analysis showed that they believe that instructional technology shaped, modeled, and extended learning processes for students. Instructional technology extended students learning experiences by providing them with opportunities for more independent, self-directed, and in-depth learning. When students felt in control of their own learning they became more actively engaged in it, and were able to select, analyze and synthesize information, make decisions about their learning, detect gaps in their knowledge, and find solutions for how to fill those gaps.

DEDICATION

This venture is dedicated to my family who's gracious acceptance of the long hours of research and writing have resulted in a finished product.

Thank you, Melissa who even from afar kept saying, "You can do it."

Dennis, your support was invaluable. You listened when I was trying to get it straight in my own head and you offered thoughtful wisdom. Most of all you believed in me. I could never have done it without you.

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CHAPTER 1

Introduction

I remember my very first methods class in this building 25 years ago and I started class with a statement that I thought was rather profound at the time. I said “I’m going to prepare you to teach, but I want you to think what your job would be if every child had the Library of Congress on their desk. If information was no longer the issue, what would you do?” Guess what? That has happened and we still haven’t changed what we do! We act as if we are the possessors of knowledge and we’re not! We don’t know squat compared to what kids could access if they wanted to. So what are we going to do about that? (An instructor in 2010).

In the decade of the 1780s, public schools in the United States adopted the teacher/manager model with the teacher as the primary manager of instruction and assessment in a classroom. Many effective strategies have been introduced during the years; however, this model has continued to be prevalent in schools to this day. During the latter half of the 20th century, technology was used in education in many forms. In the 1960s and 1970s, the same decades the United States was sending astronauts to the moon, mainframe and mini computers were first being introduced in the schools. The 1980s and 90s brought multimedia tutorials and computer games into the educational setting and by the mid 1990s, there was a computer for every classroom in the United States. However; computers for teacher preparation were limited thus limiting the classroom use (California State University Long Beach, 2009). A review of the literature on teaching with technology highlighted several issues related to teaching with

technology. These include the importance of sound pedagogy use in integrating technology into the classroom and concerns about technology adoption and integration among teachers.

The world has witnessed several waves of technology innovation. With each wave, the changes appear greater and the effects deeper. Technology is shaping our culture and our world such that the impact reaches language and communication (Bass & Eynon, 2009). How is the university impacted by these changes and how can it be a catalyst to help shape our future? Studies have been conducted on the use and implementation of technology in higher education. In a 1999 study, Becker revealed that as many as 70% of teachers are not using available technologies. This is true for a variety of reasons. “Some studies suggest that teachers’ educational beliefs play an important role in how they choose and use technologies in their classrooms” (Honey & Moeller, 1990; Ertmer, 1999; as cited in Buckenmeyer, 2008). Others have found that beginning teachers are not prepared to use technology in their teaching (Firek, 2003). Gray, Thomas, and Lewis (2010) in their report for The National Center for Education Statistics (NCES) found that 97% of teachers had one or more computers in their classroom and that the ratio of students to computers in the classroom was 5.3 to 1. Additionally 29% of teachers reported using computers during instruction sometimes and 40% reported using computers during instruction often.

Previous research on technology integration in higher education focused on several topics. How technology can enhance pedagogy in the classroom was one topic. Jugovich and Reeves (2006) talked about a model of a university’s Information Technology staff and how more and more faculty were asking those doing technology

training how these technologies could be used in teaching effectively. They found the need to find people with pedagogy experience to help tighten the gap between how to use the technology and how to use it to enhance learning.

Another topic found in the literature was how to prepare students for life in the 21st century and the factors that affected it. Hildebrand (2009) examined the need for schools to integrate technology into their curriculum in order to prepare students. She addressed a gap in studies on teacher's technology beliefs by conducting a study in schools in the Southwest United States, of teachers' and administrators' technology skills and beliefs. Hildebrand (2009) stated that schools need to make sure students are engaged in instruction, so their understanding and retention increase.

Brown (2006) also studied 21st century skills by looking at how students learn, how they solve problems and what gives them a sense of meaning and self. He compared 20th and 21st Century learning by describing their characteristics and asserted that 20th Century learning was based on building up stocks of knowledge that could be called upon when needed. He called it "demand-pull" learning and stated that in a slow-changing world this approach was effective. He characterized 21st century learning as "supply-push" with a focus on learning through enculturation and on collateral learning. Collateral learning broadens learning for students by engaging them with other students in focused learning. As they work together, they also learn about communication, collaboration, and how others view the world.

In 2011 the need is to acquire 21st Century Skills which help students learn to collaborate, think critically, problem-solve and communicate. These elements will naturally be supported by information and technology skills acquired as students use the

tools within their classrooms and as faculty model the use of technology and tools in their own teaching. The challenge for higher education is to prepare tomorrow's teachers and leaders to not only survive in a world of fast-changing technology, but to be able to pass those skills along. Studies have been conducted on the use and implementation of technology in the higher education classroom. However, the practice of instructors in their implementation of technology has not been widely studied. Those teachers who have a bent toward technology will find it easier to integrate it into their personal practices and their work within the classroom. Those however, who are technology challenged, may have a harder time being willing to try new technologies as well as incorporate them into the pedagogy of their classrooms. In my study of the attitudes and practices of instructors in their integration of technology into their courses, I would like to discover the views they hold on gaining technology skills and their perception of its importance to their lives and their profession.

Significant to this study, are the types of tools and technologies used in the classroom. Rather than look at all the tools available, my research focus was on the tools that the participants used in a successful integration of technology with their classroom pedagogy—whether online or face-to-face. I also explored how the difficulty of the technology or the extent to which the technology is used, was determined by the beliefs and attitudes of the instructors. These findings were compared with technology use by the remaining faculty in the college through a technology-use survey.

Purpose Statement

The purpose of this mixed methods study was to describe the practices of instructors from a Midwestern Research I University who integrate technology into their

teaching. I wanted to understand the practices of these instructors by having them describe how they integrated technology and to understand what they face in a real-world situation. In this mixed methods design, interviews allowed instructors to describe their experiences with technology integration. Concurrent with the interviews, instructors were asked to respond to a survey to determine the categories and frequency of technologies used in their classrooms. Once interviews were completed and surveys were submitted, the surveys were sent to other faculty in the college.

Research questions focused on the attitudes and practices (actions) of instructors in their use of technology both to prepare their lessons and to incorporate technology to support pedagogical best practices in the classroom. The central question of this study was: How do instructors who use technology to support pedagogical best practices in the classroom describe their experiences? Specific questions that guided this study included:

1. What technology practices have instructors adopted in their classrooms?
2. What contexts and challenges to the use of technology do instructors describe?
3. How has technology changed their teaching?
4. What is the relationship between instructor attitudes toward technology integration and the difficulty levels of technologies used?
5. How do the quantitative relationships between attitudes and integration relate to the qualitative descriptions of integration practices? (Does the participants' use of technology inform their attitudes about technology integration?)

To better understand the practices of the participants interviewed, a literature review was conducted. Topics searched included technology integration in a higher

education setting, best practices of technology integration, current trends of technology use, and attitudes and beliefs about technology integration. Chapter two will highlight the literature findings.

CHAPTER 2

Literature Review

To understand the complexities of technology integration in the higher education setting, one must look at past experiences as well as current trends. It is important to understand best practices in technology integration to help us avoid using technology for its own sake. Research on technology use in the higher education setting revealed two main themes—Pedagogy and Adoption and Integration. For each of these major themes, sub-themes emerged. It was in the second, Adoption and Integration, that a gap was found. This led to my study on the practices of instructors who integrate technology in their teaching. A description of the themes follows.

Pedagogy

21st Century Learning. Student learning is at the heart of the literature on integrating technology into instruction. Brown (2006) examined how students learn, how they solve problems and what gives them a sense of meaning and self. Twentieth Century learning was compared to 21st Century learning. Brown (2006) asserted that 20th Century learning is based on building knowledge that can be called upon when needed. He called it “demand-pull” learning and stated that in a slow-changing world this approach was effective. Twenty-first Century learning was characterized as “supply-push” with a focus on learning through enculturation and on collateral learning which, when employed, broadens learning for students.

Hildebrand (2009) examined the need for schools to integrate technology into their curriculum in order to prepare students for the 21st century. She addressed a gap in studies on teacher’s technology beliefs by conducting a quantitative, non-experimental

study in schools in the Southwest United States. The purpose of the study was to examine teachers' and administrators' technology skills and beliefs. Hildebrand stated schools need to make sure students are engaged in instruction, so their understanding and retention would increase. Data were analyzed using descriptive and inferential statistics, T-tests and analysis of variance. Results of the study showed that administrators' technology skills are greater than those of teachers and that they view their technology beliefs higher than those of teachers.

Mills' and Tincher's (2003) research evaluated technology integration in classrooms in a school district in a small town (2,000 students). The purpose of their study was to evaluate a professional development initiative for technology use by reviewing the standards and stages identified by a professional development model and assessing the progress of teachers through the stages specified. The researchers discussed literature around themes of technological fluency, modeling technology use, stages of technology integration, and characteristics of exemplary computer-users. They found that discrepancies exist between integrators and operators. Teachers know how to use computers, but not how to use them to deliver instruction. The researchers concluded that change was needed to prepare students for life in the 21st century and more important than training in using hardware and software, teachers needed to learn how to use technology to enhance student learning. Data collection consisted of a tool the researchers called *The Technology Integration Standards Configuration Matrix* (TISCM) which they developed based on previous research of developmental stages and standards as well as their model of technology integration. The TISCM checklist was completed two times—at the start and end of the year. Seventy teachers completed it at the beginning of the year and 78 at the end. Results showed that teachers grew in their

technology use. A clear distinction was seen between novice users and those who were progressing in their integration of technology into their pedagogy. They were quickly becoming experts in knowledge, ability and integration of technology. Successful integration took time, training, and focused attention.

About learning, DuFour (2002), a former principal, stated:

I had been focusing on the wrong questions. I had focused on the questions, what are the teachers teaching? And How can I help them to teach it more effectively? Instead, my efforts should have been driven by the questions, To what extent are the students learning the intended outcomes of each course? And What steps can I take to give both students and teachers the additional time and support they need to improve learning (p. 13)?

This shift from a focus on teaching to a focus on learning is more than semantics. When learning becomes the preoccupation of the school, when all the school's educators examine the efforts and initiative of the school through the lens of their impact on learning, the structure and culture of the school begin to change in substantive ways (p. 13).

Integrating technology into the teaching is one way that learning in this new paradigm can take place. Camp (2007) stated,

Since technology has revolutionized most aspects of our daily lives, it is reasonable to think that it would lead the way to improved teaching and learning (Noeth & Volkov, 2004). There is ongoing debate as to the actual impact

technology has had on student learning. Agreement, however, exists as to its potential as an instructional tool (as cited by Camp, 2007, p. 21).

Camp (2007) contended;

When the first computers came into schools, I saw an opportunity to use them as powerful tools to motivate learners and enhance instruction. I began teaching teachers to use technology effectively and eventually became a technology specialist in public schools. There I saw technology used creatively to motivate students and to engage them in constructivist learning activities. I saw how technology could address different learning styles and levels (p. 22).

Baia (2009) examined how faculty are motivated to integrate technology into their teaching. She wanted to “test the hypothesis that each faculty’s commitment to pedagogical quality is a strong predictor of instructional technology adoption” (p. 2). In other words, faculty who believe that IT can enhance student learning in their discipline will be more likely to use it in their teaching. However, their “intent to use technology is predicted by their beliefs about instructional technology” (p. 29).

Okojie, Olinzock and Okojie-Boulder (2006) studied the use of technology in teaching and noted that it is not currently viewed as tied to teaching and learning, but is viewed too narrowly. The purpose of the study was to explore the technology integration processes and to encourage teachers and other technology integrators “to be reflective practitioners” (p. 1). The authors stated that technology should facilitate learning as a part of the instructional process and should not be tacked on as an end in itself. The researchers stated that technology integration involves developing learning objectives, instruction strategies, feedback, and assessment strategies and found that excuses for not

using technology to support instruction are valid. They include shortage of computers, lack of training and fear of computer use.

Georgina and Hosford (2008) stated that faculty are being pressured to include technology in their teaching. They studied relationships between technological competence and its integration into pedagogy. The purpose of this non-experimental quantitative study was to examine how faculty competence in technology use and training impact their willingness to integrate technology into their pedagogy in a Midwestern university's College of Education. The inferential results of the Georgina and Hosford study showed significant correlations between technology literacy and pedagogical practice integration. They found that the perceived value of using technology affected frequency and extent of its use and concluded that "[t]echnology alone does nothing to enhance pedagogy; successful integration is all about the ways in which technology tools are used and integrated into teaching" (p. 695).

Hartman (2008) wrote about adoption of technology as a systematic transformation stating; "overall higher education has not convincingly demonstrated that technology has had a systemic, widespread, or sustained impact on the process of teaching or on student learning outcomes" (p. 25). "...all too often we 'bolt on' technology rather than redesign the teaching and learning process" (p. 25). The form not just the function of technology holds the key to effectively using technology to teach and seeing learning take place.

Hartman (2008) said "One measure of an institution's approach to teaching and learning with technology is the response to two questions: 'How many instructional designers does the institution employ?' and 'What do they do?'" (p. 25). He stated,

There are so many technologies to choose from, so many ways to use them, and so many faculty members that it is no wonder most institutions have been unable to determine, on an enterprise-level scale, whether the introduction of technologies is having a positive impact on students learning outcomes (p. 25).

Jugovich and Reeves (2006) described a model of a University's Information Technology staff and how more and more faculty were asking those doing technology training how these technologies could be used in teaching effectively. They have made adjustments to the structure of the university to accommodate both the how-to's of the technologies and the pedagogy of them by combining the technology training department with the faculty development area as well as being committed to hiring IT staff with pedagogical backgrounds.

Otte and Benke (2006) addressed the focus on pedagogy in technology use by saying that change in instruction is a matter of pedagogy, and a how-to approach cannot adequately ensure change. The authors highlighted online instruction showing its many applications to face-to-face instruction. They stated that in order to maintain the focus for teaching and learning, administrators need to embrace and support new approaches to education—whether in an online classroom or face-to-face with a commitment to both quality pedagogy and to the goals and mission of the institution. Thus, no matter the mode of delivery, the quality of the pedagogy is of extreme importance—how these technologies can enhance learning while changing the way teachers teach.

Windschitl and Sahl (2002) found that while there was abundant research on teachers' use of computers in the classroom, not many studies had been conducted on laptop initiatives and their impact on integration of technology. The purpose of their

multi-case study on teachers at a middle school which had recently instituted a laptop initiative was to look at how and why teachers used technology in different ways over a period of time. Three overarching questions were at the base of this study. These included questions of (a) how personal history and beliefs influence technology use in instructional practices; (b) how teachers come to adopt their practices; and (c) the relationships between the prevalence of technology and if that influences teachers' implementation of constructivist pedagogy. Data were collected through interviews, observations, informal discussions and field notes taken at several faculty meetings. Three themes emerged from this case study. First instructional decisions were made based on teachers' belief systems about learners in the school, what made good teaching in that school setting, and the role that technology played in the lives of the students. Decisions were influenced by the "ubiquitous technology." The second theme was that portable technology did move the instructors toward constructivist pedagogy. The third theme related to the way school-wide activities conducted over time created norms and procedures which were then reinterpreted by individual teachers. The strength of this study was shown in what happened to the three participants during the course of the two-year study.

Adoption and Integration

A second theme that emerged in the literature about instructor use of technology in the classroom was adoption and integration of instructional technology. Several studies examined teachers' beliefs and how they shape their instructional goals and their perceptions of technology use as well as barriers or difficulties in integration. Teachers'

beliefs about technology, how valuable it is to student learning, how the barriers affect them—all have an impact on what they do with technology.

Attitudes and beliefs. Ertmer, Gopalakrishnan, and Ross (2001) conducted a qualitative case study to examine the pedagogical beliefs and practices of 17 teachers considered to be exemplary technology users in the classroom. They studied attitudes and perceptions and how technology use for these participants was affected. They then compared what they found with best practices described in the literature. Data were collected from open-ended questionnaires, interviews, and observations using “within and cross-case analyses” (p. 10). Profiles were created for each participant and common and uncommon characteristics were noted and compared. Ertmer, Gopalakrishnan, and Ross (2001) concluded that there is not one technology, resource, or vision that would explain exemplary teaching with technology but that it was dependent on an individual’s strengths and perceived needs of students in their classrooms. They also concluded that discrepancies exist as to the comparison with commonly published best practices and it remains unclear why they exist.

Basinger (2000) saw the need to examine the learning process of teachers as they integrated technology into their instructional practices. The purpose of Basinger’s qualitative study was to understand the processes teachers from two schools in northern Louisiana experienced as they implemented new technologies. Basinger observed 12 classroom teachers as they participated in a technology course. In a pre-survey instrument, she gathered information on teacher self-perceptions of computer proficiency. Basinger found that teachers experienced stages of growth in using technology where the focus moved from self use to how to use the technology for greatest impact on learning.

Teachers were no longer thinking about how to use the technology, they were using it to meet their needs. Once they moved through the process of designing, developing and delivering an application, they were able to see the effectiveness of the technology in helping students learn.

Tabata and Johnsrud (2008) also found attitude to be a factor in use of technology. Their contention was that the speed with which technology has changed education, has impacted university responses to how teaching is delivered. The study's purpose was to examine teacher technology use and teacher attitudes toward technology and distance education in a large 10-campus system located in the Western United States. The researchers surveyed faculty teaching distance education courses and learned that as faculty acquired technology skills, their self-confidence was strengthened to continue and to learn more. Tabata and Johnsrud (2008) viewed faculty as an important resource to the success of institutional initiatives and designed their study to facilitate understanding between university administrators as policy makers and faculty as educators to sustain the quality of education. Results of their survey showed that instructors' skill in using technology, attitude toward technology and/or distance education, ability to adapt, all had an impact on their use of technology in the classroom or participation in distance education. The researchers recommended further study looking at the roles of faculty attitude, values, and use of technology specifically in teaching distance courses.

Chen (2008) studied the issue of why teachers do not practice what they believe regarding technology integration. The researcher saw that in several studies barriers to technology use were investigated, however, none of the studies focused on teacher beliefs and how they interact with other factors in influencing the integration of technology. The

purpose of the study was to explore how teachers' pedagogical beliefs aligned with their practices and to understand the inconsistencies between beliefs and practices. Semi-structured interviews and classroom observations were conducted using 12 teachers from a Taiwanese high school. The researcher found that all participants used technology for personal or administrative use and for planning instruction, but very few saw that technology could help them reach instructional goals. Faculty did not feel that technology could adequately deliver quality, pedagogically-sound teaching which would result in student learning. They scored high on use of and perception of the importance of technology in their teaching, but did not demonstrate that same commitment to using technology in the classroom. Chen reported three categories of factors explaining the inconsistencies, including external factors, teachers' limited understanding of constructivism, and other beliefs which conflicted with the pedagogical beliefs they expressed. However, key to the findings of the study was how these factors interacted together to cause the inconsistencies.

Wan (2009) found that faculty at one university were not taking advantage of technology training and that misconceptions about technology prevented its integration. His research sought a better understanding of teachers' perceptions and experience with computer technology integration at a university in the Western United States. Through in-depth interviews with 10 secondary education methods instructors, classroom observations, and by examining artifacts, Wan found that teachers' beliefs shaped their instructional goals and perceptions including barriers to technology use. Many participants viewed computer technology as a "tool in a teacher's toolbox" (p. 45). However, those who learned and used technology saw changes in their approach to teaching, but not a change in the heart of what they taught. They viewed technology as a

tool allowing better communication with the purpose of helping the students learn and be successful. Wan contended the participants experienced improved teaching and learning materials; mastery of teaching objectives, and enhanced learning processes.

Engagement. The term “best practices” is used in many areas of academe to infer that there is a proposed model that works and resulting strategies that will bring academic success. Steinbronn and Merideth’s (2007) study began with a question; “do the instructional methods and strategies utilized vary with the teaching environment” (p. 266)? The purpose of their quantitative study was to compare instructional strategies used effectively in the online environment with those used face-to-face by surveying 40 faculty who had taught both online and face-to-face at a mid-sized, liberal arts university. Steinbronn and Merideth (2007) sought to understand the relationships that exist between the teaching methods and strategies in an online setting and that of a face-to-face setting. They contended that both technology skills and pedagogy need to be addressed—not one or the other and concluded that faculty need to look carefully at both their perceptions about instruction and teaching practices, allowing them to modify their teaching practices to include “best practices” for teaching with technology. Best practices in online learning include a high level of engagement and collaboration between students. The researchers observed the significance of the study stating, “[t]he implication here is clear: Show Me the Engagement” (p. 275).

Kim, Jain, Westhoff, and Rezabek (2008) found deficiencies in the research exploring ways to effectively teach the importance of integrating technology into teaching and so conducted a quantitative study to explore the relationship between the perceptions of preservice teachers as they viewed their teachers’ use of technology in the

classroom, and their perceptions of their own intent to use instructional technology when they became teachers. The sample used was 100 preservice teachers enrolled in a required methods course at an institution in the Rocky Mountains. Surveys were conducted in the classroom. Regression analysis was conducted to determine the relationship between the dimensions of the two surveys. Kim, et al. (2008) found in an analysis of best fitting line, that as the participants' perceptions of faculty use of technology increased, so did the score on their intent to use technology. Thus, they concluded that faculty modeling the use of technology significantly influenced the participants' future use in their own classrooms.

Barriers to technology use. Barriers to technology use are perhaps the most common topic of discussion on technology at an institution of higher education. One study found that a plan for technology integration needed to include proper equipment and training. Groves and Zemel's (2000) study showed that faculty responsible for preparing the future workforce were not using instructional technology in their own teaching. The purpose of their action research case study was to look at attitudes, interest in technology, and use of instructional technology by faculty and Graduate Assistants (GAs) at a Research I institution in the Southeast part of the United States. The study made use of a survey delivered by campus mail to faculty and GAs. Responses from 66 faculty and GAs were used to determine technology use and perceptions of expertise of technology use in a teaching setting. Groves and Zemel (2000) found that the use of technology is related to several factors faculty considered important to critically important including; the availability of equipment, training, ease of use, level of confidence using a technology, and colleagues' use of the technology. Additionally participants were asked about the importance of technology in teaching. More than 46%

responded that it was important or critically important to teaching. The need for an action plan was apparent to Groves and Zemel (2000). They created a resource site to address the findings of the factors that influenced the use of technology at that institution, primarily that of training.

In a study of literacy teachers in the United States, Hutchison's (2009) quantitative online study included five purposes focused on literacy teachers in the United States; to investigate the integration of technology into instruction, how instructional technology affects learning literacy skills, obstacles and challenges literacy teachers face, how literacy teachers define and the importance they place on instructional technology, and to identify the practices of teachers who do not use instructional technology related to those who do. Data from the surveys were analyzed using descriptive statistics, ANOVA, and regression analysis. Two factors were found to affect technology integration; lack of resources--time, equipment, training and that most teachers do not understand what technology integration involves. Teachers need to understand the power of technology in teaching and be provided with the incentive, equipment and training to use it effectively.

Surry, Ensminger and Haab (2005) saw that barriers to the integration of instructional technology into higher education were affecting successful integration. This quantitative study sought the opinions of deans of education from the 126 Carnegie Research I and II universities in the United States to determine the need for a model to provide a framework for technology integration in a college/university setting. Categories investigated were planning and support; infrastructure; expenditures; integration and overall impressions. They found correlations in five areas: 1) A college's

technology infrastructure and the technological competency of recent graduates; 2) A college's technology infrastructure and faculty efforts to integrate technology into their teaching; 3) Technology expenditures and satisfaction with the college's technology infrastructure; 4) Technology expenditures and faculty efforts to integrate technology into the classroom; 5) Faculty use of technology and the technology competency of recent graduates. All five findings are significant to a college/university's goals. Future research was suggested to focus on the refinement of the model developed through this study.

Hardin (2006) looked at how well teachers' attitudes predict levels of technology integration into the classroom. She investigated whether perceived support from the administrator as the instructional leader was related to teachers' levels of technology integration into the classroom. Findings showed that teachers' attitudes did predict levels of technology integration and that administrators viewed technology mainly as a support tool—supplemental to educational uses and also viewed their role in technology integration as a provider of funding.

Perhaps the most striking findings were those of Williams (2009) who believed that there was little awareness about the role that unreliable technology plans had on teachers' use of technology in the classroom. The purpose of this mixed methods study at both a technology center of an institution in the Southeast part of the United States and with randomly chosen teachers in public schools was to determine to what degree the reliability of technology affects teachers' use of it in the classroom. Data were collected from a web-based survey and qualitative interviews. Survey data were analyzed using computerized software and percentages, frequencies, dependencies, and significance

were examined. Interviews were coded and field notes transcribed. Findings from this study showed the importance of both well-working technology and good technology support. More than 90% of responding teachers stated that they would use technology more if it were more reliable and if better support was available.

Integration skills. Using technology in higher education is being driven by a number of factors including student demand and competition with other institutions. Roberts (2008) outlined the framework for a strategic plan to implement instructional technology in an educational setting stating that in the planning process organizational as well as personal reticence to using technology needs to be overcome in order to successfully implement a technology plan. The outlined plan included strategic analysis, plan design, and implementation.

Summary

A review of the literature revealed an opportunity to expand on existing literature in examining the practices of instructors who are teaching with technology. The speed with which change is occurring in technology and the wealth of information at our fingertips provide a challenge and an opportunity for 21st Century learners. Therefore, I began this study to both understand the changes we face and the challenges that lie ahead. The methodology used in the study will be described in the following chapter.

CHAPTER 3

Methodology

A pragmatic worldview underlies this mixed methods study with a focus on the practice and “what works” for these participants (Creswell & Plano Clark, 2007). Multiple standpoints were examined and real-world experiences were at the heart of the study. Both qualitative and quantitative data were collected and mixed after each type was analyzed separately. A pragmatic worldview fits my beliefs in its practicality and its real-world focus.

A triangulation mixed methods approach was used in this study. Greene, Caracelli and Graham (1989) stated that a triangulation mixed methods design works best when the “status of the different methods—that is, their relative weight and influence—is equal and when the quantitative and qualitative study components are implemented independently and simultaneously” (p. 259). The principle aim of this approach is “to obtain different but complementary data on the same topic” (Morse, 1991, p. 122) and is used when seeking to develop qualitative results and quantitative data. This is true of my study. I wanted to understand if there is a relationship between practices used by instructors and their beliefs and attitudes toward the use of instructional technology in their teaching.

Positioning Myself

Education has held a vital role in my life. I have earned degrees in Elementary Education and Instructional Technology and have participated in classes for personal growth and development. I have 13 years of professional experience as an instructional designer and technologist with a focus on consulting with instructors on best practices for

online course delivery and use of technology for optimal student learning. These experiences have helped me better understand the educational setting and have given me a clearer view of the needs of instructional leaders. They will help me in listening to the responses of instructors, to understand the pressures, barriers, and rewards of integrating technologies into their teaching.

Purpose Statement

As instructors confront new technologies, their attitudes about technology, beliefs about teaching with technology, and the perceived barriers to the use of technology often determine the success of their efforts. Many studies have been conducted about technology used in teaching and how it has been implemented. However, the practices of instructors in their integration of technology have not been widely described. Therefore, the purpose of this mixed methods study was to explore the experiences of instructors' technology use in a higher education setting and to describe the practices of the integration of technology in their teaching to understand what they face in a real-world situation

The central question for this study is: How do instructors who use technology to support pedagogical best practices in the classroom describe their experiences? Specific research questions include:

1. What technology practices have instructors adopted in their classrooms?
2. What contexts and challenges to the use of technology do instructors describe?
3. How has technology changed their teaching?

4. What is the relationship between instructor attitudes toward technology integration and the difficulty levels of technologies used?
5. How do the quantitative relationships between attitudes and integration relate to the qualitative descriptions of integration practices? (Does the participants' use of technology inform their attitudes about technology integration?)

Sampling Method

The qualitative sample consists of 20 participants which should allow me to hear most or all of the perceptions that might be important. All participants are instructors who are known to use technology in their teaching at a Midwest Research I University College of Education and Human Sciences. A purposeful sampling strategy was used along with a referent method to expand the sample size. Interviews and surveys were conducted with all 20 participants. The survey will be used to explain types of technologies used by each participant. The sample size allowed me to gather in-depth information about each participant and the mixed methods design gave voice to the instructors interviewed. The survey offered an understanding of the technologies each instructor is using in the classroom. In addition, after the 20 interviews and surveys were completed, I invited all instructors from the College to participate in the survey with the goal of comparing data from the 20 referred instructors with answers submitted by the rest of the College instructors.

Teddlie and Tashakkori (2009) stated “purposive sampling techniques are primarily used in qualitative studies and may be defined as selecting units based on specific purposes associated with answering a research study’s questions” (p. 170). The sampling technique used in the current study will allow me to answer the research

questions. The reputational technique, (Kish, 1965) was used to identify participants for the study. This is a nonprobability technique involving the use of an initial list of respondents obtained from screening a population; a specialized list of persons who manifest the criteria being searched, or "key informants" identified by the researcher. The technique assumes that those persons manifesting the sampling criteria are aware of others with similar characteristics. Thus, the initial respondents generate leads for a broader range of contacts that can be screened for inclusion in the sample.

In this study, initial participants were selected based on reputation—those of whom I am aware who are doing what I want to describe in their use of technology in teaching. The sample was expanded by referrals from those initial interviews. Participants provided important information that helped me understand their participation with technology in their teaching and the concerns involved in its implementation.

Qualitative Data Collection

Interviews allowed me to gather information based on the participants' experiences teaching with technology. The interview questions were designed to answer the research questions which included: What technologies do instructors use in their classrooms? What is the context in which technology is used? How has technology changed their teaching? Based on the research questions and the literature review, an interview protocol was created including 11 interview questions (Appendix A) and probe questions.

