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A Comparison of face-to-face and online learning environments to prepare teachers to use technology

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A COMPARISON OF FACE-TO-FACE AND ONLINE LEARNING ENVIRONMENTS TO PREPARE TEACHERS TO USE TECHNOLOGY

by

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ABSTRACT

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by

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This study investigated the similarities and differences in the implementation of face-to-face and online versions of an undergraduate educational technology course for elementary teacher candidates. A common course project, the *Innovations Mini-teach,* was the focus of the investigation. Twenty-four students participated in the face-to-face section, 22 were enrolled in the online section, and the instructor was the same for both classes. Through this investigation, similarities and differences were identified in the nature of the learning experience as well as student outcomes. Similarities included how the project was introduced, structured, and facilitated. Key differences pertained to the nature of collaboration and teaching strategies employed by the students. Gains in student learning outcomes were pronounced in each section, but the face-to-face group significantly outperformed the online group on post-test scores ($p = 0.005$). Students in both sections presented similar reflections on personal growth in the use of technology in education.

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CHAPTER 1

INTRODUCTION

Purpose and Background of the Study

Largely, prior research and literature related to comparisons of online and face-to-face learning environments report no significant difference (Bernard, Abrami, Borokhovski, Wade, Wozney, Wallet, et al., 2004; Zhao, Lei, Yan, & Tan 2005). This statement, however, does not accurately describe learning in either environment. "Continuing to compare DE with the classroom without attempting to answer the attendant concerns of "why" and "under what conditions" represents wasted time and effort" (Bernard et al., 2004, p. 416). In accordance with this statement, the purpose of this study was not to corroborate nor contradict prior results of non-significance, but rather to approach each learning environment through an analytical lens exploring the "why" and "under what conditions" of both face-to-face learning and online learning.

Specifically, this study investigated the similarities and differences between face-to-face and online versions of an introduction to educational technology course for elementary teacher candidates, *Preparing Teachers to Use Technology*. A common course project, the *Innovations Mini-teach*, served as the treatment under investigation and was analyzed through mixed research methods to provide a rich description of learning in both environments.

Evolution of the Innovations Mini-teach Project: The Pilot

The *Innovations Mini-teach* project was first piloted in another teacher education

program in the southwestern United States (Foulger, Williams, & Wetzel 2008; Wetzel, Foulger, & Williams, 2008-2009). The project sought to better prepare teacher candidates for future professional collaboration that mirrors 21st century teaching and learning as outlined by the ISTE NETS for Teachers and Students (Foulger et al., 2008; International Society for Teacher Education, 2007, 2008; Wetzel et al., 2008-2009). Through background research of instructional design principles, constructivist work of Vygotsky (1978), and consideration of the plethora of technological tools available at the university level, instructors created a project built from a true communal constructivist model where "students and teachers work together to develop their own understandings… [and where] knowledge students generate is meant for their personal benefit and for the benefit of their instructor and other students" (Foulger et al., 2008, p. 29). The project was designed to change and evolve each semester in order to adapt to new and emerging technologies.

The *Innovations Mini-teach* project was first piloted in six sections of a required introductory educational technology course taught by three instructors. The overarching goal instructors had for the *Innovations Mini-teach* project was for students to learn about new and evolving technologies and their applications to 21st century teaching in pre-kindergarten through twelfth grade education. They sought to create an environment that would support learning of new technologies and how they can be integrated effectively in the classroom (Foulger et al., 2008).

Instructors gathered feedback and collected data to investigate the process involved, student perceptions, and outcomes resulting from the project. Data were

collected through purposeful sampling of students to participate in focus group sessions of 4-8 students, N=24 (Foulger, et al., 2008). Data from end-of-semester course effectiveness evaluation, analysis of students' final projects, and the class wiki were used to triangulate data from student focus group sessions and to confirm trustworthiness. Results of the first implementation and data analysis of the project provided great promise and implications for the short and longer term. Instructors' direct conclusions and reflection on the project resulted in evidence that,

> …students gained high levels of expertise with their assigned innovation and became familiar with the range of innovations covered by their classmates and archived in the class, students took ownership of their own learning, and the class wiki provided a situation in which the knowledge gained by one group was also owned by others (Foulger et al., 2008, p. 36).