Individual interviews get to the complexities of research questions. Weiss (1994) asserted,

In the qualitative interview the respondent provides information while the interviewer, as a representative of the study is responsible for directing the respondent to the topics that matter to the study... helping the respondent expand her responses without constraining the information she might provide (p. 8).

Rubin and Rubin (1995) emphasized “the art of hearing data” during the interview process. They stated, “Qualitative interviewing is a way of finding out what others feel and think about their worlds. Through qualitative interviews you can understand experiences and reconstruct events in which you did not participate” (Rubin & Rubin, 1995, p. 1). They highlight the importance of comprehending as well as conveying the meanings of those interviewed and allowing the participants to talk about their experiences. Kvale (2006) affirmed that interviewing was a conversation with a purpose. With these observations in mind, interviews with each participant were semi-structured with the goal of understanding. The interview format allowed me to follow an established protocol, but also allowed the flexibility to include probe questions to aid the participant and to experience a natural conversation. It was important to me to see the participant’s viewpoint in the interview rather than imposing my own and to establish trust (Fontana & Frey, 2005). I wanted participants to be comfortable with telling their experiences and so conducted pilot interviews to determine whether the questions would allow a natural conversation and offer an in-depth description.

Creswell (2007) described qualitative interviews in a series of steps. I followed these steps in my interview process.

- Identified interviewees based on purposeful sampling procedures.

- Determined the best type of interview—one-on-one, semi-structured.
- Recorded the interview for transcribing.
- Designed and used an interview protocol form.
- Pilot tested and refined the interview questions.
- Determined the place for conducting the interview.
- Obtained consent from each participant.

Each participant received an email (Appendix B) describing the study and asking for an interview. Once they responded, an interview time and place was established. A conference room convenient to the participant's office was used for most of the interviews. Interviews were audio recorded and transcribed. The interviews took between 55 and 65 minutes. At the beginning of the interview participants were advised of the purpose of the study, the time needed for the interview, confidentiality of the data, and plans for using the data. They were asked to sign the consent form and I answered questions that they had about the study.

Qualitative Analysis

Based on Hill's and Williams' (1997) summary of qualitative content analysis, widely used in social science research, the data were analyzed using the following stages of the process:

- Identify research questions.
- Transcribe data; read, and sort into grounded categories representing themes.
- Review category names.

- Review data for emerging patterns.
- Examine patterns with relevant theory and other research in mind.
- Explain the findings.
- Relate the analysis results to the current literature on the topic.

Interviews were transcribed and themes identified through a process of coding and condensing the codes (Creswell, 2007). The process included reading and re-reading the transcripts, applying codes and identifying themes based on the codes. This was done for individual participant responses and themes appearing across cases were compared and patterns noted.

According to Creswell and Plano Clark (2007) “coding is the process of grouping evidence and labeling ideas so that they reflect increasingly broader perspectives” (p. 132). A list of codes found in the transcripts (Appendix C) were grouped into broader themes and are reported in chapters four through eight. Themes found in the transcripts emerged from a careful examination of the codes which were directly related to the words of the participants. The themes were then organized by my perception of their importance to the participants. That is the order in which they are presented in following chapters.

Description of Participants

The 20 qualitative participants were instructors from a College of Education and Human Sciences at a Midwest Research I University. They varied in years of teaching experience as well as technology use. Some were assistant professors, some tenured professors, others lecturers. Each instructor was willing to share his/her experience

integrating technology and all offered insight into their journey into the world of technology.

The 85 participants who completed the survey were from the same College of Education and Human Sciences. Approximately 202 faculty were invited to participate in the survey, 85 responded, a return of 42%. Faculty held full-time, part-time, adjunct, tenured, and non-tenured positions in the college.

Quantitative Data Collection

Fink and Kosecoff (1985) stated that “A survey is a method of collecting information directly from people about their feelings, motivations, plans, beliefs, and personal, education, and financial background” (p. 13). They offered three reasons for conducting surveys. These include meeting policy or program needs, program evaluations, and surveys for research. Good surveys are difficult to write. Typically each question in a survey has a concrete answer, contains just one thought, is worded using standard English, avoids biased words, and is not too personal. (Fink & Kosecoff, 1985; Dillman, Smyth, & Christian, 2008). Pilot testing surveys allows one to test the reliability and validity of the survey instrument. Test/re-test can check the survey’s validity by allowing a group to take the survey twice. Scores should produce high correlation from one time to the next.

The survey instrument used was modeled after an open-source survey found on a university website. Questions were adapted from the survey which was developed by Middle Tennessee State University to “assess the effectiveness of instructional technology by measuring its impact on the depth and breadth of content covered, student performance, and good teaching practices that were widely acknowledged as catalysts for

improved learning” (<http://www.mtsu.edu/~itsurvey>, 2009). The survey was piloted with two instructors to confirm the interpretation of the questions and the validity of the survey.

The quantitative research question answered by the survey was, what is the relationship between instructor attitudes toward technology integration and the difficulty levels of technologies used?

Quantitative Analysis

The first survey dataset were collected concurrently with the interviews. The 20 participants interviewed were asked to respond to the 20-question survey (Appendix D) during the interview and the link to the web-based survey was emailed to them subsequent to the interview. Questions were designed to capture the categories and extent of technology use. Questions included items to determine the degree to which 13 types of technologies were used and seven questions about perceptions of technology use in the classroom. A scale based on *never* to *extensively used*, scored the first 13 questions. The final seven questions were scored on a Likert scale of *strongly disagree* to *strongly agree*. A short paragraph describing the survey was provided to the participants. The survey was offered either online or by paper and pencil—at the preference of the participant. All participants chose to take it online. The second survey dataset were collected after all interviews were completed. An email was sent to all instructors listed in the College listserv. Eighty-five instructors participated in the second survey dataset. An original email and two reminders were sent to everyone on the listserv (Dillman, Smyth, & Christian, 2008).

The online survey was created as a webform which was connected to a spreadsheet. When the participants answered questions on the form, answers were automatically available in the spreadsheet. Each submission for the participants in the interviewed group was identified by an assigned participant number and by question. The College-wide survey did not include identifiers. The form and spreadsheet were encrypted. The blank form was only available to those with the web address—the participants of the study. The spreadsheet is only available to the researchers. Once all participants submitted their answers, the spreadsheet was downloaded, printed, and removed from the website.

Data from the survey were analyzed using SPSS. In the analysis stage, results were first analyzed alone then results converged with the qualitative data offering a clearer understanding of the instructors' practices by providing numbers to enhance their words. Data from the two quantitative datasets (N=20 and N=85) were also compared to determine differences between the referred, experienced participants who were interviewed and the college-wide instructors who responded to the survey.

Mixed Methods Data Analysis Procedures

For both forms of data analysis, similar steps were required: preparing and organizing the data, reviewing and exploring the data, coding and building themes, testing hypotheses, determining statistical tests, and reporting and interpreting the data (Lodico, Spaulding & Volegtle, 2006). Onwuegbuzie, Slate, Leech, and Collins (2009) assert that analyzing the quantitative and qualitative data is the most difficult and complex part of using a mixed methods design. The central question of this study that

relates to mixing the data is, do the participants' uses of technology inform their attitudes about technology integration?

Because this is a triangulated mixed methods study, data were analyzed in two stages. In stage one both qualitative and quantitative data were analyzed separately. Stage one included carefully reading and re-reading the interview transcripts, coding and determining developing themes for the qualitative data, and identifying interesting patterns to find unexpected or puzzling issues that stood out. The quantitative data revealed both descriptive and inferential statistics. Descriptive statistics describe what is there. Inferential statistics allowed me to draw inferences or related variables from the data based on my research questions. What I hoped to find was a relationship between attitudes of instructors toward technology and the extent of their technology use in the classroom.

In stage two, the datasets were merged to show the complete picture. This helped to determine the extent of data convergence, as well as how the themes and survey results were similar to each other (Lodico, Spaulding & Volegtle, 2006). A matrix (Appendix D) was created to show key responses of participants' interviews along with survey data, thus converging the results.

Validity Approaches in Qualitative and Quantitative Research

Creswell and Plano Clark (2007) recommended:

- Reporting and discussing validity with the context of both qualitative and quantitative methods since both types of data are collected and analyzed separately.

- Use of the term “validity” or “inference quality” to refer to validity procedures for a mixed methods approach.
- Within mixed methods, defining validity “as the ability of the researcher to draw meaningful and accurate conclusions from all the data in the study” (p. 146).
- Discuss validity from an overall perspective. Although it is difficult to combine two different datasets as in a triangulation design, it is possible to see results that would be better than one set alone.
- Discuss potential threats to validity in the data collection and analysis of the mixed methods study and seek to minimize those threats (Creswell & Plano Clark, 2007).

Potential threats to this triangulation mixed methods design include both threats to data collection and threats to data analysis. Potential threats were minimized by using the same sample for both the qualitative and the first quantitative dataset of the study.

Reducing bias during data collection was important to this study because in my role as an instructional designer, I work with technology and distance/online instructors on a daily basis. I was careful to not impose my views and biases during the interviews and data analysis. I reduced the chance of these threats by following recommended steps of data analysis for both qualitative and quantitative data collected. A triangulation of sources helps reduce the threat and a sample size of 20 participants helped reduce this threat. Member checking also reduced threats. Transcripts of interviews were made available to participants to allow them to confirm their words during the interview.

Ethical Concerns

Ethical concerns were considered throughout the study. Gorard and Taylor (2004) stated that these concerns primarily “[focus] on the actions of the researcher in respect to the participants” (p. 172) and that quality and rigor are important. Confidentiality was upheld and informed consent was obtained (Appendix E). Names were not associated with participants except on a list of participants with their pseudonyms which are kept in a locked cabinet in my office. There were no known risks to participants. Institutional Review Board (IRB) approval was received before the study began (Appendix F).

Data Reporting

A matrix best shows the convergence of the two datasets. Discussion is also effective in communicating qualitative data results followed by quantitative data (most-used technologies) to compare the qualitative themes that emerge from the interviews with the quantitative data from the survey.

Limitations

One limitation of this study relates to the difficulty of merging two datasets. Another limitation of the mixed design of this study was the number of participants for the college-wide survey. There was not a safeguard for assuring who was responding, although only those who were invited had access.

End Note. The survey instruments used in the 1998 and 1999 studies of the impact of instructional technology on teaching and learning at MTSU may be adapted and used. MTSU retains the copyright on the original surveys and requests that proper credit be given if the instruments are used (<http://www.mtsu.edu/~itsurvey>).

Summary

In this chapter I described the methodology used in the study. The following seven chapters will outline the findings of the study as the methods have been applied. Five chapters of qualitative findings will be followed by a chapter on quantitative results and finally the mixed methods results.

CHAPTER 4

Findings

This study was guided by the central question, *How do instructors who use technology to support pedagogical best practices in the classroom describe their experiences?* The use of a triangulation mixed methods design used both qualitative and quantitative data to examine the relationships between attitudes and integration related to the descriptions of integration practices.

The follow seven chapters report the findings of (a) the qualitative interviews and the quantitative surveys, and (b) how those findings converged to offer an inclusive picture of instructor technology use in a college of education at a Midwest Research I university.

Findings from the 20 interviews will be described in chapters five through nine and analysis from the interviewed participants' responses to the survey, followed by analysis from the survey of the College of Education at large appear in chapter ten. The mixed analysis will be reported in chapter 11 followed by a discussion of the interpretation of the results in chapter 12.

The qualitative sample consisted of 20 university instructors known for using technology in their teaching. Interviews ranged in length between 55 and 65 minutes and were conducted in a place convenient to the individual instructors—usually in their offices. Pilot interviews began in January, 2010 and all interviews were concluded in November of 2010. Surveys were offered in a paper-and-pencil format or web format at the time of the interview. All interview participants chose the web format and the link to the survey was sent to participants subsequent to the interview along with a thank you

email. Survey completion from the faculty of the college was requested via email and the link to the encrypted form sent with a statement that submitting the survey data was analogous to signing the informed consent form. No identifiers were collected from the college surveys.

Analysis of the recorded interviews revealed five themes. The themes are; technology tools, student learning, pedagogy, context, and relationships. Descriptions of these themes are recorded in the following five chapters.

CHAPTER 5

Theme 1: Technology Tools

I try to show my students what is appropriate for use. I'm honest with them. I say, you know, I'm a real "techno geek." I have to have all the latest tools, toys just like... a lot of people. But there really is a time to use technology and time that's better just to leave it turned off.

The words in this chapter are representative of the participants in the study. They are significant because they offer a picture of the value of technology tools in classrooms today—whether they are face-to-face or online.

The value of interviews lies in the wealth of information gleaned from instructors who have incorporated technology into their teaching. Comments about the tools they use varied from online to classroom-based. Participants' comments were rich with descriptions of tools used and how they are used in courses. They spoke about the effectiveness of tools and their own feelings of inadequacy in integrating them properly and adequately. One participant said,

I think that the tools have been pretty effective. I haven't pushed the tools to the maximum, because I know there's a lot more that they could be doing and that I could use to assess their learning. So, for example, I could have them send me PowerPoints or narrate things. Mainly I'm analyzing text when I'm looking at their understanding of things.

Another participant spoke about the value of the availability of technology. He said,

Students can get access to information so much more quickly than they could when I first started teaching. The information is relevant and up-to-date. We were doing a unit on space in grade 6 Science. I went down to the library in the school I was teaching at and grabbed all the books on astronomy and space and took them back to my room. I hadn't really looked at them. When I got back up to my room, I opened up this one book, and this was in 1970 and it said, "one day man will reach the moon." And man had reached the moon at least 10 years before that time.

In Table 5.1 the frequency of use of tools mentioned during the interviews is displayed. These frequencies were extrapolated from the conversations with participants—not from the survey.

Table 5.1

Frequency of Use of Technology Tools, N=20

Tool	Frequency	Tool	Frequency
Discussion Board	9	Captioning for video/audio	1
Blackboard	9	Peer/self assessment	1
Adobe Connect	8	MS Word comments features	1
PowerPoint	8	Jconnect	1
Videos	7	Pre- post-tests	1
Automated feedback	6	Proctored Exam	1
Blogs	5	Excel	1
Texting	5	Timed exams	1
Discipline-specific Software	5	Online course evaluations	1
Wikis	4	Google Scholar	1
Email	4	Internet	1
Facebook	4	Publisher website	1
YouTube	3	Digital components	1
Graphic software	3	Twitter	1
Skype	3	Elmo	1
Hybrid Interaction	2	Voice recognition Software	1
Web 2.0	2	Listserv	1
Audio	2	Podcasts	1
Study guides posted online	2	Clickers	1
iPad	2	Rubrics	1
Web search	2	Electronic textbooks	1
Jing	2		

Technology tools' frequency of use from interviewed sample.

Blackboard as a Course Management System

Nine of the participants talked about the value of Blackboard, the designated course management system at the university. Most were positive about the tools found in Blackboard. A few participants used other technologies to do the equivalent to what they wanted a course management system to accomplish. They felt Blackboard was too restricting and found homegrown tools worked better for them. Following are three statements from participants about Blackboard:

Blackboard has been very valuable... It has relieved the paperwork issue of getting wads of 30 reports to have to read; whereas, I can nibble at those easily without having to carry all that around all the time wherever I am, as long as I have the internet access. Also structuring one's course I think was facilitated with Blackboard.

I utilize Blackboard for posting a student version of my PowerPoint slides... they don't have to write as much, but they always have to fill in some information. It provides them with some of that study information.

A course management system includes communication tools. One participant cited "instant communication" as being a big help, "Instant communication; email. If a kid has a problem with something, he can email me via Blackboard and before we meet for the next class that problem has been resolved."

Another participant who had extensive experience teaching distance courses, spoke of the value of Blackboard as a course management tool.

My first efforts at distance teaching were video, television, and then after that we started using Blackboard as kind of a gatekeeper of documents. So we just would post an assignment or make reference in the TV presentation of an overhead. We'd use the ELMO and we'd show something and they'd say, "Can we get a copy of that?" So we'd put it on Blackboard. For other courses where we didn't have television, I'd tell a story, I'd write it out, give them links to websites or handouts, PDFs. So it was Blackboard as the text base and me trying to converse with the students in a conversational lecture in print; which worked for a number

of years. It was innovative enough that it worked. And then the novelty [wore] off and other technologies looked a little bit more exciting.

One participant shared her learning experience with effective use of Blackboard. She also spoke of recent changes to Blackboard.

[I need to have] a moderate understanding of Blackboard. You don't have to learn all the bells and whistles to get it to work. But you do have to have a pretty good overview of it and I've found that the new version of Blackboard makes it a lot easier and I'm trying to learn more about that.

Another participant did not mention Blackboard by name, however he spoke of the value of some features.

I've tried to go paperless... I have my students send me all their assignments electronically. What I like about that is that I can review them in Word and then use the comments feature in Word and just write my comments wherever needed. Then I just email them back to them at that point in time.

Two other participants spoke of recent changes to Blackboard and what has worked for them. One participant said,

Recent advances in Blackboard have been very, very helpful—the ability to grade discussion boards has been really helpful. What has worked is the use of discussion boards, and that's as old as time. Blogs have worked for me; although both have worked in a limited way. Kids get tired of them after a while as an ongoing assignment. So the ability to play with the variables and shift between modes seems to be helpful.

Blackboard was used by some participants for assessing their students. One participant stated, “I use Blackboard for almost all my assessments—the test feature. I use it for objective and more analytic and synthesis things.” Participants spoke of the use of assessment with the Blackboard system. One said, “My students are assessed on content through online technology. The grade is pumped directly into the gradebook—alleviates me from that and immediately.” Another stated, “I have been able to post open book application level tests in an assignment tool.” This tool allows students to upload a document—a word-processed file, spreadsheet, or presentation file. The instructor views the files from the grade center and is able to provide comments and/or corrections to individual students. About assessing online, another participant said,

You’re able to put a multiple choice test on there (Blackboard) and it grades it for you. That was a huge time saver. And the test was there and you could edit it and do an item analysis—you knew exactly which items the students did well on.

Another benefit to use of a course management system is the addition of testing/quizzing tools. Blackboard houses assessment software for timed tests, quizzes, anonymous surveys, and uploading assignments. Instructors can post video, images, and audio files as part of the assessment. They can provide specific feedback to students not only on overall grades but also for further learning on questions missed and correct answers. Many of the participants of this study talked about the different testing features they use.

I have been able to post open book application level tests in an assignment tool.

Online assessment has worked tremendously well for me. The final is done online. I love it like that. It's actually a lot better than in-class assignments it gives them the choice. So for example I have three parts to my final exam and they can take them at totally different times. I open the whole thing for five days and each part is two hours. It has a timer—the timer has two hours on it. So once you open it, you have two hours. For all I care, you can do it at any point in time. That makes them happy—makes me happy.

Use of online quizzes (using Blackboard quizzing) was described as an important pedagogy in preparing for class participation.

Online quizzes—this has ended the not reading the textbook chapter. They read it, they take a quiz on it, and they come to class prepared for a rich dialogue, and I've noticed my evaluations have been impacted a bit. They were always strong but now they're even stronger. They come committed even though there is some resistance on occasion. But they come ready to learn because now they've had to do the quiz.

One instructor spoke of the help that timed exams are to her. She said, "The timed exams would be an example of where technology is used. I've had as high as 50 students in a class, so I could do the volume of testing that's possible with the technology." She went on to speak about the use of pre- and post-tests and the part they play in her course.

Another way I use assessment is the pre-and post-tests that are a part of every module. They are not part of the course grade, but they are part of the assessment on the part of the student, one, honoring the amount of information and

experience they have when they come into the class, so they don't need to do everything if they have a high level of competency and show that on the pre-test—they can start where they really need to.

Another participant uses online assessment with his final exams. He said, Online assessment has worked tremendously well for me. The final is done online. I love it like that. It's actually a lot better than in-class assignments because it takes [away] some of the anxiety—it gives them the choice. So, for example, I have three parts to my final exam and they can take them at totally different times. I open the whole thing for five days and each part is two hours. It has a timer—the timer has two hours on it. So once you open it, you have two hours. For all I care, you can do it at any point.

Discussion Boards

A second tool mentioned by nine participants was the use of discussion boards. Most of these were inside Blackboard, but were discussed as a very powerful tool to enhance student learning. Many found it better than face-to-face discussion for some students. One participant stated,

There is more discussion on the discussion board than there was in class. For whatever reason, people feel more willing to share on a discussion board by typing stuff than they were if they were saying something. I try to encourage it. I've been surprised at how well people on the phone can listen and still contribute to class discussion. Even though I'm focusing on the people in the room, they seem able to jump in.

One instructor talked about the way he is involved in the discussion board

[In discussion board] I have the scrap of involvement where I'm fairly heavily involved in the beginning, although not too much because I don't want my voice to shut all the other voices down. Then I monitor and push the quality up by asking questions and guiding that discussion. And then I find a way in as I see the quality and the truth is that there's a certain point where, no matter what I will do, it won't get any better.

Another instructor spoke of her experience with discussion board.

I think part of the community building is my being a presence. I still get feedback from the students that the reason they learn from discussion board is because I do so much of my teaching there. That's where I see myself actually teaching, which means facilitating learning.

Discussion boards allow students to thoughtfully respond to questions in the course. Two participants talked of their use of discussion,

We've had three-hour asynchronous discussion board that have been fabulous. Fabulous! With hundreds, literally hundreds of interchange during those three hours. I think that when they're putting it down in writing, they tend to try to be clear in their thoughts a little bit more.

Discussion boards that are application of taught content [have worked]. They're also scaffolded by the instructor. Discussions have open options for perspectives, whether that be different people's experiences that are shared, or it poses a question for a dilemma and there are different answers and people can bring that to the discussion.

One issue that has plagued instructors in the change from face-to-face discussion to online discussion is how to evaluate the quality of the postings. Two of the participants talked about this issue and shared about their use of a discussion rubric to enable them to objectively assess students' discussion. During the interview, one instructor showed me a rubric which was in the form of a table with multiple levels. She stated,

This is not a matrix. These are just examples of things that you're looking for in order to give it a five. When we really want to be picky, we say, "this was an example of 4A or this was an example of 2E."

"God's gift to the distance educator." One participant—a distance educator—spoke of the value of the discussion board. She said,

I've become much more directly interactive with individual students. The asynchronous discussion board is God's gift to the distance educator. I'm even doing pedagogical research on ways to make maximum use of the asynchronous discussion board. I think I can raise a students' higher order thinking levels, studying what kinds of prompts and what kinds of tasks will do that. I am able to hit each student at their own level in our discussion; which means if everybody's using the same materials to start with, I can tell from what I ask them to do with that material, where I need to respond to them. It's allowed me to provide distance oversight so that I can get students to tell me what they're doing and therefore they have to analyze what they're doing more than if I just came and observed them.

This participant showed me the earnestness with which educators approach their role. She demonstrated a passion for teaching and commitment to doing what was necessary to provide an environment for students to learn.

Adobe Connect

A tool mentioned by eight of the participants was Adobe Connect which is the supported web conferencing tool used at this university. Adobe Connect was first introduced as a pilot without a deadline. This proved to be frustrating for instructors as many were quick to implement it without wide technology support. In spite of the difficulties in support and use, Adobe Connect has been widely used by instructors and administrators alike which points to the need for a web conferencing tool for instruction and administration. One participant stated, “Adobe Connect is a very useful tool.” Another participant spoke about the power of the tool in bringing in other instructors as resources to the students. He stated, “The synchronous delivery has been effective—using different instructors and actually demonstrating the power of that.”

A participant said,

I have been using Adobe Connect with another instructor in [another state]. The two of us do the same thing. We have our classes at the same time and we have different expertise and so Dr. X is online to teach my class this semester. I taught his last semester a couple of times using Adobe Connect. That worked relatively well. Adobe Connect is pretty complicated, though.

Three of the participants use Adobe Connect for advising their doctoral students. They have blended doctoral seminars that meet weekly and using Connect allows their distance advisees to be part of the total group. This allows them to discuss their projects

and share with fellow doctoral students in ways that challenge each student in his/her doctoral research and writing. One of these participants said,

A participant talked about the help that Adobe Connect could offer in allowing her to provide instant feedback for online students. She said: “Synchronous discussions on [Adobe Connect] help with the component that students really miss out on—the ability to interact with others and get real time feedback with question and answers.”

The students really love to be able to be part of the doctoral seminar. Even if they’re in [another city] they like being able to interact with their cohort and for us to facilitate that.

Additional applications that work with Adobe Connect allow students in blended classes to participate without having to pay phone fees or use cell phone minutes. An instructor who teaches a blended class stated, “Skype has allowed students to plug into Adobe Connect without the phone. They’re not using their cell phone—which wasn’t great reception. They’re using Skype and getting very good, clear audio.” Adobe Connect also allows instructors to record sessions for students who are not available at the time of the web conference. One participant described the power of those recorded sessions, stating, “Students have been able to use the recordings of an Adobe Connect presentation. I have a student this semester that’s traveling, moving across the country over a four-week period from Virginia to California and she’s keeping up on class.”

Skype has also been used as a conferencing tool. Three participant mentioned the effectiveness of Skype. One said,

About a third of my students are on Skype with me and that's useful because they know that when I'm on they can ask quick questions and in addition to that, it helps in a number of ways.

Video, Audio, and Podcasts

Video was mentioned by seven of the 20 participants, audio files by two, and podcasts by one. They used these formats in a number of different ways. Some were QuickTime videos to illustrate teaching points, others were videos the instructor recorded as lectures or introductions to a module or new topic, still others used software such as Jing to demonstrate a how-to lesson. Audio files were used for interactive coaching and introducing or wrapping up topics. The podcast was viewed as a different type of lecture format.

Video. One participant used embedded video links in narrated PowerPoint presentations created using Adobe Presenter. Her view of the videos was,

The videos we have hyperlinked [into the narrated PowerPoints] are very good. They're the ones I've not always been able to use in lecture just because of the timeframe. The [narrated PowerPoint] allowed me to include some of the videos... to supplement a lecture.

A participant commented that the use of videos brings up issues of accessibility when she said,

Streamed videos are good, but more and more the captioning of those—transcripts are not enough and we're having difficulty finding ways to do that.

A participant spoke about the power of videos for her students when there was a gap in their learning. She said,

When [my undergraduate students] were in elementary school they didn't have systematic phonics instruction because of the language being taught at that point. So it's another layer of information and practice. I think that with the videos they can watch the teachers actually teaching lessons that are incorporating the concepts. They are able to see that this is not an impossible thing to do—actually a relatively easy thing to do. So in that way, it scaffolds my students and gives them a clearer idea of different instructional tasks they might have students do.

Visual demonstration is a powerful process for learning. It can enhance face-to-face classes as well as show distance students how to understand or apply a concept that is important to their learning. One instructor stated, “I like the videos in class. It helps me to be able to see the principle in action. You can talk about it, but to watch it is a different thing.”

Two instructors talked about videos they find on the web as opposed to “staged” full-length videos they could provide their students. One participant said the following:

I can go and buy educational videos of children and they're staged. But when you go to YouTube, you're looking at people's home movies of real kids... It's very interesting, [students] can't stand talking heads—a non-professional production of a lecture, but they're very tolerant of YouTube videos... and I have found that they actually then start to send you suggestions for the next lecture; did you see this one, did you see that one?

Another participant spoke of YouTube as well.

I've used a lot more consumer-produced media. I've always used a lot of videos in class... over the last couple of years [I've used] a little YouTube video of somebody talking about what it was like growing up in this situation or how they're dealing with their experience in adopting a kid. So I've use a lot more consumer-produced, nonprofessional produced media. And I think that's changed a lot.

Self-made videos of specific course applications have proven to be useful for several disciplines. One participant used video to summarize a module and introduce the next.

The video clips of me doing a summary of a module or me doing a little prelude to what's coming the next week, my audio clip feedback on an assignment—those I hear about. Students say, “Oh, I like it, and I like hearing it, I take notes when you're talking.” They'll email me and say, “Thanks, but I have a follow-up question.”

One visual arts instructor truly used multi-media in her classroom. She said, I can use the video camera that we got with the dry erase boards to video tape myself drawing and I can publish that on YouTube. So, now the students are absent and they miss the demonstration, I'll just tell them to watch it on YouTube. She was able to blend use of a dry erase board with video, demonstration, and YouTube to deliver important visual content to students.

Another example of YouTube effectiveness was highlighted by a participant in a course where multicultural understanding was important. This participant said, “In my

field, I get to pull up authentic YouTubes. If I'm talking about the subway—the Metro in Paris, I can pull up a subway YouTube to show them.”

Some uses of video are fairly common and offer valuable illustration or demonstration that are more powerful than verbal or textual delivery. One participant spoke of a variation of this use when she said,

I have a class now where I show a video clip and the students have to watch it and write up what they saw happening in real time of this kid on a videotape. Years ago we would have showed a video in a classroom and typed up a description and had them read it.

A participant described her use of video for teaching pre-service teachers.

When [my undergraduate students] were in elementary school they didn't have systematic phonics instruction because of the language being taught at that point. So it's another layer of information and practice. I think that with the videos they can watch the teachers actually teaching lessons that are incorporating the concepts. They are able to see that this is not an impossible thing to do—actually a relatively easy thing to do. So in that way, it scaffolds my students and gives them a clearer idea of different instructional tasks they might have students do.

A specific application that was identified as important by two participants was Jing. Jing is a free web-based tool that allows one to create a five-minute video showing their computer screen with voice-over. The files are small and the screen-capture is saved either on the web or the creator's computer and can be linked in a course. Some typical uses include tutorials, or demonstrations for students to view a process. One participant said,

Jing technology for giving demonstrations has been well-received. The content is so important to them functioning as a student because it's telling them how to use a website, or how to fill out a format or something. I don't hear a lot of accolades about it, but if I probe, they say, "That was really, really helpful." What else can you say except "Thank you?" You know they just got the message. I don't have many misconceptions. I don't have people making mistakes like I did. So I think it's clarified my communication.