Evolution of the Innovations Mini-teach Project: Receiving Institution

Since the piloted semester, the project has been shared with and adapted to accommodate similar needs of the educational technology course required for completion of the elementary and secondary teacher education program at another university. The project was first piloted at the receiving institution in three face-to-face sections of the required educational technology course-- two elementary sections and one secondary section of the course (Grove, Foulger, Wetzel, Archambault, Williams, & Strudler, 2008). The project was integrated into the course with few modifications and additions from the original model. In two of the three sections, "comment forms for students to fill out during the presentation(s)… provided students with opportunities to practice assessment

while providing additional feedback to the presenters." All sections incorporated a scaffolding structure to support student learning comprised of "just-in-time responses and resources" to point students in the right direction. Data were collected through course reflections at the end of the course. Student testimonials gleaned from these reflections specifically pertaining to the *Innovations Mini-teach* revealed:

> Overall, the assignment established a supportive environment where students could take risks with technology, learning, and teaching, and, for some, ignited a trajectory that students felt will lead to innovative, technology-rich strategies that the authors envision as 21st century teaching and learning (Grove et al., 2008, p. 6).

The *Innovations Mini-teach* project has since been a successful and meaningful component of the face-to-face version of the required educational technology course for three semesters at the receiving institution, but has never been implemented into the online version of the course.

Research Questions

The following research questions led this investigation of the *Innovations Mini-teach* project:

1. What are the similarities and differences between face-to-face and online versions of the *Innovations Mini-teach* as it was orchestrated in an introduction to educational technology course for teacher candidates?
2. What is the nature of the learning experience involved in the *Innovations Mini-teach* project implemented in the face-to-face section of the course?

a. Can the project be modified to make it viable in an online environment?
b. What accommodations are necessary to implement the project without synchronous face-to-face interaction? How does this impact the learning experience?
c. Are there differences in learning outcomes resulting from the face-to-face versus the online section of the course?

Significance of the Study

Previous data collection and results gathered from the *Innovations Mini-teach* project have indicated evident growth and development among students completing the project in the face-to-face setting (Foulger et al., 2008; Grove et al., 2008). The project, however, has never been integrated into the online version of the course at the receiving nor the original institution. The nature of the learning environment and any impact on the learning experience or outcomes resulting from the online version of the course were unknown. The foundation of the assignment, based on the theory of communal constructivism and 21st century teaching and learning warranted exploration in an online learning environment. Because of the design qualities of the project and the learning community that has developed as a result, the online pilot of the *Innovations Mini-teach* will have great implications for the evolution of the project. The results of this study have the potential to inspire other instructors and programs of teacher education to integrate this kind of learning experience into their coursework. The project itself has grown from the instructional model precedent in order to share the *Innovations Mini-teach* project, materials, and research results across the teacher education community

(Grove et al., 2008). This study represented a next phase of the project and aimed to answer essential questions not only about the *Innovations Mini-teach* project, but also about learning experiences and outcomes in both face-to-face and online environments.

Through the use of a research design that offered more robust and richer data sets than previous studies surrounding the *Innovations Mini-teach*, the results of this study will impact the continual development and evolution of the project. Previous investigations of the *Innovations Mini-teach* project have been primarily qualitative in nature. The mixed methods research design for this study was based on *Simultaneous Triangulation*, a research design that Clark and Creswell (2008) describe as a method for "obtaining different, but complementary data on the same topic, rather than to replicate results" (p. 157). The *Simultaneous Triangulation* research design afforded empirical, descriptive, and theoretical analysis of data to answer the research questions under study. This specific investigation achieved a more complete understanding of the adaptability of the project as well as a richer comparison through description of similarities and differences resulting from the modification of the project to make it viable in the online instructional setting.

Limitations of the Study

This study has two identified limitations. The first limitation deals with sampling procedures and number of participants. Students in two sections of a required educational technology class for elementary teacher candidates were asked to participate in the research study yielding a small, purposeful sample. This limits the ability to generalize results. The second limitation deals with instrumentation. The instruments

(pretest and posttest) were not normalized prior to the study. This also limits the extent to which results can be generalized. The purpose of the study, however, did not aim to specifically generalize results. The aim was to provide a descriptive, research based snap-shot of the design and learning experience surrounding a common course project delivered in two similar, but different instructional and learning settings- face-to-face and online.