One participant described his thoughts when he was first introduced to Jing.

If I were just shown Jing and told to use it, I would say no way. It's too complicated. It's got action, it's got audio, it's on a website and it's moving around. But when I began to see it as a tool to communicate a demonstration that I wanted people to see, then I used it that way to help me get a message across of showing them how to orient themselves within a website, or how to go through a diagram and see the different parts of the diagram that I want them to pay attention to. And now I can comfortably open Jing and in five minutes get a good message across. So, I'm not as afraid of technology as I used to be.

Audio. Another participant spoke of her use of audio for lectures. She said, [Students] lean on it, they hang their hat on it, it grounds them. They feel as though I'm committed to them by being a voice every week in a lecture. I think I've always been very good at lecturing and I abandoned it for a long time. So I think I've evolved back to it, but in a new medium.

Podcasts. Podcasts have become popular due to the ubiquitous nature of mobile applications. Instructors are finding the informality of the podcasts to make creation of

content easy and easily disseminated. They use podcasts for explanation of concepts, feedback, assignment comments, and even lectures. One participant stated,

I've found podcasts to be extremely efficient. I sit down, I have a list of things I want to talk about, and I just talk. The advantage of the podcast is it doesn't need to be so structured. If I would have to write it, it would take me four times that time, maybe more. And I would never actually get to it. When I just turn it on, I talk for 50 minutes, we're done. Packaged and sent.

A participant used podcast to walk students through how to use Google Scholar. She said,

Google Scholar has really done tremendous things and I have a few modules. I actually use podcasts for that to walk them through the process. How do you know if that's something worth looking at or not? What are the sources that will help guide you toward the most seminal research?

PowerPoint

PowerPoint has been used for many years in the face-to-face classroom. It is being used more and more for narrated presentations of material for instructors who teach online or who would like to provide audio with their visual lecture material.

Eight participants mentioned PowerPoint in the interviews. Among those who use PowerPoint, one participant stated, "I have developed more [narrated PowerPoints]. I try to do one each semester. Have to have the narrated PowerPoint lectures."

Another uses it for supplemental information. He stated, "By using PowerPoints, I can really supplement the text, and have it updated." Another participant said,

Some of the PowerPoint's pretty cool. PowerPoint makes it possible for me to do some really cool things as far as indulging in my love of making visual multimedia. It's a combination—the interaction of linguistic and pictorial information to enhance new learning.

Some instructors have found that their use of PowerPoint has changed through the years. One participant shared,

[I use] simple things like PowerPoint for presentations although... I'm using it differently. I used to use it for words and now I use visuals essentially to access documents through PowerPoint to show examples. I'm using PowerPoint more effectively I think.

Participants related that their use of PowerPoint drew positive comments from students. Concepts can be effectively presented because of the ease of using images and visuals within PowerPoint. One participant said,

[Students] are complementary with the PowerPoint slides that I have developed. My field, textiles is a visual world, and, to just put text on slide after slide after slide does not make the link to the visual component of textiles. So, what I have developed in all of my [narrated] PowerPoint lectures, is always inclusive of visuals within the slide—to sequence them in with the [audio].

About the effectiveness of narration included in PowerPoint, a participant stated, I can easily upload PowerPoint all day long. But that's just not going to be nearly as effective. You have to take the opportunity to give the examples, the illustrations, describe the concepts in depth just much more effective than looking

at bullet points, which is why posting notes for students can't serve as a substitute for coming to class.

Another participant commented on the convenience of bringing guest lecturers into the class with minimum difficulty.

With Adobe Presenter [narrated PowerPoint] we've been able to bring the experts from the medical community to our students every time we teach without having to schedule all those people's appointments for a night time class and a drive to [campus]. It has made access to the information easier for more students.

Automated Feedback

Participants spoke about the effectiveness of automated feedback in online testing. Six participants told about their use of automated testing features offered on this campus. One participant mentioned the convenience of automated assessment and feedback, "My students are assessed on content through online technology. The grade is pumped directly into the grade book—alleviates me from that and immediately."

An instructor commented on feedback as part of online testing,

In terms of the students, they liked the online tests where they can get some feedback. At the end of the multiple choice test they can tell right away what their score is and get feedback as to which questions they missed. I think that does help a student put closure on some things.

Proctored exams have become an important part of courses in some departments. A participant spoke of this, "Another thing that really works well is the proctored exam centers on campus." The specified proctor in the exam center asks students to identify

themselves, the proctor logs them into the test, and the instructor is confident that the test was taken by the students and they have followed the rules of the test.

A participant said, “Having [tests] proctored is great, because if something does crash, it’s documented and the proctor can start them on another computer, and its closed-book.”

A participant spoke about a third party tool for testing that is linked in Blackboard,

Another big piece of software I use is MapleTA [testing software] for images. That’s been quite a learning curve for me. But I’m now feeling at least adequately skilled to manage creating questions—multiple choice questions with images and feedback with images and for my field which is visual, that’s essential.

Another participant described her use of MapleTA in connection with course materials posted in Blackboard,

I put all the course materials on Blackboard. Most of my teaching takes place in the form of what I call *study guides*, but MapleTA calls them *homework quiz*. That’s where students can find out really whether they understand the material or not because I give them many questions. When I was first asked to do this course, I was told, “well you really need to put maybe five questions to each lecture just to see if they’re getting it.” Over the four semesters I’ve taught it, I know now that’s not what they need. What they need is repetitive practice and questions phrased in many different ways, different images and ones that require them to do their analytical thinking not just repeat definitions.

Blackboard and MapleTA give students this repetitive practice allowing variations on questions.

Blogs and Wikis

Blogs and wikis have been used extensively by the participants of this study. Blogs were cited by five participants as valuable tools for students doing reflective assignments or analyses where classmates would benefit from viewing their work. Many faculty offer wikis for collaborative assignments when distance students need to work together on a project. A participant spoke of the effectiveness of wikis saying, “Wikis have allowed me to give feedback on some of their projects as they go so I can have them do drafts and I can give feedback pretty efficiently.”

This collaborative space allows student to post their work, make changes to each other’s work, and present a finished product without having several iterations of the project going back and forth through email. It simplifies their communications and is less complicated than former ways of collaborating on projects. In the past, the discussion board was used for projects such as this. One participant stated, “[Blogs and wikis] are a part of the skill development. It’s changed through time from the use of the general discussion board into the wikis. That has been a really good change.” The difficulty with using the discussion board for this type of collaborative effort was the threaded format of the discussion and the way links to collaborative documents could get buried in the threads. On wikis, students final projects can be made available to the rest of the class for observation and comment and instructors can view the history of student collaborations—a valuable tool for assessing group activities.

Another example of an effective use of Wikis was described by the instructor as closely matching real life,

Students are faced with situations and asked to respond to questions that will come up for this case in the future. They learn the concepts of the course all in a framework of a team approach. When they finish this course, they are well-equipped to move forward in their career because they have the contextual tools as well as the ability to work with a team in this setting.

A participant commented,

I use the wiki and I had a good experience with the wiki last semester. [Students] are either educators or childcare people... They had to do two wikis. They had to participate in one wiki that was created around working with the age group that they wanted to work with. They had to contribute to a wiki that talked about how you work with families with an adolescent, how you work with families with a young child. The other one was professional related... The outcome was really good... I liked that I could see which students participated and how much they contributed. So to be able to go back and track, I think Blackboard does an awesome job... of tracking.

Wikis also have been seen as valuable to students. One participant said,

Wikis—the students liked that. They liked knowing that their contribution to the group project was going to be recognized as their contribution. They liked producing something that wasn't just reading a journal article... videos they can use documentaries, they can make their own videos... This was really a great, great experience.

With the wikis—I can look and see if they contributed something meaningful. It took a lot of stress off of students—there’s always griping about group projects, because they feel like their contribution isn’t recognized. And I never have students worry about that at all.

Blogs are used extensively by instructors on this campus. A participant said, “I use blogs pretty heavily.” Another stated, “Within Blackboard, blogs are very useful for student journals, wikis are better for students to work together on small projects—tools that allow students to do what is really important.”

Blogs are an effective reflective tool. Following is one participant’s use of blogs, Classes where I prompt them to write a philosophy statement four times in the semester in the same place [blog]—so they can read their first draft, see my feedback, read their second draft, see my feedback. If a student had been doing that in handwriting and turning it in, it was a 50/50 chance they would be reading their previously printed printouts or efforts and my feedback; they probably would have started their third one from scratch and just gone forward. So this one forces it for them to reflect a little bit.

These collaboration tools have offered instructors greater flexibility in the types of assignments they offer in their distance courses and many of the participants have used them with positive results.

Texting

Five participants talked about texting in the classroom. Their use of texting included a variety of assignments and types of uses. The question many participants had about texting was the difficulty of texting for in-class activities, but not being able to

monitor texting to one another which could distract from learning. A participant explained his reluctance to use it, “I have a general distrust of text messaging. I have to admit that in general technologies that might cost people, like text messaging, are problematic for me.”

One participant used texting and found while it caused disorder in the class, it was effective for the assignment,

This is something I’m not sure I would do again. But we had them in teams. We were doing reviews for a test and the first one who could text the answer... The grad student was standing up there, [saying] “this is pretty crazy.” They got the point—they loved it!

A participant commented about a colleague,

[One instructor] experimented with text message so she got an additional phone and the only function of the phone was in-class text messages. And so students could text her. The only thing that I haven’t talked with her about how that went, but I know that one of the concerns that she had was that then there would be a lot of text messaging going on that had nothing to do with class.

Another participant shared about his use of texting for a face-to-face course. He said,

I’m experimenting and I’m using, very sparingly, text messaging—group text messaging. Snow storm, no class goes out to everybody’s phone right like that. Just things that are quick—I make them short. They’re like real text messages but I group text to the whole class. I can send it out from my email as a text message that goes through their provider.

A participant spoke of the use of texting in a high school and his thought that at the university level there is a need to move forward with many of these technologies—especially in teacher preparation programs where our students need to be prepared to teach in settings of all kinds. He said,

I saw at one high school, the students were texting up onto a Smart Board and doing multiple choice and electric scale and things like that. I think the question I'm likely to start getting is, "When are we going to get Smart Boards and clickers in our classrooms so we learn how to use them because we have them in schools.?" You know, it's only three year ago, some of my undergrads were high school seniors, so that stuff is going to catch up with us pretty quick.

Discipline-Specific Software

Although the participants were all in the College of Education and Human Sciences, I found a variety of technologies used for specific disciplines. These included math education, science education, textiles and design, and business education. Participants spoke about the importance of these applications to their teaching. One participant spoke about applications used in his courses. He said,

Part of [our] curriculum is input technology, which is keyboarding and voice dictation software so [students] have to practice doing a lot of that stuff so they understand how to use it so they can teach it when they're out in schools themselves. I guess it would be rote learning, but when we use the voice dictation software they're actually sitting at the computer learning how to use the software. So they've all got headphones on, all got microphones on and they're talking to the computer and learning how to edit mistakes and stuff like that.

I did discover that there is a version in Dragon Naturally Speaker for the iPad. I haven't really played with it yet, but what I would like to do is try to use it in some conversations like this with individuals, students, and staff. It converts right to text. While it's recording you can't see what it's doing. You can just see that it's recording.

A participant commented on the communication technology used in his discipline, "What we're trying to do is use communications technology to deliver and explore a mathematical technology problem-solving system."

Publisher websites were valuable for some disciplines. A participant acknowledged,

It's (publisher website) a study aid. I work with a peer mentor to have her use the companion website when she does her peer mentoring sessions. So it augments it too. It balances so they don't go away thinking the only thing they have is PowerPoints.

An intriguing software used by one participant was that of the virtual child. She explained the process,

[Students] birth a virtual child. Before the child is born, they get to name it...

They take a mini personality test... and they're randomly given the gender of the child. They get to name the child, they get to select the ethnicity of the child, but that's all. As their child grows there's a little picture of the child. They can actually see motor development. They get scenarios with four choices. Based on their choice, they go to different parts of the program... We have them write a two-page paper, give them the rubric ahead of time and then instead of giving us

the paper, they exchange papers in class... and they do peer evaluations. They talk about their children and share about their children; it's very interesting. The technology presents the platform for us to help students engage with one another in very practical, but also very academic topics related to child development.

The instructor believed one interesting aspect of the virtual child activity was the way in which the students approached their "child." They viewed the child as real. She spoke of a conversation with a colleague. She said,

I have reports from colleagues, and one colleague who teaches family sciences didn't know about the virtual child. She said, "There's this group of 15—they were all talking about their children. I couldn't believe there were that many single mothers in my class." She couldn't tell these weren't real children.

In the interview, a participant demonstrated a software application he uses. As he demonstrated he said,

So that's the difference between drawing and constructing. And you construct something, you build certain properties into it. You draw it, you just get what it looks like. And notice that while I'm doing this, it's also logging the coordinates and everything over here. Then you can do it the other way. You can put things in here—you can put in some algebra and it puts in an equation up here, and then it puts a problem here which you can change. As you change it, it also changes there. So it's a very interesting interactive program, and I've taught two or three courses where this is sort of the central feature.

Another participant uses a type of tablet software for her students. She said,

I started in the fall using Waycom Pen Tablets. Lab fees enabled me to get one per student. I just treated it as another medium as though I were teaching charcoal, watercolor or some other hand's on medium. The [students] did a long series of drawings and strung them together in an animation on QuickTime. "Oh, wow!" Those turned out to be fairly interesting, and I know from my own experience if I teach this two or three more times I will be able to anticipate better what the difficulties are and [help] them to produce a better product.

About discipline-specific technologies an instructor stated, "Teachers many times are introduced to technology, but yet they don't have a deep enough understanding of the technology and how to use it appropriately." Technologies need to be understood in order to be effectively implemented.

Email

Email was mentioned by four participants as an important communication tool. One commented,

There for a few years I had students say, "Well, I don't use email anymore. I use Facebook." I use those kinds of things; I don't check my email. But now with the smart phones, I have a lot more students using email again because they can get it on their phone... I notice the amount of communication that I have that's email based, but it's really coming from their phone.

A participant talked about the significance of instant communication. He said, "If a kid has a problem with something, he can email me via Blackboard and before we meet for the next class that problem has been resolved."

Listservs are email for groups of individuals. Some listservs are based on subscriptions, others can be set up by an instructor to easily communicate with the class. One instructor spoke of the power of listservs for his students throughout the years,

We have our own listserv, and we've had listservs for over ten years that are ongoing and still exist. So the nerds 01 is 2001 cohort and they still send pictures of new babies and sometimes questions that they have in classrooms. Its more than just technology for the old nerds—they're actually a family and they share back and forth with relationships.

Social Networking

Feelings about the value of social networking run deep—especially as it applies to teaching. There are numerous ways to measure the value of social networking and academe is just starting to look at this phenomenon. One participant said, “I think the literature's quite clear; it says that students stay in school and do better in school if they have a network, than if they feel isolated. So, whatever I can do to help them.” This network can be strengthened with online, social networking tools according to some participants. A variety of uses of, and beliefs about, technology were described by the participants. One argued,

My Facebook is not so much a social network as a professional network. With an occasional--my family in [another country] is on there too. But it's interesting that they're on there now, and some of my students have hooked up with my family so that their students can hook up with their students and do communication, which is interesting. I'd never thought about that kind of collateral benefit from it. So I do use Facebook.

Another had a different experience,

I use chats often with my graduate students for consultation. In my online graduate classes I have a lot of individual meetings... on Skype or Adobe Connect simply because the audio element helps. I tried Ning a couple of times. Never really took off to be honest... I find that people are a little confused about the use of social media.

One participant found a unique benefit to her use of Facebook. She said,

I had a student who I felt like I would never reach. Could not reach her. And she found me on Facebook, and it was okay. So, that might be a way to do that. I'm not sure I'd want to use it for teaching... because my own family, my own kids are on Facebook, and I don't want to mix that.

Still others are very careful in its use. One participant stated,

I'm afraid to use much on Facebook because of students' privacy. I've talked with students and they don't want academics drifting over into their personal Facebook stuff. So I've tried to treat the discussion board almost like it was a social networking for academic purposes... I broke them into groups of 10... but it didn't work very well. I mean that's not what it was designed for.

Another participant has had similar experiences with social networking. He said,

I'm not actually convinced that social networking has such a role in learning in standard courses. I think that it has some room in building more general growth that is almost outside of courses. So I can easily see for example, putting all elementary students on a social networking—a professional social networking site

and see if just naturally they seem to rely on each other for specific things and to have conversations about not what happens in class and class learning, but that kind of integrative thing that might happen inside.

Another participant stated,

On Facebook I have a totally social face on. I'm still very careful, but I have a totally social face. I think in some of these "worlds" students are not sure how to behave. They don't want to be totally social because this is not the point. The point is learning. And they don't want to be totally professional because we have other channels for that. So there's not a clear—this is how you do it. And this is what you do with it.

One participant who uses Facebook asserted,

Most of my students are on Facebook with me. And I don't abuse it, but I do use it. Yesterday when I started class I asked one student if she'd gotten rid of her two white kitties. I think she was a little surprised that I was aware of everything she's doing on Facebook.

The following statement was made by an instructor very interested in giving students as many opportunities as possible, to find ways to use technology and teaching using many different forms of technology,

On our Facebook page... within a week we got over 100 members to our team. So that's where I put my updates and my comments, and they put comments too about things they're learning that we want to share with people who come to our site. Getting a lot of hits on it.

Other networking applications include Twitter, a web-based software which allows followers to respond to a question of “what are you doing?” with 140 characters. One instructor tried Twitter, but had this to say,

It’s just, what do I post where and now I’m going to post on four things... I’m on Twitter, but I rarely tweet. Mostly because I find it annoying at this point. I read, I follow some people but, most of the people I followed, stopped. To be honest I don’t know if the whole thing is waning, or it’s just changing its stature.

Graphic Software

Three participants mentioned the importance of graphic software to their teaching. Following are comments they made:

Just being able to grab images from many different sources and put them up online and being able to create them and draw on top of them myself. I do a lot of that and so I’ll have an image of a painting with different charts and the diagrams drawn on top to show its composition and ask questions about the composition.

Another participant said,

I’ve increased my skills using Photoshop and Illustrator in order to make images to use for the course. So now I can fairly quickly whip up some kind of a diagram that shows linear perspective or "kirascuro" or light and shadow or some kind of question I need to ask.

Use of the Internet and Web 2.0 Tools

The term *Web 2.0* is generally used to refer to technology tools available on the internet. Many of these are free tools and many have been developed for educators. One

of the benefits of Web 2.0 tools is the fact that they can be accessed from any computer or device with internet connection. A participant spoke of the importance of these ubiquitous tools to her discipline. She said,

Foreign language is a difficult thing to sell when you can't leave the classroom and use it. So, all of those available classroom 2.0 things I'm going to call them—I need to know what's out there—I have to find them. I have to have ways to get access to them.

The Present and Future

Rogers (2003) defined innovation as “an idea practice, or object that is perceived as new by an individual or other unit of adoption” (p. 12). The word was first used in the 15th century (Merriam-Webster, 2010). The meaning of an innovation in technology integration is an individual determination—to one person it may be an innovation, to another, considered old. Individuals who participated in this study were chosen because they have perceived technology integration as important to the students whom they teach. They are innovators. Although many of the technologies described are not new, the uses of them in the classroom may be. Some participants looked at the future and speculated on what it could bring. One participant said,

Soon all books are going to be on Kindle type readers, or iPad type readers because it's going to seem really medieval that kids carry around books like Algebra books and backpacks full of these things. And that may change a little bit, too, because you can broadcast stuff right into people's iPads even faster than you can with laptops.

Two of the participants had recently purchased iPads with the hope that they could implement them into their teaching. They described ways they will use them in their disciplines.

Challenges to Use of Technology Tools

Several challenges to the use of tools in the classroom were cited. A participant spoke of the challenge to her own teaching through the years. She talked about the difficulty of keeping up and making changes. She said,

I slowly became dependent upon just the text base and wasn't sensitive to what was missing for those students who might benefit from auditory input, and I got a little complacent. I think some of my content didn't get updated because I didn't know how else to show it. It was barren text—it was typed, it had a link to a website; I figured there's nothing to do, nothing to change. And I think it became a little stagnant in some classes. With the newer technologies—QuickTime video, QuickTime audio, Jing, the Adobe Connect meetings, narrated presentations—I feel [they] invigorated me. I feel that my classes have had a rebirth. There's a freshness to them, and I want to clean them up. I want to make them newer looking and newer feeling, which forces me then to add new stuff. So I can see a new way to get new facts into the class because it's easier now to show a graph, to capture a picture and drop it into a slide and then talk about it—easier than it was seven or eight years ago... technology has taken me on a ride to revisit my classes.

A participant described his use of different technologies with varied results. He said,

I use Blackboard a lot when I'm in the classroom. I use videos and DVD. I tried to use the clickers for two semesters and I just found it absolutely disastrous because I couldn't use it for anything that was going to be graded. Sometimes people's clickers wouldn't work or they couldn't get it to work and then I was always having to go back and check. And then new people were saying, "Oh my clicker didn't work," and I knew it didn't work there, so it just didn't work for any kind of assessment capacity.

Throughout the years, participants have tackled a variety of challenges to teaching online. One instructor described how newer technologies have helped students. She said,

I have classes where they have to graph data, and I spent years with people with crayons and markers trying to make graphs. There are all kinds of systems now; Excel and PowerPoint and some on the web. We have a little tutorial of three different ways they can make graphs and those graphs come in assignments now clean, easy for me to see the message and not blinded by the squiggly lines or inappropriate increments on the graph.

A participant, concerned with the way technology integration is evaluated, said, I don't think in our teacher evaluations at the college level and certainly not in our department teacher evaluation that there's any questions explicitly asked about technology. I think that really might get at sending a message to the teachers—this is important. And it also might help us be able to better evaluate our effective use of technology.

Transparent Technology

Participants spoke about the need for technology to be transparent. What they meant was that the technology should not be an issue—either positive or negative to the students' learning. One instructor stated, “[Successful implementation of tools is indicated by] low number of system failures. By fluent use of the part of students when they're asked to do something. When it's running well in the background. When it's transparent.”

Another participant spoke of the questions she asks herself about teaching online. She said,

I worry about the other students I maybe haven't looked at in the last number of months. Maybe I didn't have opportunity because the one I'm looking at is struggling so. I'm thinking, “yes, they got B's and C's, and I had to scaffold a lot, but they passed.” And I don't expect them to be an A performer. But I'm thinking did the technology get in the way? Would this student have done better in a traditional class? I don't know. So, there's still going to be a bell curve.

Anytime--Anyplace

Instructors commented on the changes they have made in their teaching as a result of integrating technology. They talked about teaching online, teaching hybrid classes.

One participant stated,

I would say [the tools have been] very effective. There are a couple of things that I would mention to validate that. When I look at the number of students that we've had—that have applied for the program, and entered the program, and then decided that distance education wasn't for them... In the last eight to 10 years I

can only remember two students in that 10 years who have withdrawn because they just felt that distance education wasn't the way for them. So, that's a very low percentage. If you use that as a guideline, it seems to say to me that they see it as a valuable tool and a valuable way for learning.

One participant talked about the design of his course. He termed it a "hybrid" course where a group of students are in the classroom and several individuals access the synchronous classroom from their homes or offices. He said, "Hybrid courses where some of the students are at a distance and some of the students are in class is something I love. It's not easy, and it's not obvious, but it's something I love doing."

Access to course materials has been made easier in recent years for students and a savings for colleges and departments. Many faculty use the course management system to post course materials so they are accessible anytime. Other students valued the variety of methods that can be used to deliver content. An online instructor said,

Students like being able to access materials whether they came to class or not—things posted on Blackboard. If they lose everything, they know they can still go somewhere. They don't say it this way, but [they like] not having to rely on waiting a week to go see the teacher. So, I think access. They like the combination of teaching strategies that are utilized. One student just commented this week, she valued being able to hear me explain and then also having materials that were print, and a video or illustration. She said, "if I didn't get it via one method, I know that I'll be able to read something more, or see something more." I think that's the general thing that has occurred.

When courses are available to students wherever they are, they are pleased to access materials online rather than driving from remote parts of the state to participate in the class. Many have found collaborations take place that enriches the learning experience for all. One distance instructor stated, “Reach as many students as possible. My goal is to be able to use technology to reach people who can’t get access to it by going somewhere local.” Another stated, “It’s just amazing what technology has made possible as far as this kind of training.” Another participant said,

I have had a student for the last three semesters taking the last courses she needed for her New York endorsement. I’ve got two students from Kansas right now. I’ve got a student in Colorado, a student in South Dakota, a student in Iowa, some western Nebraska students, and a couple of Iowa people... I’ve got two people in North Carolina and I’ve had inquiries from five or six other states as well. Oh, and West Virginia. Students were very dissatisfied with the supposedly accessible on-campus program that was clear across the state and was online, but required them to drive every month for each class.

Online courses have benefits for instructors and students. One instructor spoke of his growth in teaching. He said,

My teaching always evolves. There’s just no way to separate analytically, my growth in teaching that’s a result of technology and my growth in teaching that’s a result of just growth in teaching. Every year we teach, we hopefully get better or at least do something different and play with variables. That’s been true since I started teaching... I see my online teaching, especially classes that are

exclusively online, as totally different phenomena. I think that there are inherent differences.

Another benefit is in the design and organization that teaching online offers. One participant said,

They have to know what it is they are supposed to be doing in a given week. It's made me organize my classes differently. I look more at my topics and judge how much time and how important they are and pull together all of the various resources that are going to enhance learning on that topic. And I think it's really easy to forget something, if you're just grabbing what you can before a class session... Distance education the way I do it is much more labor intensive.

Besides access to materials anytime-anyplace, there is also a global vision that can be developed for students without leaving their home. They can see with a few mouse clicks how the U. S. compares to other countries. One participant spoke of the importance of this for her discipline. She said,

We're talking about reading about the highest building in the world in Dubai and a quick article in the German newspaper or the Spanish newspaper that talks about that and then looking at the passive voice used in that. It's just changed it to another global dimension because we have access to those kinds of things. It allows students then to say, "Okay, I'm going to create a PowerPoint in which I describe... childhood obesity or adolescent obesity." Okay, it's an issue in Nebraska, it's an issue in the United States, is it an issue in Spain, Germany, Japan, and China?

Technology is a Tool

Although there were differences in the interest that participants showed in the technology and tools used in their teaching, most viewed technology as “just a tool” and spoke of the importance of recognizing that “It isn’t the instruction.” One instructor said, “It’s not an issue of, ‘oh, here’s something fun, we’re going to put it in.’ But rather, why? ‘Why would you want to use this? Does this make the learning process more effective? More efficient?’”

Another participant put it this way, “The technology just lays on top of that in terms of what technology will allow me to do.” A veteran online instructor reflected on the progression of her teaching and commented on the value to her of living through those situations of having to learn on her own. She said it changed her view of teaching with technology. Here are her words,

I’ve threaded 16 millimeter cameras and dropped slides into trays. We thought we were getting advanced when we got portable overhead projectors that had to be folded up and you kind of popped up and had the light bulb go on at the right time, and replacing a light bulb in an overhead projector. But what those did, in addition to helping the instruction, is they forced us into knowing how to cope with technology as a tool, and not technology as the instruction. So you begin to realize that if the overhead projector wasn’t working, you could still draw on the board. You could write on a piece of paper. There was always a default plan that you had to be prepared for.

A participant expressed concern about the vulnerability of the instructor when teaching with technology,

With technology, if it bombs, everybody knows. So, if you were trying to have all the students have an audio connection to the class and there's a barking dog in the background or things go down, that really is apparent when technology doesn't work.

Another participant spoke of the medium of teaching. He said,

The medium doesn't really matter. Cognitively what's in the student's head is what matters. So, I'd be skeptical of something that's just a variation on the many kinds of things that have been tried.

Another participant iterated the importance of how we view technology in teaching, "The technology is like tools that facilitate what you'd be doing otherwise." Therefore, the tool is not the teaching—it is a means to an end.

Other insights into the tools used in teaching include the follow two statements by participants:

If you get used to those tools in their strength, using them in ways that are really positive, I think you're prepared to do online teaching and to use technology for teaching regardless of what new innovation comes up. It's a matter of putting on that other side of your brain, turning it on, and being patient and saying "It's a tool."

One of the major things that was stressed at that conference—not anything earth shattering—but that any time technology is used for technology's sake, it's a failure. Students see right through it if you're just trying to use technology to be tech savvy. So, I think the biggest times that it has worked are the times when

students didn't really even realize that it was something technologically different than the typical teaching.

A participant very succinctly described the use of technology as a tool saying,

One of the things that the technology and the internet have allowed me to do, is act as a vehicle to show them the difference between opinion and fact. They come with some of these outlandish [web]sites. And then I have them bring to class, and I say come and show me or email me your [web]sites and we'll look at some of them. I'll say, "Okay, who's the author? Where is it from? Do you see any bias in this that would be the agenda?" I couldn't do that—even in a small class. I could cover six or eight or 10 of them. So, technology allows me to do that. Not just to show or display the evidence, but to display it in a large enough format that students can see it. Provokes a lot of conversation.

One intriguing phrase that was used by a participant was that of "technology busy work." He was concerned that the use of technology can just become a new way to do worksheets,

If the objective of what you want to learn is best addressed through that tool, I think it's effective. If its tools for tools' sake, or assignments for assignments' sake...It's not different than it always has been. It's just a different type of busy work—technology busy work.

A participant acknowledged a problem of short-sightedness observed by many of us,

They'll spend a minute and a half in front of an audience trying to explain what their slide was supposed to look like and trying to make it work. They've lost

sight of the fact that the slide was just a tool, and that they probably have another tool available to them that they just haven't taken a moment to think about. So there's too much dependence upon the tools becoming the instruction.

When one participant was asked which skills were essential to his teaching, he answered, "To me it's more knowledge or disposition rather than skill--it's all about how you use technology--what is the best tool to achieve the goal?" Another added, "It'd be almost impossible to list a particular set of technology skills. So it's more about an attitude or approach to being able to figure out what you need to figure out with the technology." This participant went on to say, "I think of it as sort of a search to find a solution to a problem and I hope that I convey that to [my students] as well."

Summary

How the technology is used seemed to be important to these participants. They were not advocating for tools for tools' sake, but for effective use of technology tools to achieve learning objectives. Learning technology is a challenge and it is continual, but participants saw it as worth the effort. A participant put it this way:

I couldn't even begin to give you the list of benefits [of teaching with technology]. Of course it also means that I have to keep learning every moment in a field that really I had not anticipated continuing to grow in and I thought my content area and my research would be it. But now keeping up with technology is taking as much time.

CHAPTER 6

Theme 2: Student Learning

I teach graduate students. I want them to think about what they're doing and not just regurgitate stuff.

A second theme that emerged from the interviews included observations about technology integration and student learning. Participants spoke about meeting course objectives, student-centered learning, active learning, and student interaction.

Observations of student learning by the participants included:

I have some new ways of gathering insight into where they're at in their learning. Evaluating them in terms of assigning a grade or a value to their performance probably isn't much different [from face-to-face] other than the way they submit their assignments.

A participant compared his online and face-to-face students,

I think [technology tools] have been very effective. I honestly think my students learn more now than they did when I had them in class—the onsite class. I know that wouldn't be true for everybody. But I think that the students learn more thoroughly. Their cognitive processes are engaged much more of the time.

Another participant commented on the quality of online education,

I rarely see a student who hasn't learned what they need to learn in order to move on to the next level, or to apply what they've got to real-life situations.

Meeting Course Objectives

A participant reflected on the effectiveness of teaching with technology and commented,

The effectiveness of my technology would be determined by how well the students do in the class. I think it speaks to the mastery of the material that would be determined by all of the methods that are used in the evaluation of the course.

A participant spoke about how he provides for different strengths students bring to their learning, “It’s a matter of trying to integrate the auditory learner and the visual learner, the kinesthetic learner and to develop a lecture or a class or a lab session that includes something from each of those dimensions.”

Online or technology-assisted pedagogies were described by participants in how they led to student learning. One person described it this way:

I begin it with an article that they read, and then I can group them easily and have them respond to a few questions. Of course it allows me to individualize instruction to get at a much deeper critical level of thinking with the kids. Very labor-intensive however.

A participant who teaches instructional technologies reported how students use time outside of class for course activities; “I like to be able to make sure that they’re getting the content and in class use that time to apply it.”

Another participant spoke of how he can guard his in-class time because of the availability of materials 24 hours a day,

Access to information allows me much more time to go much deeper and give them more experiences during class time.

Technology has allowed them to access things when they can. It has made things so much more accessible but also allowed us to keep the quality up.

A participant observed her students' discussions and told how she evaluates their effectiveness,

I scan [group discussions]. If this was substantive and moved the group along it gets an asterisk, and if it was a response that kept them in the game but wasn't particularly productive, it gets a slash. I look for a certain number of asterisks and if somebody's clearly a group leader, that gives me a lot of information.

Another participant shared an evaluation by a student,

"I like the fact that I could see you, I like the fact that I could hear you, and I like the fact that we get class on the phone now and then because I need the auditory. That's the part that really helps me quite a bit—that connecting with other students with the auditory just makes me feel a greater part of the group." So, when I hear that, I'm reinforced that I have to keep auditory technology going.

The participants saw technology as a tool to help get to student learning—"merely the mechanism." They realized that their best use of technology would allow students to learn the concepts without being aware of the technology used to deliver or facilitate the learning. One instructor spoke of the effectiveness of technology this way,

If I was to feel that my use of technology was 100% effective, then the students would never comment on the technology that we've used. They would

acknowledge and recognize what they learned. They wouldn't really be aware that there was a different medium of technology used to teach that thing. So I think for me... if the conversation was ever around the technology—it was a swing and a miss. But when I have students that come back and say, “boy, I really learned a lot from that”—that was a successful use of technology because technology was merely the mechanism and it didn't distract them from what they were really doing.

Getting to synthesis. Participants brought up the importance synthesis to student learning. One said, “Students need to bring in [to the discussion] the points from their reading, partly so I know they've been doing the reading. But also so that they are synthesizing the material and applying it.”

Another said,

People over the past 10 years or so have kind of pooh-poohed lectures as a format. And really, lectures aren't bad—bad lectures are bad. It's a legitimate format of learning, especially if its brand new material and you need to convey some information or if you need to make connections. That's how I really see the lecture format. They get a lot of content from the readings, and I'll introduce new content and supplement in class, because I have a much broader range of knowledge on the topic than what's in their reading from their textbook. So, I want to bring that in. But then, the key part of that is making the connections among all of the things and helping them to connect the dots. And in a lecture in a discussion, you can do that. You can help them to make those connections and make it applicable to their lives and encourage them to think about it that way.

A participant spoke about the variety of assignments provided to his students, I've provided a wider variety of assignments. For example, if it's a situation where students might feel more reluctant to speak up in a class discussion, the discussion board assignments are a way for those students to participate so they might feel more comfortable. In terms of assessing what students are understanding, even if you have really good productive-in-class discussions, when you read students' responses, I think they provide a different kind of response, whether it's that they think about it more as they're writing it, it gives me a better understanding of what they understanding of the content—on their perspective on the content.

In spite of what they offer, one participant observed, “There are still going to be students who... I don't care what the technology says, it's still a game board to them, and they're not processing, they're not taking it deep.”

Participants spoke of how they use specific tools to provide rich instruction, I remember back in the pre-Microsoft Office days when it was an overhead projector and a transparency, thinking wouldn't it be great if I could put this visual with it? And PowerPoint allowed that. That's what's been the beauty of PowerPoint.

A participant described learning with visuals,

If there are ways to reduce the garbage on the screen and replace it with a visual, you have just circumvented the problem, and you've laid the groundwork for learning with a visual. Each of my PowerPoints has three modalities minimum.

1) I'm going to talk about it, 2) they're going to read something—it's going to be short and, 3) they're going to see a vision that activates that concept.

One participant observed changes in student's grasp of the concepts, but was not sure what accounted for the changes,

If I compare the student responses on their first exam last year which was in-class and the student responses on the first exam this year (online), the quality is so much higher now. They seemed to really get the core concept and communicate those much better. I'm not sure what processes account for that but I would say that students respond really well to presentations of photo and video. You can present and talk about your text-based discussion of what concepts are and then when you show them video or photographs, then they can respond and talk about the application of those things.

Course management. Participants spoke about how they managed courses so students knew they could be successful. They were concerned about students feeling frustrated with the online setting or with learning new technologies,

I do get concerned about student frustration. But it's kind of like "the tie goes to the runner." I always tell students that if things aren't working out, I'm always going to give you the benefit of the doubt more time to do something.

Another participant stated,

There have been times when I've communicated back to the student, "I think that you really misunderstood this, and I want to give you a chance to redo it." I would probably do that in an in-person class as well, but it's a one-on-one direct communication... I'm going to point them in the right direction and tell them, "If

you have questions about this, feel free to email, call, stop by, because I think that you really misunderstood what you needed to do, and I want to give you a chance to be successful at this.” So, in some ways it does give you opportunities to do that more one-on-one communication with students that can give them more a tailored feedback and just let them know that you’re paying attention and you actually care that they learn the material.

Other comments about course management included the following:

There are ways to manage [differences in students]. For example I found that discussion boards need to be cut to specific group size. I usually have 8 to 10 per group or it becomes too much. Then they don’t read and then there’s kind of self-fulfilling prophecy—they don’t read, they don’t respond, and it becomes a totally muted conversation.

A participant spoke of the importance of managing the discussion online,

Without [closely managing discussion], just turning the little blossoms free to bloom and grow; I don’t think takes them much of anywhere. Wasn’t it Bill Cosby who said, “Pooling their ignorance?” I don’t appreciate giving students a chance to pool their ignorance. If they already knew this stuff, they wouldn’t be in the class.

Collateral benefits. One participant found the collateral benefits to having students work collaboratively. She said,

I had them work together in groups and they did individual projects and shared them. Then I asked how this was going to help them be better teachers when we step back from it and how is it helpful to share these materials in class? One

person said, “Well, it really made me realize how good teaming is.” This wasn’t even about teaming. She said, “Even though I was the expert on what you asked us to prepare, when I was sharing, other people had things to add. So, I was leading and then people were adding to it.” I had set up an experience for a purpose, but the way that I had them do it, we could extrapolate about that. Then even that same activity—how it impacted them personally. That processing—you can see outcomes if you ask some of the questions.

Participants spoke about student outcomes. Comments included repetitive activities and the use of blogs for reflective activities. Participants said,

I also can’t do it as a one-time thing because the learning that took place was having to do it weekly, over a period of time. And that was great success in terms of the learning objective and outcomes I was looking for.

The effect on learning that I’ve seen with blogs is an effect on out of class processing. It allowed for out of class reading and studying, and interactional processing of information.

A participant spoke of the importance of seeing different outcomes from her students as a result of technology use in the class,

Maybe it’s not the particular skills I mentioned as much as it is having the perspective of having been a searcher of information. So, any technology that forces you to figure out the system, figure out the tech language, whether it be the keyboard that’s being used or search engines, keyword phrasing, or the website’s organization for what they hot link, or what their arrow buttons mean. Just learning the language of technology in some format puts your mind in another

space, and it makes you think a little bit differently from your day-to-day operations with pencil and paper and telephones.

A participant observed how discussion helped her students' outcomes and the cost to her,

The deeper discussions especially in the online teaching courses worked. My gosh, the kids are writing better papers, they're getting more feedback. But it is costing me. I always want to emphasize that. It's not like teaching a course where I go in and teach for an hour and a half and I'm done. Online means I'm accessible all the time.

Another participant talked of her experience with discussion. She said,

We actually had a discussion in class the other day because they're out in practicum right now, and every week I have a guiding question on the discussion board about what they are seeing out in practicum. It was interesting because the week before fall break I just said, "Talk about whatever you're interested in" and I didn't lead them at all. Out of 24 responses, 18 of them had to deal with what they were afraid of about being in the classroom, and things they were seeing that were causing them consternation about having their own classrooms... and we can use this as a discussion starter at [the next] class.

A participant spoke of receiving student feedback on how class activities had impacted her,

A student came up to me last night and said, "Can I talk to you?" They are doing some school-based observation, and she wanted to talk about it. She was expressing how a reading we had done two weeks ago, an in-class activity, and

then something she was preparing for a future assignment, was making sense to her, and how she realized she had no idea what we were talking about two weeks before. She understood content-wise, but she couldn't apply it. And she was beaming! I think that the teaching comments I'm getting are where students are making the connections.

Student-Centered Learning

All of the participants interviewed demonstrated a commitment to a student-centered environment. One participant said, "So, technology has changed teaching—from teaching to learning. The shift is there and that includes me." Some evidences of this were the use of the words such as *collaborations*, *discussion*, *project-based learning*, and *cooperative learning activities*. A participant said, "Learning is in the hands of our students more than just the teacher. I think it's a huge change. You know you've empowered them so now we have to look seriously at what does it mean for me to be a higher ed professor?" Another commented about the communication in the online classroom; "It's the mental shift from a classroom setting to self-directed learning. I know that that's the shift. And so I think that that's been a difference in the frequency of communication. I think that's been something that's changed." Following are examples of student-centered teaching offered by participants:

[Students] all have to collaborate on one method—I have groups of three or four so they formed little subgroups and they began to work and it caused a much more learner-centered community among them. That way they get to know each other substantively through content... and then when they come to class and do a

cooperative learning activity built on that, it becomes a much more professional environment.

Technology was discussed by the participants as a way to get information and communicate.

Another participant spoke of how collaborative activities have impacted students,

I think they have to do a lot more writing. And as a consequence, they have to think things through more thoroughly and more specifically. In many ways incorporating more writing assignments is taking the place of either in-class discussions or in-class activities. So, they have to reach a much higher level of precision in their understanding of communication of concepts. It's like the principle of—you will really understand something when you have to teach it or when you have to communicate it to somebody else.

Participants spoke of the changes they have seen in their instruction as it relates to student-centered learning. They said,

I did peer-review teaching a few years ago. Essentially what I've done with this course is do the criteria of peer review on the course, and that idea is to basically figure out what you want them to do, how to get them to do it, and whether or not they're doing it. And I've come much closer...

I think some of my teaching got better because I had to be more explicit, so it was all text based, and I think I did get better, and I got out of the way. My discussion boards became the teaching and it was rich. I was amazed at how much involvement the students had, what they were thinking, and it was clear the format got me out of the way.

Other examples of commitment to a student-centered approach were shared by a participant who talked about how technology allows access to students—a way to communicate. She said, “The technology is meeting the students where they are—in their mental framework of how they want to learn, how they comfortably can learn.” Another said, “I have to have ways to get access to them. I think it’s important—hookup things like Skype for them are important—things like that—using technology.”

Another participant said, “Our kids create movies, they create text, they create stories, they create podcasts, and all of that is for a true audience in some ways.”

Other examples follow:

It allows me in a sense to improve my instruction by diagnosing the learner needs... I’m much more learner-centered in the needs of the learners I have in my classroom. I’m more responsive to them because they have access to me and so when one of them asks me a question, I’m assuming that’s probably a question for all of them and so typically I just zip out a quick email, “I know there’s a misconception on number two...”

What they’re required to do is describe specific strategies they use and give examples. So, they’ll have to talk about the role they took and what they did that illustrates that role.

So I think that it’s no longer the old paradigm of the teacher teaches the students, it’s this wonderful, rich intersection of all of us learning.

One participant looked at what she had learned about class discussion through her experience teaching online,

For years I struggled with students commenting on the readings. And I was stupid enough to just say, “Well, let’s talk about the readings” because I didn’t want abstracts. And people had nothing to say. So, then I would open up and on the phone or face-to-face say, “Well what did you think about this?” And get nothing. So, what I’ve done is I’ve posted the readings for the week and I post two or three questions about the reading that can guide them in what to be looking for when they read that article or that chapter. Then when I get together, I just ask one of those questions. It’s worked out much better because if they’ve read it, they read with that in mind and they have something to say about it.

Sometimes I give them options so they’ll pick the reading with the questions that sounds most interesting to them. It’s helped me be more focused in how I do a review. I assumed they’d be high level thinkers by the time they finished the article and I’d ask a high level question, and I’d get nothing. And I’d have to scaffold back down to lower levels. But now, if I ask the question I posed, it’s a better match and we can start from there. And if they’re faulty in their answer, I only have to scaffold down one level.

Collaborative activities. Participants viewed collaboration as an important part of many courses. I found varying degrees of use of collaborative activities in descriptions of their courses. Some explained the importance to their subject matter, however, two distance faculty found too many barriers to student use of the collaboration tools and therefore, did not use them. The majority described uses of collaborative tools that were central to the success of their students in their discipline. A participant talked

about her class and how important collaborations are to what she wants to accomplish in the class,

The class is about understanding perspectives. By getting students talking to each other and reflecting on their own family by journaling, it got the vocabulary on paper, and they revisited the concepts over and over again. I think that class gave them opportunity to hear and see the concept of family from a perspective that was different than their own personal experience.

Online we hear about different family structure, different family values, different family experiences, boundaries, communication, taboos, without being disrespectful or breaking confidences. The students start to see that their way isn't the only way. I think technology really helped that class.

The use of quizzes and practice with feedback was reported by a participant along with the difficulties he has had using online discussion effectively,

I answer them in great detail and sometimes I ask the students to score themselves on those. So repetitive practice with feedback [is an important part]. The more specific the feedback can be, the better. Now I'm using discussion board as well. This is my first attempt at that and that is an art. They can earn a little extra credit by doing it. So that's an incentive. But to get a real dialogue going on discussion board has so far eluded me.

Discipline-specific technologies. Discipline-specific applications are important for many courses. Participants talked of how they have affected learning. A participant spoke about the technology literacy of students today. He said, "The words and the verbiage and the terminology—we're dealing with students who are very technologically

oriented. So, we have to at least keep up somewhat with what they are accustomed to.”

Another said,

If they are a little bit familiar with Photoshop and Illustrator, they’ve not used it from the standpoint of that specific application and how it relates to the textiles and apparel industry—for them it’s fun. Once they get through the frustration of learning the tools and the commands and everything, they take off. In fact, they teach me things then.

One participant provides resources which result in students gaining fluency as they work with the different resources,

In some of the online classes I have a lot of resources in terms of web links. For example, I’ve had them go look at three different programs and compare and contrast them on these dimensions. So I know that they have to have gone and looked at those programs, because they have to be able to tell me something about each one of them.

Active Learning

Participants spoke about the importance of active learning. They had many different ideas about what that could look like in their classes,

These tools have helped student learning become much more effective because they’ve been active learners. It’s forced them to be active learners because they have to be communicating through them to each other and me. They can’t just sit back. So this definitely enhanced the learning.

Other participants observed the changes to her teaching,

The questions have changed for me. Before I was the source—the fountain of knowledge. Now, the internet is the fountain of knowledge and my job has shifted to teaching kids strategies for reading it, for selecting the relevance and the validity for what they're reading and to begin to question those things.

Those who teach future teachers have different ideas of the effectiveness of active student learning,

Some of the instruction I do—having to do with technology has to do with a couple of things. Getting pre-service teachers and some in-service teachers to realize that reading on the web is reading. It's just as valid as reading a book. And a lot of people will not define what you do on the internet as reading and writing. To me, it's fascinating—that they make that artificial division there. So then you have to go another layer deeper and help them understand the strategies that they need to teach children on how to read text on the web how to use hypertext as an advantage, how to use visual images to support the text. It's not linear necessarily as it is in a book, because you can jump to different places as you need them.

One participant spoke of the challenges to providing activities that mean something and are safe and transferable to others,

How to use resources like the visual dictionary, images. How to organize something similar to *webquest* and make sure that students are going to sites that are okay. How to get students to judge the quality of what's put up on the web and to know what are quality sites that you can rely on because they've been

monitored well and what is the difference between [a good one] and one that's just put up.

Another challenge acknowledged was class size and reluctant class participants.

I have groups of 15 (in a class of 150), and they have this group dialogue about what we're learning in class. Then they communicate with each other about the things that we're learning. I think that is helpful. I think that's an avenue where some of those students who don't want to participate in class can have a voice.

And I like that. And I think they use it for that. It was better in terms of the quality of what they were saying, when it was through Blog Spot or Blogger when it was public domain because I think they were more careful about what they said. But it is more functional to keep it right within Blackboard.

When class size varies in an online setting, the dynamics of interactions change.

One participant captured this idea,

Two years ago when I taught this class online I had 16, now I have five. That's a totally different game—it's a totally different interaction. What worked there, doesn't work here, and vice versa. That's true face-to-face but in a totally different way.

One participant reported her strategy for effective discussion, "You want really good people to post first—because they set the standard." Another active-learning strategy discussed by those teaching future teachers was the use of video. "Our Students video or audiotape themselves while they're teaching. This has worked to help them analyze reality instead of what they think happened." In this comment, she highlighted a tool that works well for self-analysis.

Participants observed how technology has changed and continues to change teaching and learning. “They’re (students) asking different questions. Not everybody, but I would say the majority. So that has changed my role as a teacher in classroom.”

Following is an observation from a veteran online instructor,

People thought that technology was finally taking advantage of the Sesame Street’s focus of flash and messages. I think it’s true. I think in some ways it’s true, and I think commercials and everything else just bombarded people—that its noise, noise, noise. So what technology has done most recently is master that novelty to carry a message and hold their attention long enough and then engage them in a way that they can interact where they have to talk back. It’s allowing the students to have a way to use that part of the brain where they have to put the words down, they have to come up with the ideas, they have to apply the concepts in some way. And so I think technology has allowed the student to be more active in the learning process and that always pays off for better learning.

Several participants talked about what technology can help them accomplish.

One participant talked about the part technology integration plays for students.

The primary thing that technology can do for students is engage them. The only way we learn is to be paying attention. When you’re attending, you’re open to reorganizing old beliefs and concepts and you’re most open to taking in new ones and figuring out where to store them. Technologies in all of their iterations over time have been a novelty. So, they have entertained, they have grabbed student’s attention, or they’ve gotten better at holding student’s attention. I think that in

itself, makes the student a committed learner. There's no being a passive learner if you're using some of these technologies.

Another participant asked himself, "What am I going to do to keep them engaged in the topic so they learn the objective? I come up with games or ploys of some sort—case studies, something that keeps them engaged."

Other participants thought about the integration of technology and how it has become part of their lives and teaching. One participant said, "It just became ours. And you have to know what to do—what to use and what not to use because you have to think strategically about your own time too." Another spoke about the difference for students. He said, "They know going into it that they're going to have to pay attention to and think about and remember."

Student Interaction

Interaction is an important part of many courses. Based on a review of the literature, interaction within the online environment is the key to learning. Learners interact together on a subject to "create knowledge through experimentation, exploration, and the manipulation and testing of ideas" (Stepich & Ertmer, 2003, p. 35). This experimentation involves interactions to test the hypotheses and ideas and to give and receive feedback from peers as concepts are discussed. Palloff and Pratt (1999) noted "that it is the relationships and interactions among people through which knowledge is primarily generated" (p. 15). These interactions were found to be important to the participants of this study. They described ways in which they have used technology to facilitate interactions and the benefits they have seen. One participant described the interaction using technology as a "marriage." She said, "There's something about the

marriage between human interaction and technology that's a real balance and a skill. I use the tools to deliver the information, but I guess the tool that remains the same is the examples that I use.”

A participant who taught pre-service teachers said,

I'm more aware that if we're going to prepare, if my students are going to prepare elementary students, if they're undergraduates or if they're graduates, if they're going to prepare them to be an adult in the adult world, they have to know how to teach them to interact with text, using technology, period. They have to know it.

Another participant shared how technology affects these interaction,

We had preparation for comprehensive exams with two students who are at a distance and we used a conference call number and three of us chatted about their concerns and how to prepare. The fact that the conference call is available, I didn't have to have two different meetings—and they inferred from each other. So, I frequently do advising that way. Evaluating the student, assessing where the student is at, the technology makes it a little more efficient and maybe collaborative.

Participants described different ways in which the interactions take place in their classrooms. Included in these descriptions were student-to-student interactions, instructor-to-student interactions, and student-to-content interactions. These descriptions follow.

Student-to-student interactions. About the importance of these interactions, participants commented,

There's no way that anyone of the students can operate in a vacuum. So, they're in continuous contact with one another and that starts from the first week of the course when the teams are assigned. And they work through that all the way.

A participant spoke about the part technology has in student-to-student interactions. He said,

I think [technology] has allowed for more and better student-to-student interaction. Particularly in a lab or in a studio setting where I've used technology, maybe streamed in a demonstration video that gives the information at the beginning of a session, but then allows students the ability and opportunity for stronger interaction and better interaction.

Other comments about these interactions follow,

The interaction between students—that's one of the qualities that I'm looking for. I tell them, I want you to be in discussion, I want you to be in dialogue. I don't want this to be a monologue of each of you answering the questions.

I was evaluating some of those discussions and without question there was a dialogue on most of the questions in the module blog... It's in every element of the course where they're interacting with one another, with the exception of when they're self-studying and trying to master the content, the initial content.

A participant described the use of teams in her course for student-to-student interactions. She has worked with these formats for a number of years, making changes as new technologies became available. She currently uses the wiki tool within Blackboard to facilitate this project and has reported that her best evaluations from students have been based on this teamwork within the online course,

I refer to them as autobiographies I have them do at the beginning. It allows the students to become acquainted with one another and to develop that team spirit—team interactive mode. It moves them right into the content because some of that introduction that they're doing is focused on their perspectives or their attitudes relative to whatever topic it is that we're covering.

Instructor to student interactions. Participants found that their role in an online setting using technology to interact with students was as important as that of face-to-face interactions. One said,

I remember the first course that I taught online—and I really went into it kicking and screaming—because I really like the personal interaction with students in the classroom. So we talk about change, I still have that interaction with students, but it just takes place within a different way. And I remember coming out of that class and thinking that I knew those students as well as I knew the students in any of my on-campus courses.

Another participant spoke about learning what students really wanted, “In recent years I wasn't giving them much of me. They didn't hear my voice and they wanted it.”

Student to content interaction. Participants found that student interaction with the content could be deeper in an online course than in an on-campus course, “In terms of student interaction with the content, students definitely, no question, [interact more with the materials] than in the classroom and the reason for that is, they have to.” An online instructor spoke of “communities of learning” as something “terribly important.”

Summary

The integration of technology into teaching brings with it a need for teaching strategies to change. With information at their fingertips, students are able to synthesize learning by being more actively engaged in the process as well as the product. They cannot be observers sitting passively in the back of the room listening. Participants spoke of the effectiveness of technology in getting students to engage with the content of the course. There is so much information that they are able to collect and from the beginning of a project to its final draft, students can be engaged in the creation of products offering them opportunity to develop critical thinking skills.

Chapter six will report the findings for instructors. Participants spoke about the changes for their teaching strategies as they integrated technology into their teaching.

CHAPTER 7

Theme 3: Pedagogy

A third theme drawn from the interviews involved teaching strategies and how they were affected by technology integration. The study participants teach in the college of education. Sixteen of the 20 participants interviewed teach courses on methods to help prepare future teachers to teach. Because of this unique characteristic, I wonder if interviewing instructors from other colleges would yield a different view of technology integration and its importance to pedagogy. Therefore, the participants' comments are positioned in this context. The term *pedagogy* as I have interpreted it from the interviews carries with it the context and the process of instruction. Subthemes that emerged from interviews related to pedagogy include (a) technology use in methods courses, (b) course design, (c) course organization, (d) student and instructor feedback, and (e) instructor presence.

Participants commented on how they view pedagogy in the classroom. Following are comments they made:

What hasn't changed is even though I use the technology, the strength in my teaching still rests in my storytelling and anecdotal information. That's a personality trait or a personal teaching philosophy. I have found that if I turn the PowerPoint off, darken the screen and then give an explanation, that that's more effective than putting that explanation in the audio part or the PowerPoint or the face-to-face class.

Another participant commented,

When I say collaboration, it's the collaborative understanding of the time and expertise it takes and not just the instructor expertise, but the design expertise, the pedagogical expertise.

One participant described the presentation itself and how to make it optimally effective when using some forms of technology in the classroom,

I have to seriously think about what is an effective PowerPoint presentation as a form of technology? I know where to stand in the room and where not to. In western society languages read from left to right, and if you're going to make things really effective, you stand on the left side of the screen so when attention moves from you to the PowerPoint, it's seamless... I know the colors that cause different effect and more attention than other colors. All of those things have to be embedded appropriately to use that technology.

An participant who teaches online courses commented about the changes she has made over the years,

One of the things that has changed about my teaching is that I'm much better at what I post as a prompt. I think that comes from studying higher order kinds of thinking. I am constantly looking at my questions to see whether or not [the questions are] stimulating. So, now I'm going back and labeling the level of my question and then seeing if the average—or the mean post score for that week is higher—if my question was higher.

Types of assignments were evaluated by participants,

Let's see if I can find the term that I just ran across dealing with technology.

“Disrupting class?” Is that pretty good? I'm enjoying it, but it really does point

out where the future lies with technology. If we're serious—"standardization clashes with the need for customization." (Christensen, Horn, & Johnson, 2008, p. 10).

A participant reflected on the effectiveness of learning from analyzing video, "I've also found a really big correlation between whether they were looking at a video and analyzing it, whether they were reading a peer reviewed article and analyzing it, or whether they were looking at foundational material. Those are going to be lower, but you'd expect them to be—they're learning concrete information."

Another participant concluded,

"I'm looking at the effectiveness of asynchronous discussion board which is a technology. That's all bound up in how I use it. It's not necessarily the technology itself. But without the technology of an asynchronous discussion board, I wouldn't be able to teach this way."

"They like seeing real people talk about it—real people from different places. A professor that I work with in Brazil joined the class through Skype and the students could ask her what's going on with families in Brazil. That was a technology big hit and it was really successful."

Participants spoke about the power of online technologies. One said, "Sometimes I have them do what I call "click." What clicks for you in this chapter and what's a clunk?" Another observed teaching languages and how it changed the way students view learning,

I think the most powerful thing is that the students have taken ownership of producing language rather than the teacher teaching language. They use language to actually access content from other disciplines.

The way faculty and students perceive teaching and learning have evolved, Instruction [is] based on their understandings and their needs. I'm facilitating that I am indeed the expert in the content area. They're sometimes the experts in the technology use area, and so we continually grow together, and it's changed the dynamics of me walking in as the expert who is supposed to espouse forth. It's more asking questions, trying to diagnose what they understand, what they don't understand and then intervening as needed—teaching critical thinking skills as I'm nudging more and more into teaching strategies.

An instructor who meets weekly via web conferencing with her students acknowledged the challenges to evaluating her delivery style and how to tell whether or not students are “getting it,”

I usually do a little probing in the class—whether it be online or in a phone session. I probe with a question about recent content, something they've just finished or we've just read. When I get no response, I begin to question how I presented it. Often my first thought is they missed it, the technology I used to deliver it didn't grab them, or they didn't find it. When I have people saying I haven't gotten to it yet, I begin to wonder about their time management skills. But then I realize it isn't that—there's something about the way I package my class, if they haven't found time for it yet, then when I have a class who each week half the class or more has gotten to it, they may not have finished, but

they've gotten to something in it, then I know it's working. There's always going to be a student who can't get to it.