Definition of Terms

The following are terms and definitions used in this study. The precise definition of terms is critical to understanding the implementation procedures and results of the study:

21st century skills- The necessary knowledge and skills students must master to succeed in life and work in the 21st Century including life and career skills; learning and innovation skills; and information, media, and technology skills (Partnership for 21st Century Skills, 2009).

Distance Education- A learning environment "in which learner and instructor are separate during the majority of instruction" (Johnson, 2003, p.1).

Face-to-Face (Traditional) Learning Environment- A learning environment in which the majority of instruction occurs when learner and instructor are in the same physical setting.

Online Learning Environment- A learning environment in which learner and instructor are in separate physical settings and where instruction occurs via Internet-based communication and interaction.

Scheduled Asynchronous- Approach in which participants can take advantage of the flexibility of asynchronous communication (e. g. not in real time together), but do so as a group in a prescribed sequence of learning activities designed for students to keep up with the readings, discussions and learning activities on a weekly basis.

Simultaneous Triangulation- A method for "obtaining different, but complementary data on the same topic, rather than to replicate results" (Clark & Creswell, 2008, p. 157).

Wiki- Server-based software that gives users the opportunity to create and edit content displayed on the WWW. Any user with access to a particular Wiki site can add, delete or change information at anytime.

CHAPTER 2

LITERATURE REVIEW

Introduction

This review of literature will provide an overview of distance education, what DE is and how it has evolved through history to encompass a variety of methods and instructional strategies. Of particular importance is the difference between synchronous and asynchronous forms of distance learning and the research-supported applications of each. In light of the rise in popularity of online distance education in The United States and the context of this study, relevant research related to success in online learning environments will be examined. This examination will include related literature of online pedagogy, instructor roles, technology use, learner characteristics, participation, communication, and collaboration. The focus will then shift to center primarily on face-to-face versus online learning environments. Finally, the review of research will conclude with an overview of technology in teacher education and the role the *Innovations Mini-teach* project has in the recent movement toward 21st Century teaching and learning.

Distance Education

The definition of the term, distance education, may vary slightly between various cultures and institutions, but generally describes a learning environment "in which learner and instructor are separate during the majority of instruction" eliminating the confine of a specific location for either party (Johnson, 2003, p.1). Typically, interaction in distance

education employs the use of some type of technology to facilitate the learning process (Potashnik and Capper, 1998; Skylar, 2004). This revolution in instructional delivery made education accessible to a wider range of learners through the inherent flexible nature of this learning medium by allowing institutions to alter variables of location, time, learning media, and learning design (Baggaley, 2008; Skylar, 2004). It was the flexible nature of distance education that initially caught the interest of many institutions of higher education. Universities and educational institutions learned to deal with larger class sizes, limited space, and more diverse learning populations in order to accommodate the masses (Howard, 2004; Matthews, 1999; Skylar, 2004). Although the roots of DE date back to the 19th Century, the rapid development of and advances in technology in the late 20th and early 21st century have prompted an unprecedented growth in the area of distance education.

The Evolution of Distance Education

In her book, Judith Johnson (2003) credits the technological advances of the Roman Empire with sewing the first seeds of distance education. Technological innovations of the time included the construction of roads, the printing press, and the development of a postal service. According to Johnson, these innovations prompted the creation of the initial shell of what developed into the first form of distance education, the correspondence courses of the mid 19th century.

Schlosser and Simonson (2006) credit an ad in a Swedish newspaper in 1833 advertising the opportunity to learn and study "composition through the medium of the post" as the earliest version of distance education via correspondence. In the years

following, newspaper articles and advertisements became a popular medium for distance instruction and communicating via correspondence. In 1840, Isaac Pitman began to offer shorthand instruction through England's penny post (Matthews, 1999). More formalized correspondence study was developed shortly after Pittman's initial success with the foundation of the Phonographic Correspondence Society (Schlosser & Simonson, 2006). Pitman went on to establish his own correspondence institution, Sir Isaac Pitman's Correspondence Colleges in England. During the mid 19th Century, correspondence courses were taking shape in other parts of Europe including Germany and The United Kingdom (Matthews, 1999; Schlosser & Simonson, 2006). The medium's popularity soon spread east into Japan and across the Atlantic into the United States.