The blending of online and in-class activities seems to allow students a greater depth of understanding of the concepts,

We provide audio PowerPoints that cover a chapter comprehensively. Then we tell the students that if you go through those PowerPoints or listen to those PowerPoints, or both... Then if you come to class, what we will present is a class activity or some of the main points, then give you something else. What you get from freshmen is, "That's not in the book." And you say, "well see, that's the point—the point is now you know this information, now this is how it applies in real life—here's something different."

Providing visuals for some disciplines is important. An online instructor of one such course said, "It makes me think what it is that I'm trying to teach the students. If I can put it into a picture, putting cued speech into a format like this..." This instructor was able to offer students visual media, "Some of these are better pictures than others. But I'm able to clearly illustrate (with images) what I'm talking about. I just adore it."

Participants acknowledged the range of choices we have with the many technologies available today,

Students have to be selective about what they use. You can't use all of the above, you've got to really think, how am I using this? How am I going to do this? How is this going to be helpful?

Other comments made by participants also related to the abundance of choices of technologies for both faculty and students. Following are two,

[I've heard the most student comments] about the ability to be flexible with assessment and it is appreciated. Use of PowerPoint and ability to post it later and the ability to meet in hybrid classes—to meet synchronously seems to help a lot of people contextualize the content.

There are 11 different artifacts now in [one of my courses], and they're all online. Before, virtually none of them was. There's good information out there—attaching a link and telling the students what I want them to do about it is I think has much more learning impact than looking at it myself and giving them some of the high points.

Technology seems to have brought about more work in some cases. In the past materials were created and used over and over again. Now with the rapid changes in technology and the awareness of more and better materials, there is a greater sense of the need to keep current,

So, that tends to eat up my schedule. Because every semester I edit the content—the course content, and I have these study guides that have to come out on a weekly sometimes twice a week basis. I'm always editing. It's not as burdensome as it was the first time around when we were writing all this material.

Faculty need access to others' ideas on teaching with technology, “One thing that hinders me [from using technology] is if there are no examples that I can relate to.”

Following are descriptions of teaching strategies implementing technology used by the participants:

I want them to look up certain legends or proverbs related to Mathematics--stories that mathematicians tell to each other or all know, but don't make it into a regular college class. Searching for those things would be very, very time consuming in the library whereas on the internet they really can look these things up. So I've been able to put more research questions in my course with more diversity than I used to, than I would have ever thought of doing.

My undergraduates really like the day that we explore different websites. I give them specific ones to look at and have a lot of resources for that. So it becomes a very practical thing for them. And because they've played with it, I believe they're more apt to then use it.

We've had three-hour asynchronous discussion board that have been fabulous. Fabulous! With hundreds, literally hundreds of interchange during those three hours. I think that when they're putting it down in writing, they tend to try to be clear in their thoughts a little bit more.

About the power of the use of online discussion, the following comments were made:

Discussion boards that are application of taught content [have worked]. They're also scaffolded by the instructor. Discussions that have open options for perspectives, whether that be different people's experiences that are shared, or it poses a question for a dilemma and there are different answers and people can bring that to the discussion.

Discussion board prompts that allow people to share their personal, professional experiences [have worked]. That's what was missing in my on-campus lecture

courses. I don't think I did enough, even though I had in-class activities. I don't think I really mastered that mode of teaching like I did discussion board. So discussion board has served me well, and I think I've served it well.

One participant reflected on an assignment that would not have the same power face-to-face as it does online,

Classes where I prompt them to write a philosophy statement four times in the semester in the same place [blog]—so they can read their first draft, see my feedback, read their second draft, see my feedback. If a student had been doing that in handwriting and turning it in, it was a 50/50 chance they would be reading their previously printed printouts or efforts and my feedback, they probably would have started their third one from scratch and just gone forward. So this one forces it for them to reflect a little bit.

Technology Use in Methods Courses

Participants from the College of Education of this university made up the sample interviewed. Therefore, many of their comments pertain to the methods courses they teach. The following comments by participants relate to what they do in teaching pre-service teachers from elementary through secondary. In addition, 16 of the 20 interview participants teach online. Their comments revealed strategies they use in the online setting.

Participants reflected on the need to model instruction for their pre-service teachers and about the challenges of teaching methods courses online. Following are two comments related to these issues,

In teacher education we have to model more—not just the use of technology, but making technology a ubiquitous part of what we do in a way that becomes natural to our students. It's not just modeling the way it would work in the classroom or talk about it once or twice, it's actually about having the technology there and using it as part of everyday practice. And then explain to our students how it might transfer that would make this comfortable.

[Teaching online] methods courses would be a really difficult thing. The prep work because you have to have a whole lot of videos—because you have to model things and give them practice doing it. I don't know how you'd do that small group practice. Some of it would work because you can do the small group with the discussion group. But other things, I really don't know. I'd have to try it out.

The challenge of showing a teaching method to online students was recognized by one participant,

Streamed videos—if you're not in the same state as the students you're teaching, showing them how to perform a particular teaching method is really hard if you don't show them how to perform with a real kid. Because you would bring a kid in or you'd go out in the classroom, or you'd show a video in your class. You've got to be able to do that.

A participant gave an example of how two of his former students had bridged the distance in teaching in their school district. The teachers were using video and a green screen for distance delivery of their classes to students in the whole school district. He asked his former students to model for pre-service teachers. Here is his description,

They can move the camera around, talk to the kids. I'm asking my students to each go down and work a day in that setting on methods so they know how to teach in a synchronous manner, distance delivered. And they're helping to actually put together some activities. And they're excited about it. The next phase will be that we start to teach it out of our classroom and we'll adopt a couple of schools that my secondary people will be responsible for—we have sister schools and they'll be responsible for teaching elementary science at those schools as part of their methods program.

Another way this same participant uses on-site teaching situations in an after-school program to model for pre-service teachers follows,

Every week we have 45 undergraduate students teach at an after school enrichment program. One of the assignments is that everybody gets assigned one week to be the photographer and they're to take at least two dozen pictures of kids doing things... I've been experimenting with Animoto... I've made Animotos from their photos. I've added music, put it together into 30-second clips... I'm building a webpage that we will allow the (elementary) students on so they can share with their friends what they do in the after school program. And the parents will ask questions, "Well what did you do there? What was that experiment?" And they'll start teaching others because of showing and I think it's going to be a very powerful tool for teaching. And relationships for those kids and making them feel important—hey they're on the web! That's cool!

Communication has been identified as important to pre-service teachers—they learn from one another and the examples that they share in an open forum. Here is a participant's description of this process,

I always establish what I call an open forum which really allows students to post things that would be... their opportunity to communicate with the entire class...

It always varies by class. Sometimes they use it more. There are always postings to it in terms of references that they find.

A participant uses the internet as a resource for his students to do self- and peer-assessment,

Part of my assessment... is self-assessment. I think they have to learn what quality is themselves, versus the instructor. The instructor is the expert indeed, but first you have to look at it yourself and get some peer assessment which is easy to do on the web. And then comes the expert assessment. It's a three-pronged approach which is much more a deeper processing of looking at quality—what constitutes quality rather than simply my input.

Participants in the study shared some of their “successes” during the interviews, They like the ability to use the technology and they do it efficiently. They really enjoy the asynchronous nature of the course as well. They know ahead of time what they're going to need to do and they have a week to get it done. They know how to predict... They have to be a lot more self-disciplined than they would for a [on-site] class. But they like that. They're graduate students.

Look at the process involved—they did the work, they do the reading, they do the processing, and then they have to actually--they're interpreting. They interview

someone if they want by email or by technology or in person, or by Skype. Then they present it—so all modes of communication according to the language standards are there. So they create something that they can then share with the public at large.

In addition to the pedagogy—how to teach reading, writing, speaking, listening, instructional planning and how to integrate technology. They are a cohort of [language] teachers from around the world—can now take a course together at the graduate level and immediately implement these into their classrooms and have discussions about it.

The use of video has been shown to be a powerful tool for analysis. One instructor maintained the effectiveness of this tool,

There's another reason for that video being so powerful—68% of the sensory portion of the brain is dedicated to visual and so vision trumps all other senses. So, we really need to realize that. I'm even teaching my teachers, the visual cue and that visualization and that videotaping is crucial to their development, much more so than reading some article about it or some research paper.

One methods instructor has taken advantage of this power for the past decade by videotaping his students throughout the semester so they can see their own progress in teaching. He shared the process during the interview,

The first videotape is done the first week they are in the new program. They are asked to teach as they perceive teaching to exist for five minutes and include a discussion. It tells me light years of things. It tells me a lot of information. In addition to them standing in front, they have a mic on them. I have a mic on me,

and I have a mixer so I'm able to do voice-over on the run. The camera is hooked right into QuickTime Pro. QuickTime allows me to load 10-minute segments on the run... So, they're teaching, it's directly going into QuickTime on an external hard drive, my comments are there, so I can make comments like, "you're talking into the whiteboard—we're going to work on that. Next time how could you ask that question so you could actually get a real answer?" I try not to be that insulting, but I make comments that I want to pick up on and that then is loaded to the web. It's their responsibility to immediately listen to that, watch it, and to use a program called Video Annotation where they watch it and then they annotate and they put markers in the video as to where they had problems, or where they saw things they want to work on... And everybody is supposed to watch everybody else's so they can learn from each other.

All of that is coded and everything that comes out of their mouth gets coded and they get to compare that code and it's quantified. They like the idea that we can take things that are somewhat ambiguous and quantify it, and then we can work with it concise. It's quantified.

A participant used audio-taped comments to view progress in students' ability to observe. The assignment he gave his students was to observe a family in a public place for 30 minutes, then call a phone number and in 30-seconds record their observations. They did this every week for five weeks,

I could see from week one, their ability to articulate the process of the interactions that they saw and using academically appropriate terms. In week five, there was a massive shift. We would go back and listen to them every week in class. We

would listen to the call and what they would talk about—given this description, do you feel like you understand what was going on between the parents and the children? So, it was really good for them to listen to each other explain the process of interaction.

Other uses of technology were described for pre-service teachers. They included the following:

When they're actually using technology I try to look at how they've incorporated it into their learning activities and they're creating learning activities that they will actually be able to use when they're out student teaching or when they become their own teacher.

To give you an example, I had students implement a lesson plan that I gave them which was about an open exploration of animals. They had to implement with children, infancy through age five, and there were questions that they would pose to the children beforehand; could they predict what animals they might find wherever it was they were going to go—the backyard, the park, the woods, and then what they found. What I discovered is that more than one student didn't think that insects were animals, and that at least one didn't think that humans were animals. So, I'm realizing that it really shouldn't be a surprise that I need to provide science content information to the student. And that's always been a bit of a challenge, because we're talking about science methods, but, I also understand that I'm working with a population of students who have the least amount of science and math background.

Part of teaching methods courses is working with the students on their presentation ability and style,

Part of it would be on their presentation style and therefore, you work with them to... I really strongly suggest that students need to get out of the habit of just reading the PowerPoint slide back to everybody. So I make them... create notes pages for all of their slides and when they do presentations in class, I always have a copy of their presentation in front of me, whether it's on a computer or on paper with their notes, so I can see what they're referring to and know it's not [reading] the slide.

Course Organization

Closely related to the strategies that instructors use in teaching, is the organization of the course. Traditionally teachers in a face-to-face course create lesson plans with session objectives, an outline of what will be covered in class, materials needed to communicate the concepts for that session, and methods for evaluating student work. Online, this is partially taken care of by the organization and design (see next sub-theme) of the course thus showing the importance of course organization to student learning. Participants in the study discussed ways in which they used the organization of their courses to present concepts and materials. One participant captured the dilemma of teaching online, "Clarity of communication has to be so much better. Without the person there to remind, prod, cajole, and basically make eye contact and see whether I'm being understood, it has to be better organized." Other comments about course organization follow:

You can make things boring, you can make things confusing, you can get things buried under so many layers. The organization of your visual material and the display of each individual piece of material is an essential part of the overall program.

I plan differently. I have to have an entire course up there in order to know where I'm going and whether or not I'm going to cover everything.

This unit of study they're working on; it's really intensive. The unit will have 15 lessons and they have to have a complete lesson written—all the materials for each lesson created, any PowerPoints made with their notes. And so my evaluation is, were they really able to pull it together? Does their PowerPoint make sense in context to the lesson that they're teaching?

A lot of the technology that I use now is more organizational in nature. So in terms of it impacting what I do, technology allows me to have students access materials more through the internet and the tools there. It takes more planning because you not only have to know what you're going to present and how far in advance they need it, and then what do they need to do with it and how do they use technology to gather things. It's really impacted what I've done when I do face-to-face teaching.

I try to keep it pretty simple. I want students who take my classes to be able to predict what's going to be there. If there's something new and interesting, I want it within the structure that they already know, so that they can pay attention to it without being worried about the course being chaotic. I've become much more

organized. As far as my teaching strategies, I do less of the talking and I think that's been a big benefit of the technology—students can get their voice in.

The use of innovations was described by a participant,

I've always used multiple modes [of explanation] because of the nature of the field I'm in. I had to figure out new ways to use technology when I was never with the students... I've probably always used video, demonstration, didactic, and written materials. I think technology has forced me to figure out a way to do that if I'm never present with the person.

Another participant thought about the integration of technology in a new way,

The bottom line is we still have not internalized two things; one is that there are ways to deliver instruction—very effectively through digital means and the second piece is that there are inherent advantages to doing this digitally, simply because that medium or those media, are so prevalent, that in a way by delivering everything face-to-face, they're missing a piece—or our students will be missing a piece—knowing about those digital worlds and how to walk around them and how to interact with them.

A participant spoke about his ability to assess online students' learning over those in the classroom,

They might not know what I was thinking about it. But because it's kind of hard to get students to remember to post journals, I've also become more directive. I pester them a lot more—I remind them that their journals aren't up. I make a certain amount of participation part of their grade. Maybe a little more than I

would like to if I were in the classroom, but on the other hand, I know a whole lot more about what they're learning than I did when I was teaching in the classroom. Most of the assignments at this point allow me to decouple classroom times from the assignment so they don't have class time to do assignments. They can shoot it to me on email or other structures in Blackboard. I can grade them and it's all there. So, there's flexibility in that.

You say, "technology," I'm going to say the "overall organizational skills or course development." It seems to me that there has to be a good exchange on the part of students and faculty in the relay of information and content.

The organization of the courses into modules has worked well for me rather than just having individual chapters. In other words, I'm going to call it clumping the subject matter or the content into manageable pieces.

The most challenging thing is to keep this from taking up 24/7 of my life because it's always there, students are always emailing me.

Planning the full semester has worked. What technology has allowed me to do is plan the whole semester, identify my resources, put them into folders, and package things so that students are going to find them easily. I can put a video, a PowerPoint, PDFs, and an assignment tool all in the same folder and say—this is this week.

A veteran online instructor described ideas about how to organize her course to vary the assignments and know what she has planned throughout the semester at a glance,

What's worked is approaching my teaching with a matrix—an organizational chart that says what are my course objectives, what will be some of the in-class approaches to address those objectives? Will I lecture, will I show a video, will I have the students role-play? What am I going to do in class to get that content across so they learn that objective? What are the out-of-class activities? And that can be homework, it can be exercises, it could be reading...

During the interviews I often saw that student evaluations are taken to heart by these participants, “They talk about my class websites being well-organized—easy to find things, logical.”

Another participant acknowledged changes she has seen in her online teaching, “The interaction would be certainly one way that I have changed. The other way would be in terms of the way I organize and time manage my classes.”

Course Design

As mentioned above, course design plays a big part in the ability of students to move through the course, understand what is expected of them, and easily find what they need. It also includes the technologies and activities an instructor chooses to use to communicate content. Course design is an important aspect of student success.

Comments made by the participants that relate to pedagogy and course design follow:

Related to pedagogy is the design of learning activities.

Technology gives me alternative ways of presenting and preparing materials.

I use technology to augment.

Taking advantage of the Blackboard tools as they've evolved and the web lessons and way they share among themselves are my best example [of technology integration].

Participants shared some of the technologies and ways they used them in their courses—both online and on-site. Following are some examples,

Just being able to grab images from many different sources and put them up online and being able to create them and draw on top of them myself. I do a lot of that and so I'll have an image of a painting with different charts and the diagrams drawn on top to show its composition and ask questions of the composition.

From the student standpoint, they appreciate the fact that it's [narrated PowerPoint] convenient for them. But they also can, start and stop. They can replay parts that they may need to go back and listen to again and again. And so I think from a learning comprehension standpoint, even though you're not there physically, they still have the opportunity to absorb the objectives. They do say they would not like the entire class from [narrated PowerPoint].

Other technologies that work for me are the very quick audio programs like QuickTime Pro for the video clip and audio clip in that it allows me a personal connection with the students with some animation. My face, my voice—I think I'm more successful in setting a tone than just text based.

One participant acknowledged the challenge she found in online testing and how the technology can be a distraction,

The effect was that it [online testing] was not efficient enough of a technology to keep it from being a distraction. So the things that have strengthened it come from the best way to teach it as opposed to making my life easier.

Another spoke of the misuse of PowerPoint in making presentations,

If you've done professional presentations, you learn the importance of drawing people's attention to the highlights instead of the script. Nobody likes reading a PowerPoint slide that has all the words on it and people read it. They like slides that have a little graphic, that have something meaningful to the message, and that have a few words as a placeholder.

Participants shared their vision of what could make collaborations more effective and efficient, "Reading your flat comments on a paper that they turn in. But yet, that's the easiest way to go about that."

I'm waiting for the day that we can turn that corner and have some in the cloud way of having everybody contribute to more than just a Word document. It's more than Google Docs. We're not there yet. In other words, the vision is ahead of the technology.

Even the dry erase boards are technology. And I like having chalkboard or dry erase boards in the classroom because it allows you to either plan to make lists with students or design things with students or on the spur of the moment, illustrate something. I think that I really need that open ended, concrete bit of technology.

Participants commented on making concepts come alive through the use of media in their classes,

In the classroom it (technology) has enabled me to give students a wider variety of illustrations of things and examples of things. It's better to be able to see examples, video, and those kinds of things to bring it alive and make it much more concrete for them.

If you had the right video clips and could do it synchronously... In a methods course usually half the period is a lecture more or less, kind of an interactive lecture and the other half is really hands-on things. So they can practice it.

Getting the feedback, a level of feedback that would be two things, I don't know if it would be as easy to do because you do so many on the spot things.

I really use video. Without the actual voice exchange, it's pretty much the written way of communicating with the students.

Questions about social networking in the interviews brought a wide array of responses from participants. Some were eager to use it, some were using it effectively, and others shied away from it all-together. One participant shared, "I can totally see how we could use it (social networking) professionally in events and tap that extremely effectively. In my day-to-day life, I don't find both professionally and socially, Twitter to be the place to be."

An effective teaching strategy that used an unfamiliar tool surprised one instructor,

One of my favorite examples--there's a service and I think it's called J-Connect... essentially you sign up for a phone number. They give you a phone number and when people call in, it makes an MP3 file and emails it to you. And it's supposed to be a voicemail service. What I did is I had students observe families in public

places. Then they had to call and tell me about the process of what they saw, and so, they took the content that they were learning in class about observing process type interactions between parents and children, and they took it out into a real setting where they were watching. Without having their books there, without having their notes there, they had to call it in and they had one minute to report process. I had a pretty clear rubric of what I was looking for when I listened to those. That was one of the best things because they all had cell phones so that was not an issue and they used this technology. It didn't even function like it was a technology. It was just in real time when they were sitting there watching the family, they were calling and reporting to me what they saw.

Another example of use of technology for study sessions,

One of the things I do in terms of preparation for the exams is provide concepts for review. I try to highlight the kinds of things that will be covered in the exam. I think that has worked well, and saves frustration for the student because there is a lot of intricate detail in many of the topics that we cover.

Feedback

Comments were made by the participants about the importance they place on feedback both for student work and from students in making changes to their courses.

Comments included:

In a smaller class I would like to see blogs and wikis. But when we start to talk about 300 students, the technology helps us to give them immediate feedback. When they take tests, it helps us to give them relatively quick feedback when we're grading papers. And I think that's very valuable. The other side of that is,

they come to expect it so quickly that it can be unrealistic for the instructor. The technology creates this opportunity, but it also creates this unfounded notion that because the test is there, the instructor will be awake and ready to help you 24 hours a day.

Videotaping with coding and feedback. It's immediate, it's personal, and it's cutting edge.

I think they really like the fact that they get pretty good immediate feedback from me. I think they appreciate that.

I tell my students at the beginning of the year that the easiest way to contact me is by email, and I try to respond to them as quickly as I can. I don't feel imposed on by having the students email me on a Saturday afternoon during a football game and I try to respond back to them as quickly as I can. I have a cell phone that I can check my email on, and I've found that I'm in constant contact with them.

Within Blackboard a tool that provides easy access to communicate with students, is the email feature. It enables faculty or students to easily send an email to a group or the entire class. This feature facilitates feedback for group interaction or class discussion. One instructor said, "I can make great use of Blackboard for communication. I like that feature just to click all students and be able to send out one comment to everybody." Other comments about feedback include the following:

When I think of feedback—before we had technology, you'd hand the paper back. I don't know if the students appreciate it or not. With technology, what I know

first is what isn't working for them when they don't feel like they're getting enough feedback. I think when it's working, you don't hear anything.

They really like the rapidity with which I'm able to respond. But they also like the content of the responses—the opportunity to do a rough draft of a project and get it back with responses. The main thing I hear from students is, “I always learn because I have a chance to go back and do it again.” Or, “you always respond... I don't just get a grade.” Technology makes it possible for me to do it.

Audio feedback has been discovered by some of the faculty. What they have found is that it allows them to give more in-depth feedback more quickly than typing or writing. Another benefit is the student can hear in the instructor's voice, the inflection, the friendliness, the words are not just flat words on a paper. One participant shared, “I can save time by giving audio feedback. I don't have to handwrite all my feedback so I can give a little audio clip and tell them how well they did. That saves time.”

Other participants found that the pace of courses online is sometimes different from that of face-to-face courses “They have developed this expectation—whether or not it's a healthy thing. I know they want me to respond and if they want me to respond, it's because they're learning.” Others spoke about getting behind in their feedback and of the expectations of students for almost instant feedback. One participant's comments reflect the importance of knowing the students,

If I can sit down at my computer, at my daughter's house, or my sister's house or at my house and download a journal real fast and respond to it in another color and re-upload it into the grade book—all it takes is 10 minutes of free time, and I've gotten something done. When I can accommodate my students' schedule—

my students are nontraditional. They work, they have families, most of them get on after 9:00 at night or between 5:00 and 7:00 in the morning before they go to work or after they go to work. If I get on at 7:00 in the morning, I'm going to see what everybody did last night. If I get on at 5:00 in the evening, I'll see those who were able to get in during the day. So they get a response. In fact, they get so used to it that I've got students who said, "I just wanted to let you know I posted on our blog. I'm waiting for your response. I'll check it later tonight."

I think the outcome was really good. The feedback from student evaluations was that they enjoyed the assignment because it was something that they felt like they could really engage in.

A participant commented on how feedback has been affected by technology, Technology allows me to go into much more depth immediately. We know feedback has to be timely—it allows me to do it in a timely fashion. I don't have to wait for them to hand it in and then I take it and do the papers. I can do it anywhere.

Feedback can go two ways. Here is a comment by a participant about the feedback she has received from students.

Students give fairly immediate feedback when things aren't working. I had a summer course with a lot of students who struggled with Blackboard. I think that it was partly a cohort effect, partly the fact that they were in an intensive program and that was the last course they had in the summer and they were really tired. The following summer I taught it and got zero complaints about Blackboard—so they seemed to be fresh and energetic.

When I send them papers or exams back, often times students will send a message back; thank you so much for the feedback, this is really helpful.

Another instructor shared,

Periodically I run a feedback section. It's simply a half sheet of paper that says, "tell me something in here that's really working and tell me something in here that needs changed."

A participant spoke about asking for feedback about the technology used in the class,

I've never solicited specific responses. What it seems to be doing is shortening the cycles around feedback. It does seem to be very productive. I think that it's one of those cases where people come to accept it as it is. We don't spend a lot of time giving feedback about technology, we just use it.

The importance of feedback was highlighted by a participant:

I'm of the opinion that dollops of feedback are worth more than any grade that you could get because they really want to hear what you have to say, and it's going to internalize. I always like to combine that with self-assessment so there's a self-assessment stage and then I look at the documentation and their self-assessment and give them feedback.

Feedback can also be program-wide. One participant shared that a program evaluation caused her to evaluate her use of discussion boards online,

Discussion board looms large in our courses. We had our program evaluated in the middle of our first grant and I was not as effective on discussion board as I am

now. But even then the students said that they had a love/hate relationship with it. They would never want it to go away, but they weren't sure how much—it was a lot of work. So, I've tried to modify how I use it and make it more bang for the smaller buck.

On Blackboard, built-in evaluation tools are helpful for online faculty to assess the use of tools and the time spent in different areas of the course. A participant reported how she used this feature,

I look now more closely at when the last access to Blackboard was, how long they spent on tests. I send out advice about spending longer, reading the questions more carefully and I tend to email people who haven't used it for awhile saying where have you been?

Peer-feedback was also described by participants,

Another thing that goes into the assessment is that they do an evaluation on each other with the quality of feedback they give each other and some of the major assignments where they have to do critical threads group. That feeds into the assessment that I give them. They have to tell me who gave them the best feedback. They do this in small groups so it's not like they can name a whole bunch of people and they get bonus points for that. That's all done on the web.

Other uses of technology include features of applications used to create assignments. Two participants reported,

That's not simple, but the comments and track changes in Word and PowerPoints can really transform our ability to provide feedback electronically and actually in many ways, much better than any other kind of feedback ever.

The ability to attach it (comments) to a specific piece of text, the ability to write as much as you want, whereas when it's on paper, you kind of scribble and it gets lost. That is singlehandedly the most important thing that we've done. It's really pushed our practice and our ability to assess, to give quality feedback tremendously. It has the trap of trying to do too much. I mean you can truly fix the text and sometimes you've got to learn to resist that urge to rewrite the whole doggone thing because it's so bad.

Web-conferencing tools were used to elicit feedback,

The ability to respond, to score it online has been tremendously successful.

Adobe Connect with all of its faults, for graduate classes with a phone conference has been a great way to bring people in—both in hybrid course and in online courses. So that has been helpful—intermitting some video.

Another use of web-conferencing was offering review sessions and feedback on specific tests for individual or groups of students,

I do online review sessions on Adobe Connect for each test which, of course, are interactive. And the wonderful thing about Adobe Connect that I've found is that I was having a terrible time trying to figure out a way to let students know how they did on an exam without it being downloadable and finding its way into Sorority and Fraternity files. I didn't want it to be copy-able. But Adobe Connect seems to be the way to do this. Now they have to listen to 40 minutes of my droning voice, but I can show the image, I can go question by question and say, "A was not quite the best answer because of this and B was a terrible answer

because of this and C was the correct answer because of this;" every question, and they can't as far as I know, download it.

The journal tool on Blackboard was described as being used to offer individual feedback for students in an internship course where the information is of a sensitive nature. She can keep the journals and the feedback private to just one student and therefore, protect the confidentiality of the agency in which the student works and the people involved.

I teach an internship class where the students continuously blog about their experience of their internships. I and the student are the only ones that can access those... because of confidentiality, because they're working in agencies in the community.... It's a more functional way to give feedback because I can make comments and suggestions. So it works really good for that.

Instructor Presence

Many of the participants in the study were veteran online instructors. They spoke about instructor presence in the online environment and how they perceived it, recognizing that their role was different online than when they were in front of the class. About these roles, Garrison, Cleveland-Innes, and Fund (2004) stated, "The roles in an online educational community of inquiry necessitate considerable adjustment from those of spontaneous, verbal face-to-face conversations. Understanding the intricacy of this adjustment is an important element in designing and delivering meaningful learning experiences online" (p. 62).

Students like it when you have some energy and enthusiasm around your topics. I think when students get that, and aren't used to getting it, they like it.

Not so much the technology--it's really being able to project yourself in a different way than you might otherwise do.

They appreciate that they still have a really strong presence of an instructor, and they're not just reading materials or interacting with a computer.

Two participants commented on how they learned the concept of instructor presence and the tools they use to fulfill this objective,

The thing I learned early on was about projecting your personality and your image out beyond your immediate classroom. Adobe Connect allows students to see me occasionally and hear me because they either hear me in class in person or hear the recordings.

I like the blog because it gives the professor presence on a regular basis... It's been a reality shift—I've got to do this regularly [read blog entries]. The students said, "They're (blogs) really great. I like the ability to ask a question about my internship even if we haven't had class that week or we already had class that week.

About teaching future teachers to teach with technology, a participant said, "It's getting engaged--actually using it themselves. Once the students are immersed in the use of the technology as a tool themselves, they become much more efficient in figuring out how they would use that as a tool in teaching." This participant continued,

It's perspective. If my major goal as a teacher is to provide information collection, being didactic, then using technology—there's not going to be much for me. But if we change the perspective and say, "my goal is to have kids

engaged in data collection and analyzing the data and making sense of the data, then these tools have great application.

Summary

Teaching with technology involves a shift in thinking. Participants were able to articulate this perspective and by articulating it, show that they understand the challenge to teaching that technology integration brings.

We will next examine study findings on the context of teaching with technology.

CHAPTER 8

Theme 4: Context

I've got to be able to ask questions as I go and have somebody tell me what I do when I run out of mouse pad! That was where I started—I didn't know how to keep from losing what it was I had on the screen if I ran out of mouse pad. (Veteran Online Instructor)

Context was the fourth theme found in the interviews. Eight subtopics were found to relate to this theme. They included (a) attitudes and beliefs, (b) resistance, (c) 20th century beliefs, (d) skills, (e) possibilities of technology, (f) time, (g) flexibility, and (h) support. The quote above shows the beginning point for some of these instructors—those who had to learn to pick up the mouse and re-position it in order to control movement on the monitor. Participants started at many different points—from technology novices to those who were willing to try anything and seemed to grasp technology quickly and easily. One participant described her beginning point this way:

I need somebody who's willing to hold my hand. And I panic easily. One instructional designer would just sit by me and let me do it and let me try it and show me. That's very time-intensive for designers... If I'm going to try something new, and I don't have somebody sitting next to me who really knows how to do it, I'm not going to do it.

Sometimes you don't know so you end up doing or trying something that doesn't turn out to be as helpful as it might have seemed... You have to strike the balance of waiting for awhile to make sure that something is going to work.

Participants voiced a concern about the need for someone who knows technology to be able to help guide instructors in their integration of technology. Instructional

designers are available to the distance faculty of this college, but many others would like that support as well. One participant said, “I’ve been burned so many times. I hear about something that can be used and what hinders me is just knowing that it’s not a good idea to try it when it first comes out.” Another participant voiced a similar argument,

One thing that hinders me is the learning curve of learning something new.

Because even though intellectually I can understand, this is something you can do, and this is why it would be beneficial. I could do that research right away because we have such good support here, but just the learning curve, the time it takes to do it.

Another said,

I’m not very good at [determining the effectiveness of instructional activities].

That’s something I’d like to work with somebody on. I get results—the students use them, and they tell me if something is hard. I pay more attention to the content and so if the technology gets the content to me and allows them to get the content done, I figure it’s effective. That’s not all that I could do. I am measuring the effectiveness of the discussion board using Bloom’s Taxonomy rubric. That looks at pieces of their posts that reflect synthesis or reflect evaluation or reflect comprehension or reflect application.

A participant was concerned about effectiveness in his use of technology,

If we could do something at a college level where there is a [discussion] of how was technology used effectively in this course? I think that would be a good thing. There’s an evaluation number that’s going to be important.

A participant verbalized well the issues brought about by trying to communicate with students whom you may never see face-to-face,

One [technology] that doesn't get talked about a lot—but as a person whose career was helping people communicate better, I think telephone conversations play a big role. I think that if you struggle communicating on a telephone, you're going to struggle communicating in email and on websites. There has to be this awareness of need for explicitness that you don't share the same view and moment even on the phone.

The context of technology integration carries with it inherent barriers as well as the positive ability of technologies to bridge barriers. Some participants were concerned about these issues related to their technology implementation. Comments follow:

I'm thinking of the Adobe Presenter lectures. There's a lot of up-front involvement to get it prepared, get it recorded, get it within the timeframe—all of the visuals and things that I want within the lecture. So I think that up-front time eventually will lead to more availability for me to students, because they can view it at their discretion instead of in a face-to-face lecture. It's an online lecture so I can be available to them here in my office if they need anything or need additional help.

My biggest frustration with [in-class] technology is that it's not accessible to me. Student access [to labs] is really a big issue in the drawing course. The instructor of the other class being offered and I had to get together and try to figure out how to share one of the labs in the building, and it wasn't easy, and neither of us really got the time we needed.

Two of the participants did not use Blackboard, but found other options that better met their needs,

I don't rely on Blackboard because Blackboard doesn't allow me to actually run a full webpage arrangement. We have our own webpage that includes our calendar and it's a living calendar where people add things that are going on... and everyone is responsible for coordinating things throughout the semester so, they add their information to it. In addition, then, communication becomes a real key here in technology.

Participants spoke of their frustration with upgrades to existing software and other applications they grew accustomed to using in their courses,

Upgrade the software that screws things up where I can't use my old version.

Upgrades of software that have new features and I can't break an old habit. With technology I'm spending twice as long to get the same content across.

A participant shared a fear that many instructors new to teaching online face,

Course baggage—flexibility can be misconstrued. You're a little uncertain about what you're doing and how you're doing it, which is actually part of playing in this field—admitting that we don't know it all and there are different ways to do this.

In the online environment, students do not have the luxury of coming up to the instructor at the end of class to ask questions or to get lengthy verbal explanations of how something will work during the semester. Participants considered this as part of the context of teaching with technology,

I needed to figure out a way for them to see how they're doing. They had four tests, 25 points apiece. They add up to 100. You don't have to know how to do percent—you can figure out percent at the end. It's just one less thing that I have to worry about if I can head off questions about that.

Often technologies are implemented but support is unable to be sustained for various reasons. A participant described his experience with one such program,

It (a coaching site) was a great practice for our students. It took the onus off of us and the need to do it in class so we can do partially in class and then they would complete it at home. Those things can work very, very well. But the problem is that we're waiting for buy-in to produce them. [One instructor] proved that if you build it they will come. Everybody used it. And there are opportunities like that, but eventually there's the economics of this. The way it's been done is you kind of scrape together, put it together and then everybody uses it, but nobody is willing to pay for it.

Technology allows instructors to make content available to their students wherever, whenever. A participant described his experience,

I don't think that I've changed [teaching strategies] a lot. I like the recording of Adobe Connect because then I always figure if people miss, they have the chance to make up by watching the recording, and I can give them participation credit.

One participant shared the issues he has seen in working with K-12 schools with their access rules,

Social networking [being blocked by schools]—as someone who did a short stint as a principal, I totally understand why. It's not unreasonable in some ways. It's

just that we have not found ways to control that. A good portion of kids walk with handheld devices... that does become an issue. That issue will go away when everybody has that smart phone that we have no control over, and they can all go on those websites.

The interesting aside is that [technology] has made schools a lot more transparent. Anything that happens within the school walls will be known to parents and peers and others within about five minutes. Because somebody texts somebody... It's complicating the job of running schools. But in other ways it's making schools a lot more transparent. You can't hide things like you did in the past.

A question two of the participants have is when to quit using a technology. When is it time to make that change? Two comments follow:

I have goals. There are places I want to get to and if it's not doing anything for me, it's not helping me reach any of those goals, we simply stop using it. I think it has a natural cycle of life and death. Sometimes students will tell me, "Discussion board was great, but after eight weeks, we were done. We didn't want to post one more post." If I see there's nothing meaningful going on, I will stop using it. So, you've got to be ready to try things out and let them go when they don't work.

When things are not effective, we drop them. What you've got to be ready for is to let go and to know that students are not going to like it. I have a tentative syllabus and sometimes I say, "We are not going to do this because we're not

ready. We're going to push it back." Some students feel very uncomfortable with those just-in-time decisions.

Their posts on discussion board are less jumbled than the emails would be, and certainly than text would be. They're very clear—they do stop and think.

Participants of the study showed they are concerned with effectiveness of instruction. Two instructors spoke of research they have done regarding the effectiveness of online discussion. One shared about her study,

I got IRB approval for this past spring in [one online course]. We had students send permissions to [GA] so I didn't know who they were. I had two coders that I trained on posts from the year before where there was no grade involved. It was just course work analysis and wasn't reported or published. We used those previous posts until we had a high agreement as far as coding. Any post might have examples of several different points on the rubric. It wasn't a rubric where this is better than this; it's just this represents this level of thinking. Sometimes this level of thinking is necessary before you can get to this [higher] level of thinking.

Attitudes and Beliefs

I could not get anybody else in that school to be interested in using the technology because it changed the way that they were comfortable teaching. In certain ways, that attitude still exists today. (Instructor)

Literature on technology integration was rife with studies about how beliefs shape instructor actions. Baia (2009), Hildebrand (2009), and Windschitl and Sahl (2002) found that instructor beliefs lay at the heart of whether and how they integrated

technology into their teaching. Participants of the study shared different insights into this issue as well. Some spoke of what they see, others of their own experience. Comments related to attitudes and beliefs follow:

I think at times we should put a sign on the front of our building that says, “Mediocre U--We’re no better than anybody else and proud of it.” Is anybody going to speak up for what we really ought to be doing? I think that people do know—but there’s a difference—there seems to be a lag time between what we know and what we do.

Right now in our department one program would really like to be able to have a class set of iPads to try to see what they can do with their students using iPads. In talking with the powers-that-be there’s hesitation about, “Well, you know laptops are better because you can do more things with laptops, and laptops have served us well.” Sometimes the vision precedes the reality of things.

The incentive to use technology or to teach online was described,

The biggest barrier is there’s not a mechanism in place that rewards or that acknowledges the commitment to the use of improved technological resources in the classroom to the degree that the time that you’re putting into it has some compensation.

Context involves the discussion of how attitudes toward and beliefs about technology integration affect its use in the classroom. The following two comments from participants illustrate the wide range of attitudes about technology integration:

I hear other professors talk about, “well, I’d love to do this, but by the time I figure this out, something else is going to be coming along and they’re going to

tell me to do something else. And so I just stick with my overhead.” I think that’s really sad.

I love the technology. I absolutely love the technology. And it can be the bane of your existence when it doesn’t work. But to stand in front of 150 students, young people who are raised in society today and put up an overhead—well, you just can’t.

Another participant reflected on the lack of time allotted to him as a distance instructor. He said, “I don’t have time to bring myself up to speed on the technology. I don’t have time before the semester even begins to put everything together.” Other comments about the lack of time included the following:

When I’m implementing a new use of technology into a teaching strategy, it usually takes me a couple of times before I’m able to implement it in a way that the technology then sifts into the background and the learning objective is the forefront. The first couple of times, the technology is too big of a part of the focus.

Then my concern is this: If it takes me two semesters to do that, and I teach once in the fall and once in the summer, I’m a year out. Everything I learn, I’m a year out from having it actually be effective. And in a year, there’s some other technology that’s going to do it better than what I just did. So, I wish that I could experiment with things in a way that would allow me to test run it. But then the reality is time.

Participants reflected on the attitudes that they see around them,

I've seen professors where their motive for technology was to decrease their workload and I think that students pick up on that—it's kind of pawning off responsibility in some ways. And I've had students talk about how frustrating that is.

Differing from that attitude is one of willingness. Following is how one participant communicated it,

Personnel that are willing—or team members that are willing to collaborate that have that kind of vision and that kind of risk-taking—that they're willing to try something new. I think that's huge—the risk-taking factor. I'm not stuck in a rut, I want to know—I get excited when [I see] something new—how do you do it? Where did you get that? Do you have examples of that? Can you share? That really is invigorating for me—but not for everyone. And I'd like to see a critical mass of people like that—that would be exciting.

Another participant captured well, the effect of attitude on what instructors are able to accomplish. He said, "Our face-to-face is still valued more than the chance to do this electronically." He went on to explain,

Some feel that there are no reasons in which online can have an advantage or be equal to [in-class]. We have these dichotomies in our practice, and they're very problematic, but they're very much part of our fabric. We pretend that they are equal to regular semester courses, but when you really push people on what they believe they can accomplish in the summer, they say, "No, it's not as good." I think technology functions in the same way. People believe that it's a way to deliver and we're being pushed in it, and it's okay and you can accomplish certain

things, but if you really push them; with their back against the wall and say, “If you had a student and they could take this class online or offline, all other things being equal, which would you recommend or which would you rather they did?”

Everybody will say face-to-face.

The challenge to keep courses intact in a program of study, are many. One challenge was mentioned by a participant who spoke of the differences in direction among the faculty who share courses. The issue here is that modules or content that is considered essential by one instructor may not be to another for that particular course. So consistency in what is presented to students and when is a challenge when an instructor includes an element in one course, but the next semester the same course is taught by another instructor who omits that element,

Personally I don't believe in adding continuously adding to a course. If you add something, you've got to take away. So if you add a digital module that kids will have to go through and do for X number of weeks or whatever, you've got to take something else off the table. We have a six credit class so it's not like I'm taking a third of the class—I'm taking a sixth of the class.

Inside programs. And when I say “pay for it” it's not necessarily money as much as it is the willingness to say this is important enough to give for credit. Which is a totally different matter, which goes to the heart of the matter—the belief that this is not equal.

Perceptions are important in building confidence in teaching online. One participant shared her experience, “Perceptions of confidence—I've had people say,

“You’re actually doing pretty well.” But it’s my perception and my confidence that’s going to affect my choices.”

The use of social networking brings up a lot of feelings especially as it relates to teaching. Following are comments about Facebook.

We had a case where an instructor was complaining about students on Facebook, not realizing that sooner or later one of her students will see that and will react and not in a positive way. So, that idea that these social networking sites are just like talking to your friends at your house over coffee, it’s one of those shifts that we need to go through because the truth is, that it’s not.

A second aspect of this issue is the student side. One participant said of student use of Facebook,

You’ve got to think about what you present and how you present it and what you can talk about or not. It becomes also one of those things that we need to talk to our students about just like we used to talk to them about what email they use and what that email nickname says about them.

A third aspect of social networking that was brought up by participants included the following:

Somebody else took the picture and somebody tagged her on that picture and one of her students found her. It was not a school function, she was not with students, it was not in any way crossing any line. But it had some implications. So the school suspended her. How do you protect yourself from that? I mean, you can’t; you don’t know who’s got a camera, because we all walk around with a camera in our pocket. You don’t know where they’re posting it. You have no control over

who posts it, and who is able to see it. So we've lost control, yet schools are responding in traditional ways and we have not found that time yet. So we have to talk to our students about at least don't be the instigator.

Time. An issue discussed by participants was that of time. One participant commented that this was a bigger barrier even than financial resources for instructors. One issue for online instructors is the time-intensiveness of developing good course activities, modules, and design,

The time and effort that it takes to develop really good modules. I have very little time in my life in general and when you incorporate media, that just takes time. So, if I wanted to create videos and incorporate them and edit them, I don't know where I would find the time.

The speed with which technology is changing was another challenge for these participants. An instructor stated, "This whole idea of keeping up and students in the class, keeping up [with changes in technology tools], I think is a challenge." Perhaps the biggest factor for these participants was time. All 20 interviewed mentioned time as a hindrance to learning new technologies. One participant stated, "I don't have time to develop the tools or the skills or the resources and create the particular pieces that go with it. So, I find time more limiting than anything else." They felt that time was more limiting even than funding to provide technology in their classroom.

A participant explained about the time necessary to respond to students in the online setting:

I say to students at the beginning of the semester, “I will try diligently to respond to you within 24 hours.” I think that promptness with which I’ve responded and the way in which I’ve organized my time has really worked well.

Another participant talked about the up-front planning time it takes to get a course ready for online delivery,

The time frame has changed. I have to be geared up ahead of time—particularly for the classes that I do which are hybrid where I have the [distance students] join [the face-to-face class]. I have to not only plan for the schedule, but alert the students well ahead of time so we don’t get in a position where things are under way and students are really confused about what they were expected to do. But I do try to get it up at least several weeks ahead of time.

Participants spoke about specific applications and programs they use to either present content or provide learning activities for the students. Following are comments:

I spend a lot more time playing with the Mac Books because of their audio/video capabilities. I spend a lot more time doing that than I know my colleagues and most of the people with whom I work in the department do, because you have to have the commitment, and you have to be willing to spend the time. Otherwise, it’s not worth it.

[The online use of team projects] has been a lifesaver for me. Because the first course I taught, I had 30 students and I had four projects so I had basically 120 project papers, to evaluate and provide feedback. Now, when you divide that by—let’s say you have eight teams, you’ve narrowed that now to 32. That’s a

significant change in the amount of input that has to be put into the evaluation process or the time that it takes.

A veteran online instructor summed up her feelings about her time and the learning curve,

When I think about a new technology, I immediately get a headache and I think when would I take time to learn it, what would I use it for, is it worth me taking a day to practice it, how much time am I going to lose trying to fumble around and learn it? It's that fear of the unknown—no safety net—you know sink or swim.

Flexibility. A characteristic needed in the pursuit of technology integration is that of flexibility—with the technology, with students, with breakdowns, and with the support or lack of it. Following are comments by the participants:

The first week of class, I tend to be more lenient in terms of the time. When I say, your module block should be complete by this time. In the initial part of the semester, I do allow more flexibility for that than I did.

I don't mind getting help, but it hinders me if I'm reliant on someone else. Unless I can turn it to them and say, "Okay, here it is, do it for me." But if it's something that I actually am utilizing and I'm processing it, it hinders me to have to be reliant on someone else, but I might not have enough time to master the technology. I won't do it if it's too much.

You just have to go with the flow you know. If you get down there one day and nothing's working, what are you going to do? You can't just tell the kids to go home. It's not like the university where you can just turn them loose and let them

take off. You've got to have other things ready to go. I try to use this as learning experiences that way.

Support. Infrastructure was a subject that came up in interviews but was not pursued because of the emphasis on instructional technologies. However, local support issues were identified as important to both instructors and students,

Support is the other one. If I know that somebody else is available to me who's familiar with the software or the technology I'm much quicker to try it because if it doesn't work, I can ask them questions.

Two participant commented on labs,

Nobody reinstalled the DVD software. And this was 10 minutes before class started. So they're left scrambling around trying to get it working in time for me to be able to show our class. So, that's the frustrating part. That's a hindrance.

It's the input technology. We need the computers for Dragon Naturally Speaking and for keyboarding. That room physically cannot hold another computer. So, I'm limited to 24 kids in the class. I looked at my class list today and registration has been open for five days and there're 23 kids in that class already. So, somebody is going to find out next week that they're not going to be able to get in class.

About the support available in the college, a participant reflected,

I have never found a barrier of unwillingness, and I've never found a barrier of, "We really don't want to go there." I'm on the technology committee and there is

constantly the conversation of how to continue to move forward and provide the infrastructure and the training to support the infrastructure.

Another reflected on his colleagues' needs for professional development, "They need practice in using the software and the hardware, but also learning how to actually easily incorporate it in what they're teaching."

Two technology support people who consulted with faculty were cited for their support. Following are comments from participants:

On this site you can call, they can leave a message, it turns into an MP3, they email it to you and you got it. So, that was just me saying I'd like to be able to do this, what would work? They came up with it.

[The instructional designer] had to help me set those up and still I call on her to troubleshoot on Adobe Connect. I find that software kind of difficult to use and so she said, "Well, now that I know the kinds of things that you're doing in these review sessions, why don't you get one of these Waycom Pen Tablets so you can draw more easily on the images as you're doing it." So that's how I learned—even that one was a leap to use it in the studio course.

The truth is over the last few years we've had better support for our students. So if I can send them to [the instructional designer or technology help] that helps me because I know this student is totally freaking out, they don't know how to do it. I can have the instructional designer plug in a module that'll teach them to do that—it's getting better.

A participant acknowledged the need for more student support,

I think having more support. They are doing [the technology class] at the very beginning [of their program], and they don't have a lot of background knowledge for some of these things. Just like with any professional development, if you do it in a one shot wonder—granted this course is over a semester, but there's not a lot of background knowledge. If you can revisit it in short shots perhaps... I know some of the faculty who are interested in integrating technology and those people purposefully do a lot more than I do. I think having support of people would be really good. It becomes more real and it's a reminder. Just like the practice with learning some concept—you need that review and practice. Because you're bringing it back again, you're thinking about it in a very different way than you did the first time. Now you have experience with stuff that you know and can build upon what you had before.

When technology courses are made available to instructors, they appreciate being able to walk away with something in-hand for when they actually need it,

I can look at my notes and I've really appreciated the handouts that they [technology trainers] gave. Sometimes it's just the timing or the fact that I'm just overwhelmed with everything else that has to be done. It has to be relevant to me.

Two participants spoke of their need for more support,

I don't find that around here with the exception—I have three nerd friends that I'm not even sure I want the rest of the world to know about that are willing to brainstorm with me.

I want someone to be available to me—not in a sporadic manner—part of my professional development. I love my research, I don't want anything to touch

that—it's sacrosanct to me, but I'd love to have a semester where I would use with technology folks, online technology folks and take my content area and explore that with a group of folks.

Resistance

I have a lot of colleagues who will teach online or will have online components, but still don't see how the delivery could be done effectively. In many ways it's the classic case of replicating offline courses just playing the variables a little bit. So, they're not embracing technology. (Instructor)

Following beliefs that online delivery of courses is not as effective as face-to-face, there is the issue of outright resistance to it and to the use of technology in teaching. Comments made by the participants of the study related to resistance they have experienced. Comments included:

What is hindering me from using the Smartboard is money. They don't have them built into the rooms right now. I would use Mathematica if they had a site license for it and the university is still trying to decide if they think it's a good idea. So, that's another economic issue.

I'm skeptical of some things that are changing so quickly. I'm sure somewhere is the first professor who thought using Twitter was just the way to teach comparative literature or something. Things come on fast and then they settle down. There's some interesting theories about learning with technology.

You can't always say it's a money issue. Sometimes it's, "This is the way we've always done it. This is what we're comfortable with supporting." Those kinds of things. The biggest issue I've had in my PC lab—there's got to be some way to

get rid of the junk on the computers and clean them up, but then put the software back on them. I don't want to have to go down there before my class starts and make sure all the software is there.

20th Century Beliefs

If we're not part of these worlds, then how can we help out students? Think about that—that's part of the credibility gap. (Instructor)

Participants in the study had varying degrees of experience with technology and its implementation. However, a few of them saw the gap between what we could do and what we are doing as a college. Although there are some innovations in the university and in this college overall, participants found that credibility gaps still exist in either what we are presenting, how we are presenting it, or even if we are using high-end technologies, where will those students use them if schools are not prepared for the 21st Century when they leave here?

Two participants commented on our use of the “industrial model” of teaching,

I think a lot of what I've read is what you're talking about in terms of the teaching and the industrial model—the model that we've used since 1760 and it's just incredible to me that we're still there—but that's the reality of it I guess.

One participant indicated that we are behind in preparing our students,

This is something that I have spent some time talking about recently so it's a very good time to ask this. And I think that, as a field, we're behind as a general rule.

We're not doing enough technology in our methods classes and that is problematic because we seem to be preparing teachers for yesterday's schools. However, that

being said, they do teach in yesterday's schools. That is, the schools they work in seem to be to a great degree, the schools of the 1980s. They do have computers, they do have access to computers, they do some things with computers, but it's very limited; it's segregated computer practice that we see and very often just not very robust, so, I think that integrated technology into our classes and into the way we do things should happen more.

According to one participant, there are deep-seated 20th Century beliefs in his college,

But that is because [faculty are] not comfortable with technology as much, and they don't use it in that. Or it's creeping into their practice, but, there are deep-seated beliefs, 20th Century beliefs, if you may, about how these things should go. And there's the underlying very strong belief that online experiences are inherently worse than offline. And, when you really cut to the chase and talk about that, everybody believes that that is true.

Another participant found the gap between what students experienced in the schools and what his discipline was able to offer,

It used to be when they were coming in we were showing them newer technology than they have in school. And now they're going to be coming in from schools that have started using Kindle readers and Smart boards all the time and feeling that they're stepping back in time because we think the document reader's a big deal. So what students like is what they see will be useful tools in their own teaching.

One participant reminisced about her experience in graduate school,

The old way was harsh... but you were demanded to perform. You were expected to aim for high quality and a standard was set in your face. I think we could teach in the old way, but there'd be bumps and bruises and there'd be people yelling "foul." So, did technology make the world better? Yes, but did it solve everything? No.

A willingness to try new things was implied by several participants in the interviews. One evidence of the need for this can be found when things do not work. The question is, will you let that keep you from moving forward in your technology integration? Or will you break through that barrier and move on?

Maybe the most important skill which is what stops people is you've got to be ready for those moments like we had at the beginning of the semester when you use this new module and it doesn't work and you're going to be upset, but you've got to get over it and move on.

A participant voiced a concern about some instructors he sees. He said, "They're not feeling comfortable in digital environments looking around. Their understanding of media skills is very limited." Another took this thought further,

I think [lack of media skills is] seriously challenging at this point. And the truth is even in our courses as I look at our curriculum for our teachers in the technology classes, I think we are teaching for the technology of the 1990's in many ways, and that's something that needs some attention... and it's going to get some attention because I'm in a position to do some of that.

An issue that was addressed by one participant of the study involved the use of technology for professional development and the need for students to be familiar with it

so they can participate in those opportunities with ease. Following is one participant's comment:

I think it's important because professional development is going to be at least partially delivered in electronic means and if they don't know how to tap that, they're going to be at a disadvantage so in a very interesting way, we have multiple layers about technology--it's their learning, and how much technology is part of learning today. It's the way they will teach their students and it's also the way that they will develop professionally that are all integrated into these digital worlds and will probably become increasingly so.

Skills

Real basic skills—something as simple as word processing, Excel. All those kinds of things that save hours and hours of time so you don't have to do them by hand. I think that's a baseline skill. (Online Instructor)

Participants spoke about a wide variety of issues with skills acquisition for technology use. Some were concerned with their own skill development. Others spoke of the need for students to be able to use instructional technologies. There is a belief today that all students who are coming to college are familiar with and skilled in using technology. Although that is true in some areas, what some instructors are finding is that they know some technologies—they know Facebook and MySpace. They are able to text and use SmartPhones. However, many know nothing about a complex system such as Blackboard and how to download documents and videos from a course management system. Many will not take the time to learn how to navigate a course. However, most

are adept at looking around if the motivation is there. Participants shared experiences with these issues. Following are comments they made:

I have students walking into my class that have never used Blackboard beyond discussion board, that don't know anything about using the blogs, don't know any kind of function like it. They've never taken an exam or a quiz or a survey on those. So, they walk in and they're having these moments of anxiety. And I'm at the end—I mean I teach juniors and seniors when they get to my class. I have them at the end of the road. Most of them go into student teaching after my class within a year after my class. So, this is the end of the road and they haven't done any of these things.

I'm doing the blended learning class where I have learning modules which are taught in a distance format and the class time is spent solely on practice. A lot of that class is how you do empathy skills and how you ask appropriate questions. So it's a real skills-based class. With this format, I've noticed that I get so many more emails of things that students should figure out themselves. Instead of going back into the module and figuring the answer out, it's easier to just shoot off an email to me. In class they would just ask a question.

The other side of the coin was illustrated by this comment:

I know people who in first grade teach their kids how to do a PowerPoint and do creative things with PowerPoint.

Participants verbalized some of their struggles in teaching with technology. One said, "They're pretty comfortable in that medium of communication, whereas, I wouldn't be,"

When I have to use a MAC, I feel incompetent, because my logic doesn't fit it.

So, I'm going to avoid doing that in front of my students. I've done it before, and it's not pleasant.

For some instructors, a particular technology did not seem important. One participant shared this,

I know professors in our department actually use overheads and do it effectively because it's graduate classes and graduate students—the depth of what they're looking at—they could care less what format it's presented in.

A skill that one participant wanted to learn,

I've always wanted to apply some kind of audio techniques to either PowerPoints or within the courses themselves. I haven't done that, but I think that's really a skill that's important to effective teaching.

Participants shared ideas on what would work for students. Ideas included integrating technology, learning applications, and effective writing skills. Comments follow:

For those early classes—for freshmen, sophomores, where they're really getting some foundational study skills, I think it's more important to integrate different technologies into that—things like web-based assignments, technology-based activities.

Mastering and design. Mastering some of these other programs. Mastering PhotoShop. You can't expect them to do that without having to take some time to learn it.

By the fourth time, they can write to a rubric, they can evaluate to a rubric and they're very accurate about not only writing but also evaluating their own paper. Sometimes we have them evaluate their own paper and their peer serves as a reliability. We call it "validator" because I used the word reliability and that just messed them up. So that technology has given us a dimension that we did not have before. You can get anecdotes, you can bring children in, but this is a virtual child and this group of people are very tuned in to video games and so this fits right in with their world.

One online graduate instructor shared fears with her students,

As far as technology goes—given that some of these people are even more technophobic than I am which is why I understand them so well, I think that they have appreciated having access to a [support person] running through Adobe Connect or the course orientation button that has the blogs on how to do all of these things... Now people know exactly what they're having trouble with and only after they've checked the resources. They don't have much trouble anymore. That may be that they are becoming more technologically savvy as a group. But overall, I can ask students to make me a PDF or scan a document or draw a picture and take a digital picture of it and post it as a jpg and they know how to do that.

Possibilities

Finding ways to connect it for them to make sense of technology is more my thing.

(Instructor)

Often when something is new, it brings with it its own excitement—motivation to learn, wanting to try new things. This subtheme is included in this chapter on context because participants communicated a commitment to moving past barriers of all kinds and saw the possibilities of what could be—of where technology integration could take them and their students. As I expressed earlier, many of these participants shared about their fear of technology, others shared an excitement when they are able to either grasp something new or pass it on to their students or colleagues. Following are their comments about the possibilities as these participants viewed them:

Using technology is labor intensive. I am still a technophobe—despite all the technology that I use. I am still unsure of any new tool that comes along and scared to death every time they change the Blackboard format. You'd think I'd have a good deal of confidence now in my ability to handle it because I always do. But I spend more time making sure that everything is right and going back and double- and triple-checking things that I might not have otherwise. But I think the technology, because it's made more things possible, has increased the labor intensiveness of—I do more because I can.

I don't give tests. The test is being able to do it and I've never been able to figure out how to give people a paper and pencil test to see if they can teach. So, our course is built around evidence and the evidence is many times captured in terms of technology.

I describe it as a community of scholars rather than just learners. They really come to know each other as people with whom they can share professional issues.

One of my doctoral students did a dissertation on the online [program] and found there was a huge impact on the community. This was the first course they ever received specific content feedback on their teaching. Before it was generic. They were able to interact with peers on a level that they couldn't before and so they formed little subgroups just for peers.

I had what I called a "teachers' lounge" where they could do their thing and actually they ended up doing a whole lot of email just among themselves—expanding that learner community of scholars.

They love hearing from you individually and I think the whole idea that I'm there and available to them—especially during student teaching and practicum when something's happened that immediate access—that I'm online quite a bit. The phone works, but I think the email allows me to respond quicker with a little more substance.

I think [technology] empowers the students because they have ownership in the class.

I can bring on guest speakers, experts. I have a huge network of scholars and I can say, "We're going to talk about anxiety in the classroom, let me ask my friend to get online with us and talk a little."

They like the organization of it. They're grateful for my promptness, that I give feedback promptly. I respond to phone calls, I respond to email. I'm available to them. They don't have to wait long to get to me.

Generally they feel like they leave with a lot of information and my job is to hold the reins so that lots of information doesn't become just chaos for them—that it

still is organized enough that they're finding places to put it in their head. And they can make sense of it.

Novelty—let's be honest.

I'm saying it's just not being used as well as it could be.

I remember my very first methods class in thesis building 25 years ago and I started class with a statement that I thought was rather profound at the time. I said, "I'm going to prepare you to teach, but I want you to think what your job would be if every child had the Library of Congress on their desk. If information was no longer the issue, what would you do?" Guess what? That has happened and we still haven't changed what we do! We act as if we are the possessors of knowledge, and we're not. We don't know squat compared to what kids could access if they wanted to. So what are we going to do about that?

When we have a class of guests and the guests have used Adobe Presenter, those students really comment a lot about the quality of those presentations. They're rich, they love having this authority come in and talk to them and if we can make email contact with that instructor, that presenter, and get Q & A taken care of, the students feel like they've been given something special without having to travel.

It used to be in my microteaching class, one or two people wanted technology.

Out of 29, 27 requested technology to teach their microteaching last semester.

One instructor very effectively summed up the possibilities,

The most important thing for [students] in my field of education is access to authentic materials. The newspapers, a web report, a review of a movie, a song

that's come out. Those are things that immediately make it relevant to kids and it connects them globally to the students in the classroom.

Summary

The sub-themes which applied to the theme of context included (a) attitudes and beliefs, (b) resistance, (c) 20th century beliefs, (d) skills, (e) possibilities of technology, (f) time, (g) flexibility, and (h) support. The voices of the participants illuminated their own technology integration in light of these topics. One participant spoke of a book he had read regarding the gap between reality and the ideal,

A rubber band exists between the two. You have to realize that if you're going to move reality, you have to put some tension on the system. If you put too much tension on the system, you break your rubber band and you get nowhere. If you don't have enough tension, then mediocrity reigns supreme.

Context enables us to move between reality and the ideal in our approach to technology integration. If we don't want to settle for mediocrity, then resistance, hanging onto 20th Century beliefs, and allowing life to pass us by, will not get us to our goal.

CHAPTER 9

Theme 5: Relationships

Anytime we're together as a group, things will happen that will never be the same again. I view that as being very positive—very, very and I think modeling the way is the biggest, best thing you can do. (Instructor)

Dewey's (1929) belief that education is a social process indicates the importance of relationship to education. A fifth theme drawn from the interviews showed relationship was important to these participants. They spoke of relationship as imperative to the learning process. They saw technology integration as not simply adding tools to teaching, but rather fulfilling educational objectives by using technology tools to enhance the process and the outcomes of learning—the tools to use to engage students, to facilitate discussion, and to provide an atmosphere for student collaboration and communication. Subthemes of relationship included engagement, communication, and immediacy. One participant stated,

My syllabus has a statement that really is important to me, and that is that this course is far more than informational, it's intended to be transformational. If we're serious about relationships, then relationships are things that change all of us.

There isn't any other word that describes that—(relationships). But my colleagues don't agree frankly. That's why we continue to have people that are giving my students to advisors because I have too many, and the rest of this faculty believe that advising means meeting with students once a year and filling out a form, and I am so [angry] about losing my students to people who don't

care. If they want students, they need to get out in the schools and form relationships—so it's more than just sitting in a methods class.

Engagement

They can't just sit there. They have to engage because they're writing to each other. They're thinking a little bit more deeply about some of these things. And so their learning goes up. (Instructor)

Engagement was a subtheme of the theme relationship. One participant said, "More often you can see it in their discussion and involvement in class and doing class activities." Following are comments made by participants about student engagement in the classroom.

Facilitating class discussions I find is a little bit tricky because you can have what you think is a class discussion, but really it's a discussion between the individual students and the instructor in the context of the whole class.

An online instructor commented about this,

I found that I really have to encourage them and structure that and even give them a kind of rubric or criteria for their responses in the sense that I want them to actually talk about the content of it specifically more.

Another online instructor observed how engagement could be effective,

One of the things that I'm moving toward is incorporating into exams—responding to some specific aspects of their written material. It is use this piece of information, analyze this further. They do have a text, and I want them to be able to use it and apply it and to really look at one in depth and analyze it. It's

different than saying, “Okay, so you’ve read about water, air, animals, plants. Pick one of those and do this.” And that is the next step—it makes them interact with the content a little bit more than they might otherwise have to.

An online instructor commented about online student engagement,

It used to be that you’d have students vegging out in the back of class and barely getting assignments in. I don’t have that problem nearly as much anymore. People seem very interested, proactive, and engaged, once you can get them going.

[What I’ve found effective is] hybrid courses where I have the distance students join in. They like feeling a part of the class in a way that isn’t the same when you’re just on a discussion board with kind of anonymous people.

Engagement in a face-to-face class also holds challenges,

What are they going to do outside of class time—independent of me that might get to those objectives? What are the measures of the objectives?

Two of the online participants saw their students as “shared instructors.” They saw their own roles as different from their face-to-face roles,

In the last five to 10 years I’ve done a much better job of engaging the students as shared instructors—finding ways for them to take the lead and debriefing on an article.

Another participant talked about how to engage students in class activities,

Now I ask them to take the lead in reacting to this research. What did you think happened in the study, what do you think worked in the study as an intervention

and what was the outcome? And then what was confusing to you? And really make it a conversation that gets them talking to me and the other students are hearing this dialogue. Then it just opens itself up and students can engage. I think getting more dialogue in my classes as opposed to lecture has happened more.

Another example of engaging activities came from an instructor who spoke of the turn-around she saw in her classes,

They do avoidance behaviors having to do with reading and writing which can be brought into literacy practices through things like Twitter, Facebook, and Internet and gaming online—things like that, where they all of a sudden become the experts and the teachers are not the experts. They're very creative—you can get them to do incredibly creative projects.

A participant reported being intrigued by learning new technologies,

I like the technology I've learned. I'm always intrigued like maybe I could use that. I just feel like I'm a slow learner sometimes about how to actually do it with ease.

One participant shared an activity as an example of engaging students. She said, "You really have to think analytically about the character to make a valid Facebook page. [A great project for students]. And very engaging."

A participant highlighted the importance of engagement when he said, "If you can get their attention, that's the only way they're going to learn. So, you have to hold attention in an engaging way."

Communication

Communication is an important part of building relationships. Following are participants' comments related to communication:

We're talking about three different kinds of communication modalities, and we've got two pairs of students dealing with each one with a different modality, and they have to come back by Friday with a report on what the major points are—the major features that everybody needs to know about those modalities.

[Students] have to post a minimum of three times, and one of those needs to be majorly substantive, and here's the prompt for it. Not everybody answered this question, but I want a conversation.

Certainly at the top of the list would be communication skills. That would be both written and verbal. I say verbal because although we haven't relied on Skype and some of the technologies that do verbal presentations in my course, our [accreditation] requirement has recently added an oral dimension.

It has really made me tighten up communication—written communication skills. I try to anticipate how any of my communications could be misinterpreted. I always fall short of it being completely foolproof. But that's definitely a factor from experience. I know how easy it is to be defensive when you read an email. So, I try to figure out how to phrase things in a much more positive way than I would if I were speaking to students.

Communication big time. I mean it's so crucial for ways of communicating with students day and night.

Immediacy

Immediacy as a subtheme referred to the response of instructors to students' questions because of the availability of information. Two participants commented on immediacy.

I'm able to provide students more immediately with answers to things that I don't know. I will stop in class and look something up and show them.

That models for them how to find things which is kind of where I know to do that. I'll say, "Well, let's see, let's do it. And I would stop. So, in that way the immediacy of retrieving information and answering them is really important."

Summary

The last theme that I examined—relationships—elicited a reaction from the participants. They felt strongly about the importance of relationships with students. They reported that a goal for them was to use the tools to enhance the collaboration and communication in the classroom and the distance faculty stated that relationships can be built even when students are never face-to-face. Participants spoke about engaging the students by enabling them to interact with the content more, collaborate with classmates, and learn communication skills. This was a fitting discussion to end the results section of the study. Next we will look at the quantitative results of the survey responses from the participants.

CHAPTER 10

Quantitative Results

The survey for this mixed methods study was designed to offer an understanding of the technologies each participant used in the classroom and their perceptions of technology use. Quantitative findings are presented in this chapter. Frequencies of technologies used and perceptions of participants toward technology use are reported. The data were collected through two surveys. The first survey was offered to the 20 interviewed participants so survey data could be compared to comments made in the interviews. The second survey was offered to all of the instructors in the college. Of a possible 202 instructors, 85 responded. The surveys were exactly alike; however they were treated as separate datasets for later analysis. I wanted to see if there was a difference in the technology use of the referent sample of the 20 participants in comparison to the whole college group ($n = 85$). My question surfaced because the 20 interviewed participants were referred to this study based on their technology use in class. It would seem that they would use more technologies in teaching than others in the college.

The survey was located on an encrypted website and participants were given the web address through an email. The interview participants were given the survey link within two days of the interview. An identification number was given to them to enter the survey. This helped me track the responses. The college group was sent an invitation soon after the interview participants responded. This group was not identified. They were sent three emails over the course of three weeks and 85 of 202 instructors responded. Data from the surveys of the 20 interviewed instructors were compared with

data submitted by the 85 instructors who participated in the survey to determine differences between the referred, experienced participants who were interviewed and the college-wide instructors who responded to the survey. Survey findings follow

Survey Findings

Survey questions were designed to capture the categories and extent of technology use and the attitudes and perceptions toward technology integration. Questions included items to determine the degree to which 13 categories of technologies were used based on a five-point scale of *never* to *extensively used*. The final seven questions asked about perceptions of technology use in the classroom and were scored on a five-point Likert scale of *strongly disagree* to *strongly agree*.

Frequencies.

Frequencies are most helpful when used in comparisons. Data showed that the 20 interviewed participants used more technologies and at a higher level of participation than the 85 from the college group. However, frequency difference was insignificant. A comparison of the mean of frequencies of the categories of technology used by participants can be seen in Tables 10.1 and 10.2. That same data are shown in Figures 10.1 and 10.2, respectively.

Table 10.1. Mean of Frequencies of Technology Use for College Group

College Instructors N=85	Mean	Std. Deviation
Email	4.61	.90
Presentation software	4.20	1.07
Internet content	4.16	1.08
Video	3.26	1.21
Discussion boards	3.20	1.51
Audio	3.02	1.39
Spreadsheets	2.71	1.27
Blogs	1.82	1.17
Social Networking	1.81	1.29
Animation	1.75	.99
Podcasts	1.68	1.13
Chat	1.58	.86
Wikis	1.46	.91

Mean of frequencies of use of technology by category

$p < .05$

Table 10.2. Mean of Frequencies of Technology Use for Interviewed Participants

Interviewed Instructors N=20	Mean	Std. Deviation
Email	4.65	.59
Presentation software	4.40	.82
Internet content	4.30	.73
Video	3.70	.92
Discussion boards	3.65	1.35
Audio	3.40	1.00
Spreadsheets	2.90	1.21
Blogs	2.40	1.43
Wikis	2.20	1.36
Chat	2.10	1.33
Animation	2.05	1.19
Podcasts	1.65	.88
Social Networking	1.55	1.23

Mean of frequencies of use of technology by category

$p < .05$

Figure 10.1 Mean of Frequencies of Technology Used

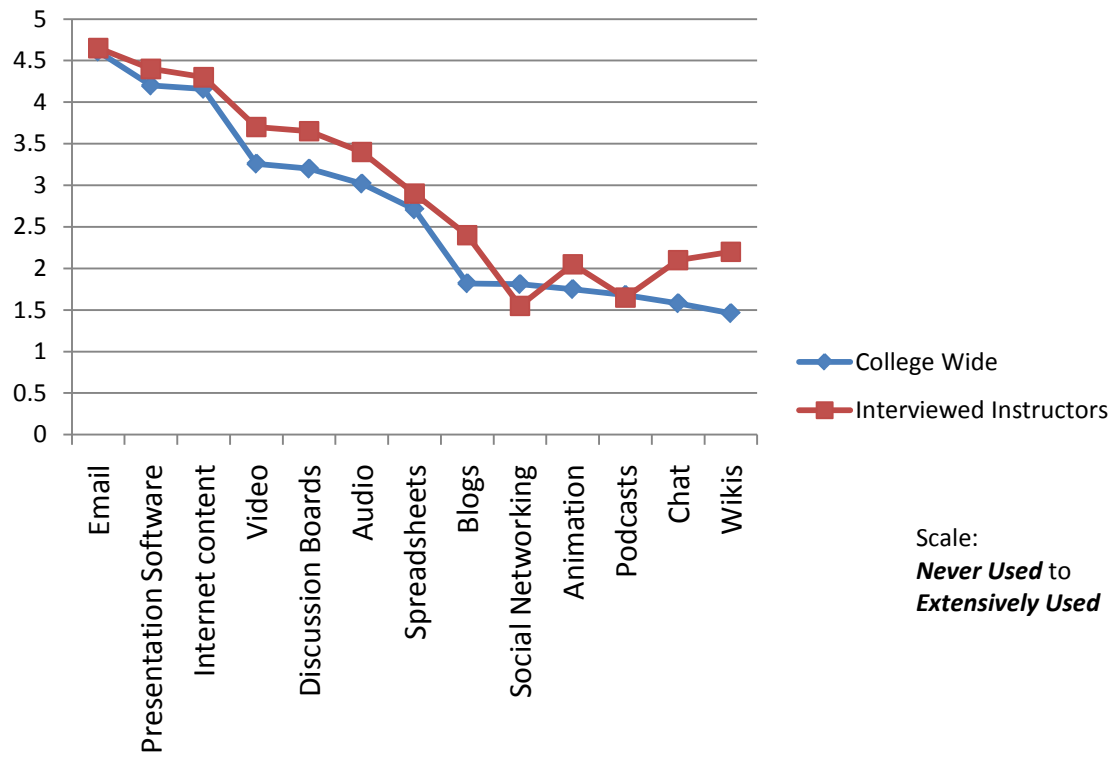
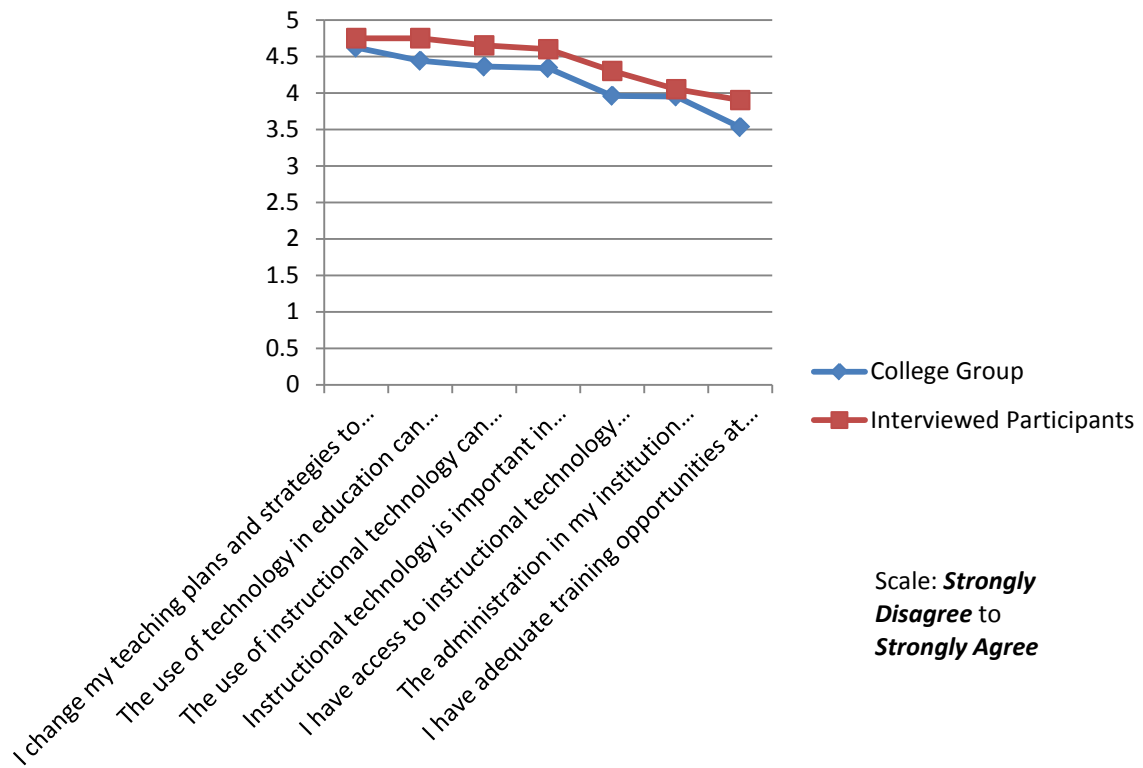


Figure 10.2 Mean of Attitudes and Perceptions Toward Technology Use



Perceptions

Participants' perceptions of technology integration were important in the study. Because research showed that teachers' beliefs shape their instructional goals, I wanted to understand how the participants in the current study were influenced by their perceptions of technology integration. Therefore, I compared the mean of perceptions toward technology use reported by the interview participants (N=20) with the responses from the college group (N=85). These are reported in Tables 10.3 and 10.4.

Table 10.3. Mean of Perceptions of Technology Use for College Group

College-wide Instructors N=85	Mean	Std Deviation
I change my teaching plans and strategies to foster student learning.	4.62	.64
The use of technology in education can enhance student learning in my discipline.	4.44	.92
The use of instructional technology can enhance my teaching.	4.36	.94
Instructional technology is important in higher education.	4.34	.97
I have access to instructional technology technical support.	3.96	.99
The administration in my institution supports my use of technology in education.	3.95	1.09
I have adequate training opportunities at my institution to develop the technical skills required for instructional technology integration.	3.53	.98

Perceptions of technology use.

$p < .05$

Table 10.4. Mean of Perceptions of Technology Use for Interviewed Participants

Interviewed Participants N=20	Mean	Std Deviation
Instructional technology is important in higher education.	4.75	.44
I change my teaching plans and strategies to foster student learning.	4.75	.55
The use of technology in education can enhance student learning in my discipline.	4.65	.49
The use of instructional technology can enhance my teaching.	4.60	.50
I have access to instructional technology technical support.	4.30	.73
The administration in my institution supports my use of technology in education.	4.05	1.00
I have adequate training opportunities at my institution to develop the technical skills required for instructional technology integration.	3.90	1.07

Perceptions of technology use.

$p < .05$

The fourth sub-question in the interview protocol referred to the quantitative survey that was offered to both the interview participants (N=20) and the college group (N=85). The 20 interview participants took the survey soon after they were interviewed. After all interviews were completed, all instructors in the college were offered the opportunity to answer survey questions. Eighty-five responded. There are approximately 202 instructors in the college who were invited to take the survey including the following ranks: temporary professor, adjunct instructor, lecturer, senior lecturer, assistant professor, associate professor, and professor. This number reflects a rate of return of 42%.

T-tests were used for post-hoc analysis to compare datasets for frequencies of technology used and for attitudes toward technology integration. The frequency of technology use for the college-wide dataset were less than those of the interviewed

participants. The confidence level was .06 which indicates that there is some correlation. The differences in attitude between the two groups were not significant (.099).

Comparisons between the two datasets revealed a level of .06 in frequencies of technology used. This was an expected result. Because I used a referent method of acquiring a sample, participants interviewed were those who use technology in their teaching. Therefore, attitudes toward technology integration varied little within that sample. In the college-wide survey, a broader look at the college group yielded a more complete picture of the categories of technologies used, their frequency of use and the attitudes of the larger group as compared with the qualitative participants. Little difference was found.

The overall frequencies and perceptions were compared between the groups. Means for the “interview group” for frequency of technology use ($M = 3.0$, $SD = 0.54$) and the mean for the “college group” frequency of technology use ($M = 2.7$, $SD = 0.61$) did not differ significantly ($t(103) = -1.9$, $p = .43$). Means for the “interview group” for attitudes of technology use ($M = 4.4$, $SD = 0.37$) and the mean for the “college group” attitudes of technology use ($M = 4.2$, $SD = 0.66$) did not differ significantly ($t(103) = -1.7$, $p = .13$).

Minimum frequency in both technology use and perception showed a lower minimum for the college-wide group than for the interviewed group, presenting a higher mean for the interviewed group. The 20 interviewed participants showed more frequent and higher use of technology than the college-wide respondents, showing a slight significance in the mean (2.7 to 2.9).

Reliability

The “frequency of use” section of the survey included 13 items scored on a 5-point Likert-like scale. The scores were averaged, yielding a single mean of frequency of use. The Cronbach’s Alpha score (.79) was above .70 the acceptable level for internal consistency.

Summary

Surveys provided information about categories of technology tools that participants have used over the past year. Comparisons were made between the two datasets in both frequency of technologies used and perceptions of the importance of technology to participants’ teaching. I expected a significant difference between the technology use and perceptions of the 20 interview participants as compared with the 85 respondents from the college group. However, no significant difference was found.

The survey data provided a measure of what technologies the participants used and their perceptions of its use. I used the two survey datasets (interviewed participants and college wide participants) to see if there was a difference in those who were known for their technology use (the interviewed participants) and the college as a whole. In the next chapter I will report findings when the quantitative and qualitative datasets from the interviewed participants are mixed.

CHAPTER 11

Mixed Methods Results

Data were analyzed based on methods recommended for a triangulation design. In stage one qualitative and quantitative data were analyzed separately. Stage two provided the mixing of the two datasets to view the complete picture for the study. This allowed me to answer the mixed methods question: How do quantitative relationships between attitudes and integration relate to the qualitative descriptions of integration practices? In the analysis stage, results were first analyzed alone then converged with the qualitative data to offer a clear understanding of the instructors' practices by providing numbers to enhance their words.

The frequency of technology use and the attitudes of the participants were compared for the interviewed participants and the college group. The Pearson Correlation between the scores on attitude and frequency of technology use for the whole instrument was $r = .188$, $n = 105$, $p = .055$. It was not shown to be significant.

Findings were correlated to determine if significance could be found between frequency and types of technologies used and attitude toward technology between the two groups of participants. The Pearson Correlation was $r = .207$, $n = 85$, $p = .058$ for the "college group" and $r = -.202$, $n = 20$, $p = .392$ for the "interviewed participants." These numbers show that these correlations were not strong.

Correlations could have been stronger if the number in the group of interviewed participants had been larger. A number approaching 30 rather than 20 would have had more power.

A matrix (Appendix D) was developed to illustrate findings from the different datasets. These findings were related to the attitudes and beliefs questions on the survey (questions 14-20) and comments from the interviews that correspond to those questions.

Summary

The mixed methods design of this study provided a way of merging two datasets to offer a complete picture. A triangulation design helps the researcher answer the question, “To what extent do the quantitative and qualitative data converge? How and why?” (Creswell & Plano Clark, 2007, p. 136). Although the current study revealed some differences in the two datasets, correlations were not strong. In reflecting on the people involved in this study, the 20 interview participants were those known for their technology use in teaching. The 85 who responded to the surveys from the college-wide group were possibly those who were interested in the topic and thus were willing to take the time to answer the questions. Therefore, I concluded that participants’ use of technology did not inform their attitudes about technology integration.

CHAPTER 12

Discussion

Overview

This study was guided by the central question, *How do instructors who use technology to support pedagogical best practices in the classroom describe their experiences?* The use of a triangulation mixed methods design provided both qualitative and quantitative data to examine the relationships between attitudes and integration related to the descriptions of instructors' practices with technology. The qualitative phase included one-on-one interviews using open-ended questions to examine the technology practices, contexts of technology integration, and how technology has affected participants' teaching. A sample of 20 participants from a College of Education at a Midwest Research I University was used in the interviews.

The quantitative phase of the study was comprised of a survey that presented categories of technologies used. The results determined the extent of technology use and the perceptions of instructors as they integrated technology. Two groups of instructors participated in the survey; (a) the interview participants (n=20); and (b) the college group (n=85).

Qualitative Questions

The following three sub-questions guided the interviews.

1. What technology practices have instructors adopted in their classrooms?
2. What contexts and challenges to the use of technology do instructors describe?
3. How has technology changed their teaching?

Following is a discussion of each sub-question.

What technology practices have instructors adopted in their classrooms?

Participants reported many variations in the tools used, the ways they are used, and a variety of backgrounds and comfort levels with using technology. Participants ranged from *technophobes* to those who are energized by finding the newest and most challenging. Analysis of the transcripts revealed participant practices with (a) course organization, (b) collaboration, (c) use of multi-media, (d) feedback, and (e) innovations.

Course Organization. The course management system was mentioned by nine of the interview participants as being important to their course organization. Course organization is an important part of not only teaching online, but also of integrating technology into a class session. Because of the up-front planning time that it takes to teach online or to integrate technology in a classroom setting, instructors need strong teaching objectives to guide their planning and organizing.

A course management system is helpful because it includes tools for organization, communication, module building, testing, collaboration, and discussion. Blackboard, the course management system at the university, houses assessment software for timed tests, quizzes, anonymous surveys, and uploading assignments. Instructors can post video, images, and audio files as part of the assessment. They can provide specific feedback to students not only on overall grades, but also for further learning on questions missed and correct answers. In addition, Blackboard offers self-assessment tools, peer-assessment tools, and plagiarism tools.

Collaboration. Collaboration activities can be found in both online and face-to-face courses. However, collaborative tools were reported by the participants primarily in

the online environment. The face-to-face students may use technology such as email or texting, but they tend to meet together to plan projects as opposed to the online students who have no choice. Steinbronn and Merideth (2007) spoke about the value of collaboration for online courses, “Best practices in online learning include a high level of engagement and collaboration between students.” Participants spoke of collaboration in team projects, use of wikis, discussion boards, and blogs. The effectiveness of these collaboration tools cannot be underestimated. Participants described effective use of blogs and wikis and how they allowed them to provide assignments which they described as closely matching real life. During the interviews 9 of the 20 participants cited the use of discussions as being effective. Blogs were used by 5 and wikis by 4. They described collaborative activities that they considered to be effective. I deem these numbers more noteworthy than they appear because interview questions did not directly ask which technologies participants used.

Participants’ descriptions of uses of the collaboration tools, wikis and blogs, provided a picture of how technology has enhanced student learning. They described using collaboration tools to provide real-life simulations for students’ projects and places for student reflections. Both are important activities leading to effective learning.

Discussion boards are one of the most widely-used collaboration tools, perhaps because of the power of the asynchronous nature of the tool and its long-time use. The discussion board allows students to respond thoughtfully to questions in the course. My observation of this tool, both from the perspective of a student and that of having worked closely with instructors in online courses, is that it allows students who may be reluctant to jump into discussions and to thoughtfully prepare a written answer to questions or

comment on a classmate's posting with opportunity for edits before submitting. The asynchronous nature of the discussion board feels safer to some students than a live discussion, thus increasing the opportunity for students who are less likely to participate in class.

Participants described the use of the internet in a multitude of ways from web searches for graduate courses both online and face-to-face to its value as a resource for instructional tools. Other participants described internet applications including Google Scholar, publisher websites, Twitter, electronic textbooks, Facebook, and web 2.0 tools. In all, 18 internet-enabled tools were mentioned.

Use of multi-media. Video, audio, podcasts and mixed media played a role in participants' teaching approaches. Not only did participants find mixed media effective, usually the media were easily incorporated into the course management system. Participants used these technologies to introduce or summarize modules or to give feedback to the group or to individuals. Videos are extensively used in online courses. Seven participants reported using videos to help students grasp course concepts. Podcasts were mentioned by one participant. However, four others use Jing or other audio applications to deliver content and feedback to students.

Instructors liked the informal, unstructured efficiency of audio applications and podcasts because they can avoid having to write scripts. Furthermore, armed with simple lists themselves, they could talk to their students, package the files and post them to the course website.

Jing is a multi-media tool that is very versatile. It is a free download with virtually no learning curve. Jing incorporates voice with screen captures—either still or

showing mouse movements. It is effective to demonstrate something that students need to see on the screen. Participants spoke of being able to clarify communication with this tool.

Feedback. Participants discussed feedback as an important practice. Whether feedback is automated or of a more subjective nature, feedback was referred to by the participants as an important part of learning.

Participants spoke of the help that web conferencing could offer in providing instant feedback for online students. It allows instructors to bring students together in a virtual setting to discuss, present, and collaborate on projects. Eight of the participants spoke of using the web conferencing tool supported by the university.

Innovations. According to dictionary.com (2010), innovation is “the act of innovating; introduction of new things or methods.” One participant described the need for innovation because of the field she is in and the fact that she is never with her students face-to-face. Another participant talked about innovations to build on what students already know so they can build new things. He advocated the use of pre-tests in his discipline/courses as a way to test pre-knowledge and move the students forward.

One important aspect of teaching with technology is the ability to show students how to do something. These technologies offer instructors powerful media for moving away from telling them what to do, to showing them how to do it.

What contexts and challenges to the use of technology do instructors describe?

Contexts. The second sub question of the study related to the contexts and challenges of technology integration. A participant stated, “Teachers sometimes implement buying the technology because it’s the sexiest newest thing, it’s pretty, it’s

flashy, and it looks good; whether or not it's effective or whether or not it's used for the right purposes." Participants reported that using technology for technology sake was not a good idea. However, because of the draw some technologies have, it is easy to fall into that trap.

Context involves the discussion of how attitudes toward, and beliefs about, technology integration affect its use in the classroom. Comments from participants illustrated the wide range of attitudes about technology integration. One said,

I hear other professors talk about, "Well, I'd love to do this, but by the time I figure this out, something else is going to be coming along and they're going to tell me to do something else. And so I just stick with my overhead." I think that's really sad.

An examination of the context of technology use today demonstrates the differences between 20th and 21st Century beliefs. We hear about *the cloud* everywhere—even in television advertising. An educational technology blogger reflected on the part technology plays in stated,

Because school defines learning as passive, learners come to see education as something done to them. When students are stuck in the middle of a problem, they don't try and figure out what makes sense to do next; *instead, they try to remember what they are supposed to do*. If this is the premise for learning, is it any surprise that learners become less autonomous, more dependent? (Bower, 2010).

This blogger reflects evidence that growth is taking place as instructors prepare their students to survive and thrive in a changing world.

Challenges. Wherever technology has been implemented in teaching, there have been challenges to its use. These challenges range from learning the technologies themselves to the support offered by the university or department.

Meeting courses objectives was important to the participants of the study. One participant responded to a question of which skills were essential to his teaching. He answered, “To me it’s more knowledge or disposition rather than skill—it’s all about how you use technology—what is the best tool to achieve the goal?” This statement demonstrates the importance of the use technology for the purpose of meeting course goals and learning objectives.

Another added, “It’d be almost impossible to list a particular set of technology skills. So it’s more about an attitude or approach to being able to figure out what you need to figure out with the technology.” This participant went on to say, “I think of it as sort of a search to find a solution to a problem, and I hope that I convey that to [my students] as well.”

The speed with which technology is changing was another challenge for these participants—how to keep up with the technology. Perhaps the biggest factor for these participants was time. All 20 participants interviewed mentioned time as a hindrance to learning new technologies. One participant stated, “I don’t have time to develop the tools or the skills or the resources and create the particular pieces that go with it. So, I find time more limiting than anything else.” They perceived that time was a more limiting factor than was funding in the provision of technology in the classroom.

Participants demonstrated attempts to help students understand that education is not about coming to class and letting the instructor dump knowledge into their heads; but rather to provide them the tools to discover solutions to the questions they face.

How has technology changed their teaching?

All of the study participants reported having been affected by technology integration. They were able to do things differently. One participant compared the “stand-and-deliver” methods of the past with what he was doing today. He said students today are exposed to a “new toolbox for learning.” Ten of the participants discussed the changes that technology brought to their teaching and the role of technology integration for students. Participants perceived that they no longer need to tell students what to do, but rather show them how to do it. Teaching students how to do it in online/distance courses was not just a change for these participants, it also increased the challenges.

An examination of the technologies in wide use today clearly show the difference between 20th Century and 21st Century beliefs. We hear about *the cloud* everywhere--even in television advertising. An educational technology blogger stated,

Buckenmeyer’s (2008) conclusions that “if change is to occur in classrooms, it must begin with the teacher, not the technology” is iterated in this study. The participants saw technology as a tool to help get to student learning—“merely the mechanism.” They realized that their best use of technology would allow students to learn the concepts without being aware of the technology used to deliver or facilitate the learning. Transparency of the technology was important to them—students would see the learning without being fully aware of the medium used to get them there.

The implications for this to happen are great. It means instructors need to be equipped with the skills, training, hardware, software, and support to provide a learning environment that allows students to accomplish learning objectives.

Quantitative Question

What is the relationship between instructor attitudes toward technology integration and the difficulty levels of technologies used?

The fourth sub-question referred to the quantitative survey that was offered to both the interview participants (N=20) and the college group (N=85). I found that instructor perceptions of technology use did not vary much between the two groups. The interview participants were slightly more inclined to use a wider variety of technologies, yet their attitudes and perceptions toward its use did not vary much from the college group. Because of the use of a referred sample, I had expected a significant difference in the frequency of the use of technologies and in the attitudes which informed the participants' technology integration. However, analysis of the survey responses did not support a relationship between the two groups. The correlation between the two groups—interviewed participants and college group—in attitude and technology use was not strong. Therefore, I concluded that although the frequency of technology use was slightly less for the college group than for the interviewed participants, the college group showed a movement toward integration of technology and attitudes toward technology that paralleled those of the interviewed group.

Mixed Methods Question

How do the quantitative relationships between attitudes and integration relate to the qualitative descriptions of integration practices?

My reason for conducting a mixed methods study was to understand if there is a relationship between the practices of instructors and their beliefs and attitudes toward the use of instructional technology in their teaching. Twenty instructors known for their technology use in the classroom made up the sample for the interviews and one of the survey datasets. Responses for these two measures were recorded on a matrix (Appendix D) which illustrates relationships between attitudes and beliefs and statements made by participants during the interviews. The strength of a mixed methods study is revealed when merging data from the two phases.

Attitudes and beliefs. The 20 interviewed participants showed a high rate of agreement on a five-point Likert scale measuring their perceptions of technology use. The highest mean, 4.75 was scored for the statements, “Instructional technology is important in higher education” and “I change my teaching plans and strategies to foster student learning.” The lowest mean, 3.90 with the greatest standard deviation, 1.07 was scored for the statement: “I have adequate training opportunities at my institution to develop the technical skills required for instructional technology integration.” These results showed that the interview participants understood the value of technology for their teaching and that they need more training to effectively use instructional technologies in teaching.

Summary

The study answered five research questions based on the qualitative dataset and two quantitative datasets. The central question answered by the study was, *How do instructors who use technology to support pedagogical best practices in the classroom describe their experiences?* Participants viewed technology integration as important to

their teaching and to student learning. However, their perception of the support and training offered by their institution was not reported as ideal. The interviews revealed participant's practices of technology integration. The survey responses showed that the interviewed participants (N=20) used technologies more frequently than the rest of the college instructors (N=85), although the results were not significant. Likewise, the interviewed participants attitudes and perceptions were higher than those of the college wide group—again not to a significant measure. Different interpretations could be made for the results of the surveys. One explanation could be that the interviewed participants were chosen because of their technology use—so they were already interested in using technology in the classroom, and thus scored high on the survey questions. Also, those who responded to the college-wide survey may have been instructors who perceived it was valuable, and they were interested in the topic. If that is true, then the measure for this group may have been higher than if a better cross-section had volunteered to answer the survey questions.

Mixing the datasets for the interviewed participants revealed scores on the survey next to their comments from the interviews. Although this is one researcher's interpretation, it reveals the words of the participants next to scores from the surveys and shows the practices of the instructors who integrate technology into their teaching.

CHAPTER 13

Implications

The major contribution this study makes to existing knowledge on technology integration is its unique consideration of the instructional practices of technology use in the higher education classroom. The themes provide insight into what instructors do, what they need in order to be effective in the classroom, and how their use of technology affects students. The results are useful for several university groups—administrators, teachers, students, instructional designers, and distance education providers. Following are implications relevant to this study.

For Administrators

Administrators in higher education settings could benefit from this information in broadening their understanding of the people they represent in the institution and as they make decisions that affect the university and its constituents. A careful observation of the teaching and learning that happens at a university can reveal what instructors need for teaching in their discipline. The participants raised questions of whether or not this is actually the case. Administrators could better understand the needs, the focus, and the culture of the people they are serving and therefore, make informed decisions on their behalf. Zhao and Cziko (2001) explained that (K-12) teachers will be reluctant to use technology when it is inconsistent with their beliefs. Chen (2008) applied this to the administration in his discussion of how existing beliefs influence (higher education) teachers' beliefs about the development of technology integration. He affirmed that since beliefs change often, administrators should be aware of teacher beliefs at each stage of technology adoption and integration. Therefore, it is important for the administration to

make resources available to instructors—both for preparation and work-related use and for teaching in the classroom. Resources include the hardware, software, professional development, and support needed to successfully integrate technology in the higher education setting.

For Instructors

This study also holds implications for instructors, who are the voices of this study. They spoke clearly in the interviews showing their dedication to meeting student needs and course objectives in the best way possible. Their concern was not for their own comfort or ease of use, but rather what would most effectively provide students with an environment and the tools to further their education. Faculty could benefit from these findings in knowing they are not alone in their pursuit of learning and passing on skills that benefit their students. They should understand the power of being a model in the classroom to future educators and that students are becoming more vocal in calling for learning the technologies that can further their careers.

For Students

Students could benefit from this study as instructors prepare them to move into a quickly changing world. As two of the participants affirmed, students need to “figure out what they need to figure out” to use the technology and to take it with them, so they are able to use it to solve problems in the future. Teachers are not teaching a set of skills but rather passing on an attitude of problem-solving to help students find solutions on their own. Students need to understand that the role of those who teach is not to pour content knowledge into their heads, but to challenge them to think on their own. They should persist in following instructors who can help them learn critical thinking skills and pursue

those courses where they are exposed to learning technology skills. This would serve them in future careers.

For Instructional Designers

An instructional designer's goal is not to figure out the tools that could be used in a course or how to simply make the course "pretty." An instructional designer's task is to help deliver effective, efficient, and appealing instruction (Reigeluth & Frick, 1999).

Implications of this study for this group of people involve understanding the connections of effective, efficient, and appealing and being able to implement those characteristics in course design. This may require instructional designers to persist in their own learning. In consultations with higher education instructors, they could provide better solutions to bridge the gap between learning objectives and learner needs.

For Distance Education Providers

One other group for which this study holds implications is that of the distance education providers at a university. In talking with instructors, many of whom have taught for a number of years in the online/distance setting, they communicated a need for a greater understanding on the part of the distance education providers in their management of distance programs offered. For example, one instructor recommended that the distance providers at his university, carefully research the policies with which they manage independent study courses saying that the format does not allow for effective and efficient instruction and is restrictive to the instructor.

Distance education providers should be aware of current research in distance education. They should also know the needs of their students and instructors and thus

assure that distance education policies are providing appropriate structure for the direction the university and its constituents need to go.

CHAPTER 14

Recommendations

This mixed methods study provided data to describe the instructors' perceptions of technology integration and use. It revealed both positive and negative challenges to technology integration in a higher education setting and allowed me to view the challenges and rewards of the faculty in the College of Education. Following, are recommendations based on themes found in the study.

Recommendation 1. Professional development should be challenging and pedagogically-oriented. High-quality training is needed for instructors which will help them show their students how to teach rather than simply tell them what to teach. Training should be pedagogically-oriented rather than a “click here” approach which implies that instruction should be offered by those who not only know the technology, but can convey ways to use the technology in teaching to answer the “why” questions. Instructors need to not only know where to click, but also how, why, and when to use chosen technologies. Professional development providers need to know pedagogy to effectively help instructors in their technology integration.

Recommendation 2. Those in positions of decision-making for technology purchases at the university need to explore not only the infrastructure of the campus technology, but also how they can provide for instructional technology needs. I came away from the interviews with faculty with a sense of the centrality of their “job” to the effectiveness of instruction that is delivered to students. This is the group that should be listened to—to better understand the needs of students for learning, the needs of faculty for providing

instruction, the environment that would better serve both students and faculty, and what is possible when there is a cohesive movement toward making it happen.

Recommendation 3: Support for technology should be widely available, with information clearly communicated on support contacts and help hours. This means that those in help positions should be able to offer help not only for the general questions that are brought to them, but more importantly for the specific things that can go wrong whenever we work with technology.

Informal sharing is a viable approach to offer instructors who want to see what their colleagues are doing and how they are incorporating technology in new ways. Instructional designers could easily offer such an approach.

Recommendation 4: Instructional design support for faculty should be provided to assist in the design and development of online courses or supplemental materials for classroom-based courses. Instructional designers have been an effective addition to many colleges. They are able to bridge the gap between learning objectives and learner needs. They offer support to instructors by helping them work through the challenges they face in technology integration.

Recommendations for further study. Future studies could approach the question of technology integration with a more specific scope. The definition in this study for technology integration included face-to-face and distance courses. Targeting one or the other of these areas would lead to more specific data and therefore, more in-depth recommendations. There is room for both the qualitative and the quantitative approaches that the current study used.

CHAPTER 15

Conclusions

What Did I Learn?

In his article, *What the School Is*, Dewey (1897) spoke of his belief that education is a social process. He stated, “Education therefore, is a process of living and not a preparation for future living” indicating that relationship holds a very significant role for the success of the education of all students and that the stakes are higher for teachers than just stand-and-deliver. He further stated,

I believe that the individual who is to be educated is a social individual, and that society is an organic union of individuals. If we eliminate the social factor from the child we are left only with an abstraction; if we eliminate the individual factor from society, we are left only with an inert and lifeless mass. Education, therefore, must begin with a psychological insight into the child’s capacities, interests, and habits. It must be controlled at every point by reference to these same considerations (p. 80).

Following are five important things I learned from this study.

Importance of relationship. Through this study I learned that relationship should be viewed as an essential factor in the education process. At first glance, it would seem that technology is the mechanical delivery of instruction—that it would not have a part in furthering relationships. However, I found that technology integration is not adding tools to teaching, but rather fulfilling learning objectives through the use of technology tools that can enhance the process of learning and the outcomes of that learning. It can bring people together in ways that in the past were impossible.

Education is part of the life experience. Brown (2006) spoke of 21st Century learning as “supply-push” with a focus on learning through enculturation and collateral learning. Enculturation means being immersed in the culture—which is a social construct (Grusec, Hastings, & Paul, 2007). In the 20th Century we saw “demand-pull” learning which was based on building knowledge that could be called upon when needed (Brown, 2006). With the participants of this study, I see a move toward 21st Century learning—they understand their students’ needs especially as they relate to becoming classroom teachers. They understand that education is part of the life experience of their students (Dewey, 1897) and therefore, a necessity for each student they teach.

Instructors need to understand how technology fits into their teaching. The study participants continually questioned how technology fits into their goals for their students. These participants have not necessarily seen a change in their instruction, but they have seen a change in how they deliver the instruction—how they package the content and how students are able to interact with it. Otte and Benke (2006) addressed the focus on pedagogy in technology emphasizing that to see change in instruction; instructors do not need to know how to use the technologies as much as to understand the technology’s place in instruction—how technology can help them accomplish their teaching goals and objectives and maintain the focus on the quality of the pedagogy rather than the delivery mode.

Instructors’ use of technology was most effective when applied to their own strengths and students’ needs. Five of the participants reported being seen as “pioneers” or the “technology expert” in their department which was a continual surprise to them. Only one or two saw themselves in that light. Participants did, however, see the

importance of being willing to try new things because they could see the possibilities that technology holds not to make their lives easier, to get better evaluations, or to give them more time, but to focus on student learning and make sure students are prepared for their future. One participant put it this way, “I rarely see a student who hasn’t learned what they need to learn in order to move on to the next level, or to apply what they’ve got to real life situations.” Ertmer, Gopalakrishnan, and Ross (2001) concluded that exemplary teaching with technology was dependent on an individual’s strengths and perceived needs of students in their classrooms.

Slow growth over time is more effective than adopting technology that is not appropriate for the people or the situation. Basinger (2000) discussed the stages of growth in using technology where the focus moved from self use to how to use of the technology for greatest impact on learning. She found that teachers moved from thinking about how to use the technology, to internalizing it and using it to meet students’ needs.

The participants in this study were foremost, educators. Their concern was to prepare students to move into life in the 21st Century where they would need to understand the culture, the skills needed to do their work, and how to pass on those skills to those who come behind. This made them willing to do what it takes to fulfill the objectives of the courses they teach and continue to pursue their own growth and learning as they teach with technology.

In addition to learning about the research topics of the study, I learned lessons about conducting studies and about myself as researcher. Because of my role as an instructional designer, I found implications for my own job in all 20 interviews that I conducted. This brought with it challenges to listen and not to “fix” something or

answer questions the participants raised throughout the interviews. I found it difficult at times to change my thinking from practitioner to researcher. For the future, I will have a better understanding of that process and what it takes to conduct good interviews.

I also learned substantially from conducting a mixed methods study. This methodology added a dimension to the study that allowed me to interview the participants about their practices without them having to list the types of technologies they use. It offered me that data in the survey format which I believe was easier for the participants as well. If I were to conduct a mixed methods study in the future, I would have more clearly defined hypotheses in what I expected to find.

Agenda for Future Research

The experience of this study has highlighted interests that I have in future research. In addition to instructor use of technology, this research could lead to studies on an exploration of online teaching strategies, student learning and technology, the pedagogy of technology, the context of teaching with technology, and relationships in the online course environment. I am also interested in areas of professional development for online educators, the role of the instructional designer, and bridging the digital divide.

In preparing the dissertation, I found myself drawn to the comments and discussion on relationships. The fear for those teaching distance courses is that the relationships will not be made with the students. Because of the study, I am certain that effective relationships can be developed and that interactions among the students, with instructors, and with the content can be forged that can lead to effective learning and personal fulfillment. I believe this will be my first challenge—to further study relationships built via technology and the affect on student learning.

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APPENDIX A
Interview Protocol

1. What technology skills are essential to your instruction?

(Probe questions)

- a. Communication tools
 - (1) Breeze
 - (2) email
 - (3) feedback
 - (4) discussion board
 - (5) create video/audio files
- b. Blackboard tools and content creation
 - (1) working knowledge of CMS
 - (2) grading online
 - (3) adding content
- c. Classroom tools
 - (1) Elmo
 - (2) play video/audio files
 - (3) projector
 - (4) PowerPoint
 - (5) laptop hookup
 - (6) word processing
 - (7) copy and paste
 - (8) save documents
- d. Social networking tools
 - (1) Twitter
 - (2) Facebook
 - (3) Chat

2. How has your teaching changed because of technology?

3. What has worked?

- a. More planning time

- b. Use of the internet
 - c. Effect on learning
 - d. Other technologies used
4. What teaching strategies have you changed and how?
- a. More student-to-student conversations
 - b. More student engagement with classmates' work
 - c. More long term course planning
5. How effective do you feel these tools have been in helping students learn?
6. How have technology tools been part of your assessments?
7. What aspects of your teaching with technology get the best response from students?
(Probe questions)
- a. What have they commented on, complimented you for?
 - (1) Interaction
 - (2) Feedback
 - (3) Engagement
8. What is the most common comment that you receive from students?
(Probe questions)
- a. Common theme in their comments?
 - b. Has one strategy stood out to you as most effective or essential to learning?
9. How do you determine the effectiveness of the use of technology in your instructional activities?
(Probe questions)
- a. What is your key objective in teaching with technology?
 - b. How have you seen that objective met?
 - c. Surveys/evaluations for student feedback—make adjustments based on their responses?

10. What are your best examples of technology incorporation in your teaching?

(Probe questions)

- a. Can you share example of a how a technology tool has been used and how it has affected student learning?

11. What hinders you from trying new technologies?

(Probe questions)

- a. Lack of training
- b. Lack of support
- c. Time
- d. Planning
- e. Integration ideas

APPENDIX B

Email Sample

Dear Instructor,

We are conducting a research study with instructors to investigate the practices of faculty who use technology in their teaching. We are seeking volunteers for the study. The study includes an interview and a brief survey.

The interviews will be audio taped, and the tapes will be erased after they are transcribed. No identifying information will be used in any materials created from these interviews. Surveys will be used to give a clearer picture of the transcription data with no identifiers used. The information obtained in this study will be published in professional journals and will be presented at professional meetings.

You are free to decide not to participate in this study or to withdraw at any time without adversely affecting our relationship or your relationship with the University of Nebraska-Lincoln. Your decision will not result in any loss of benefits to which you are otherwise entitled.

There may be no direct benefit to you if you participate in this research, however, you will be contributing to the understanding of the use of technology in teaching.

We invite you to participate in the interview process. The interview is voluntary and will take no longer than one hour. If you would be willing to discuss online teaching with us, please reply to this email and indicate times that would be convenient for the interview. Please reply to this email, including your contact information below.

Thank you for considering our request. If you have questions, please let us know.

Sincerely,

Suzanne Becking, Graduate Student
Instructional Design Technology Specialist
Teaching, Learning and Teacher Education
Sbecking2@unl.edu
402-472-5464

Marilyn Grady, Ph.D.
Professor
Department of Educational Administration
Mgrady1@unl.edu

402-472-0974

___ **Yes, I would be willing to participate in an interview.**

The following times would be convenient for an interview:

To schedule an interview, please contact me at:

Email address:

Telephone number:

APPENDIX C

Codes

Original codes

- Transparent technology
- Distance education
- Technology is a tool
- “Technology merely the mechanism”
- Social networking
- Mastery
- “Active learners”
- Reflection
- Student Interaction
- Content
- Richness of teaching
- Student learning
- Relationships
- Examples
- Searcher of information
- Instant feedback
- Feedback
- Course organization—planning
- Instructor Presence
- Learning Activities
- Attitudes and Beliefs
- “Resistance”
- “20th Century beliefs”
- Skills
- Possibilities of technology
- Time
- Flexibility
- Support
- Interaction—“Increase interactivity”
- Engagement
- Communication
- “Immediacy”
- Tools Lists
- Complexity
- Pedagogy
- Context
- Relationships
- Behaviors
- Access
- Analyze
- Asynchronous
- Synchronous
- Perceptions of confidence

Final themes/sub-themes

1. Tools
 - a. Transparent technology
 - b. Distance education
 - c. Technology is a tool—“Technology merely the mechanism”
 - d. Social networking
2. Student Learning
 - a. Mastery
 - b. “Active learners”
 - c. Reflection
 - d. Student Interaction
3. Pedagogy
 - a. Examples
 - b. Feedback
 - c. Course organization—planning
 - d. Instructor Presence
 - e. Learning Activities
4. Context
 - a. Attitudes and Beliefs
 - b. “Resistance”
 - c. “20th Century beliefs”
 - d. Skills
 - e. Possibilities of technology
 - f. Time
 - g. Flexibility
 - h. Support
5. Relationships
 - a. Interaction—“Increase interactivity”
 - b. Engagement
 - c. Communication
 - d. “Immediacy”

- Training
- Digital environments
- Digital natives
- Comfort level
- “If you build it they will come”
- “If it doesn’t work, move on”
- Hybrid
- Unstructured
- Rules for kids and teachers
- Making connections
- Visual organization of materials
- Read, synthesize, apply
- Facilitating learning

Table Matrix on Qualitative and Quantitative Data

Interviewed Participants N=20 (Seven questions on attitude and belief about technology integration)	Qualitative Themes		
	Mean	Std Deviation	Participant Comments
The use of technology in education can enhance student learning in my discipline.	4.65	.489	<ul style="list-style-type: none"> • Access to information allows me much more time to go much deeper and give them more experiences during class time. • I rarely see a student who hasn't learned what they need to learn in order to move on to the next level, or to apply what they've got to real life situation. •
The use of instructional technology can enhance my teaching.	4.60	.503	<ul style="list-style-type: none"> • It allows me in a sense to improve my instruction by diagnosing the learner needs... I'm much more learner-centered in the needs of the learners I have in my classroom. I'm more responsive to them because they have access to me. • I post two or three questions about the reading that can guide them in what to be looking for when they read that article or that chapter. Then when I get together, I just ask one of those questions. It's worked out much better because if they've read it, they read with that in mind and they have something to say about it. • One of the things that has changed about my teaching is that I'm much better at what I post as a prompt. I think that comes from studying higher order kinds of thinking.

<p>The administration in my institution supports my use of technology in education.</p>	<p>4.05</p>	<p>.999</p>	<ul style="list-style-type: none"> • If we could do something at a college level where there is a [discussion] of how was technology used effectively in this course? I think that would be a good thing. There's an evaluation number that's going to be important. • My biggest frustration with [in class] technology is that it's not accessible to me.
<p>I have adequate training opportunities at my institution to develop the technical skills required for instructional technology integration.</p>	<p>3.90</p>	<p>1.071</p>	<ul style="list-style-type: none"> • You can't always say it's a money issue. Sometimes it's, "this is the way we've always done it. This is what we're comfortable with supporting." • I want someone to be available to me—not in a sporadic manner—part of my professional development.
<p>I have access to instructional technology technical support.</p>	<p>4.30</p>	<p>.733</p>	<ul style="list-style-type: none"> • I need somebody who's willing to hold my hand. And I panic easily. One instructional designer would just sit by me and let me do it and let me try it and show me. That's very time-intensive for designers... • I think at times we should put a sign on the front of our building that says, "Mediocre U— We're no better than anybody else and proud of it." Is anybody going to speak up for what we really ought to be doing? I think that people do know—but there's a difference— there seems to be a lag time between what we know and what we do.

<p>Instructional technology is important in higher education.</p>	<p>4.75</p>	<p>.444</p>	<ul style="list-style-type: none"> • I think [technology] empowers the students because they have ownership in the class. • One of my doctoral students did a dissertation on the online [program] and found there was a huge impact on the community. This was the first course they ever received specific content feedback on their teaching.
<p>I change my teaching plans and strategies to foster student learning.</p>	<p>4.75</p>	<p>.550</p>	<ul style="list-style-type: none"> • I think [technology tools] have been very effective. I honestly think my students learn more now than they did when I had them in class—the onsite class. I know that wouldn't be true for everybody. But I think that the students learn more thoroughly. Their cognitive processes are engaged much more of the time. • Technology has allowed them to access things when they can. It has made things so much more accessible but also allowed us to keep the quality up.

APPENDIX E**Survey Questions****Faculty Survey: Adoption of Instructional Technology**

Please type in your ID number from the email *

A. In the past academic year, rate the degree to which you used the following instructional technology tools:

SCALE: 1=never 2=rarely 3=occasionally 4=frequently 5=extensively

A1. Presentation software *such as PowerPoint

1 2 3 4 5

Never Extensively

A2. Spreadsheets *such as Excel

1 2 3 4 5

Never Extensively

A3. Internet content *such as web-based articles or searches

1 2 3 4 5

Never Extensively

A4. Audio *

1 2 3 4 5

Never Extensively

A5. Video *

1 2 3 4 5

Never Extensively

A6. Animation ***A7. Email *****A8. Discussion boards ***

A9. Chat *such as Instant Messenger or Google Messenger

A10. Blogs *

A11. Wikis *

A12. Podcasts *

A13. Social Networking *such as Facebook or Twitter

B. For questions below, rate how much you agree with each statement:

Scale: 1=Strongly Disagree 2=Disagree 3=Neither agree nor disagree 4=Agree

5=Strongly Agree

**B14. The use of technology in education can enhance student learning in my
discipline ***

B15. The use of instructional technology can enhance my teaching *

B16. The administration in my institution supports my use of technology in education *

B17. I have adequate training opportunities at my institution to develop the technical skills required for instructional technology integration *

B18. I have access to instructional technology technical support *

B19. Instructional technology is important in higher education *

B20. I change my teaching plans and strategies to foster student learning *

Identify Instructional Leaders who Incorporate Technology into Their Teaching

This research project will identify the practices of faculty who use technology in their teaching at the University of Nebraska. Information gathered will be reported in journal articles and presentations at professional meetings. You were invited to participate in this research because you use technology in your teaching.

Included in the study is an interview which will require one hour of your time and a survey requiring 20 minutes. It will also include completion of an informed consent form. The location of this interview will be at the Nebraska Union, 1400 R Street. If that is not convenient for you we will make arrangements to meet at a location that is convenient. The interview will be audio taped to ensure all responses are recorded. Interview questions will focus on your experience of teaching with technology. Survey questions will focus on technologies that you use in your teaching.

There are no known risks involved in participating in the study. All responses will be kept in strict confidence. A pseudonym will be used in place of your name in transcripts of the interview. Your name will not be included in the documents created. Pseudonyms will be used if any responses are cited in any documents. The audiotapes will be kept in a locked cabinet in the investigator's office until they have been transcribed, and will be erased after transcription. The data will be stored in a locked cabinet in the investigator's office and will only be seen by the investigators during the study and for one year after the study is complete. Survey data will be stored on a secure server only accessible to the principle investigator. The information obtained in this study may be published in education journals or presented at professional meetings but the data will be reported as aggregated data. Participants may benefit from the findings of the study in enhancing their instructional practices.

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. Or you may call the investigator at any time, phone number (402) 472-5464, or Dr. Grady at (402) 472-0974. Please contact the investigator if you want to voice concerns or complaints about the research or in the event of a research related injury.

Please contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965 for the following reasons: you wish to talk to someone other than the research staff to obtain answers to questions about your rights as a research participant; to voice concerns or complaints about the research; to provide input concerning the research process; or in the event the study staff could not be reached.

You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska. Your decision will not result in any loss of benefits to which you are otherwise entitled.

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

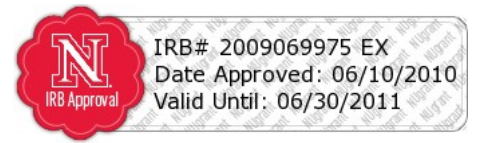
_____ Check if you agree to be audio taped during the interview.

Signature of Research Participant

Date

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IRB# 2009069975 EX
Date Approved: 06/10/2010
Valid Until: 06/30/2011

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Signature of Research Participant

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APPENDIX H
Transcriptionist Confidentiality Statement

Transcriptionist Confidentiality Statement

I Deb Altman (name of transcriptionist) agree to hold all information contained on audio recorded tapes/ and in interviews received from Suzanne Becking (Name of PI), primary investigator for Instructor Technology Use, (Name of the project) in confidence with regard to the individual and institutions involved in the research study. I understand that to violate this agreement would constitute a serious and unethical infringement on the informant's right to privacy.

Deb Altman 11/07/10
Signature of Transcriptionist Date

Suzanne Becking
Signature of Principle Investigator

11-30-2010
Date