According to Sherlow and Wesdemeyer (1990) and Skylar (2004), The University of Cambridge started an Extension System in 1871 and was designed to deliver initial in-person instruction to students via a "traveling circuit of lecturing professors" (Skylar, 2004, p. 2). Initial instruction was followed by mail correspondence between student and professor. Ruskin College in Oxford was also offering similar instruction via correspondence at approximately the same time. Students at Ruskin were mailed readings with accompanying essays and assignments to complete and turn in via the mail system. Student work was evaluated and mailed back to the student (Sherlow & Wesdemeyer, 1990; Skylar, 2004).

The earliest form of distance education in the United States began with Anna Eliot Ticknor when she founded "The Society to Encourage Studies at Home" in Boston in 1873 and attracted upwards of 10,000, mostly female, students within its 24 years in

operation (Schlosser & Simonson, 2006). The 1880's through the early 1890's represented a period of growth in distance education via correspondence at various institutions of higher education including Chautauqua College of Liberal Arts in New York, The University of Wisconsin, and the University of Illinois Chicago (Matthews, 1999; Skylar, 2004). Departments at these institutions began authorizing academic degrees- Bachelor's, Master's and Doctoral- earned by students unable to attend traditional courses (Matthews, 1999). Graduates earned the first distance education degrees by successfully completing correspondence courses and summer institutes.

Dr. William Rainey Harper, a visionary professor from Yale who headed the correspondence program at the Chautauqua College of Liberal Arts, confidently supported the program and its viability to produce quality education and talented scholars. He once said,

> The student who has prepared a certain number of lessons in the correspondence school knows more of the subject treated in those lessons, and knows it better, than the student who has covered the same ground in the classroom (Schlosser & Simonson, 2006, p. 7).

By the early 1900's, financial and administrative support for correspondence courses was more commonplace globally. According to Skylar (2004) the majority of these offerings were planned and orchestrated by part-time faculty and staff with some institutions only offering noncredit courses for non-degree seeking students, while others continued to accept correspondence courses for credit toward academic degrees at all levels.

In the 1920's, correspondence courses made their way into the secondary curriculum focusing on vocational education in Benton Harbor, Michigan. Later that decade, the University of Nebraska followed suit and began testing similar courses in high schools (Schlosser & Simonson, 2006).

Technological advancements including the telephone, radio, television, audio and video cassettes prompted another period of growth in distance education. Universities began employing these broadcast technologies to explore alternative methods of distance education; thus becoming more popular and more accessible to an even wider audience (Johnson, 2003; Potashnik & Capper, 1998; Schlosser & Simonson, 2006; Skylar, 2004).

Radio broadcasting courses gained popularity in the 1920's and 30's after the construction of over 175 radio stations at universities across The United States (Schlosser & Simonson, 2006). Pioneering institutions of the time were among the first to merge their correspondence course offerings with accompanying instruction via radio broadcasting (Skylar, 2004). It was also during this time when a few universities began experimenting with creating instructional programs using the television. It was not until the 1950's, however, when institutions began offering television instruction for course credit (Schlosser & Simonson, 2006).

Satellite technology prompted more widespread use of the television as a preferred method of instruction- both in the classroom and from a distance (Matthews, 1999). Various broadcasting services and programs including those televised by the Public Broadcasting Service (PBS) and Central Broadcasting Station's "Sunrise Semester" through New York University taught courses for credit during the latter 1950's

and saw decades of success through the 1990's. These programs prompted the use of varied instructional media in and outside of the classroom and paved the way for the commonplace educational programs and television stations of today (Schlosser and Simonson, 2006; Skylar, 2004).

Although radio and television broadcasting were originally viewed as instructional media for distance education, Skylar (2004) notes that faculty use suggested otherwise- noting that "seventy percent of faculty surveyed indicated that they used television in the on-campus setting, while only 29% used it as a tool for off-campus instruction" (Skylar, 2004, p. 4). In fact, limitations in the use of broadcast technologies are similar to those that remain concerns of DE instructors and institutions today. Some of those limitations cited by Skylar (2004) include low technological quality of courses, lack of appropriate courses, lack of interaction, insufficient notice and/or scheduling of courses, limited institutional funding and administrative support for development of courses, lack of commitment to produce courses, and lack of professional development and training for distance education faculty.

The next phase in the evolution of distance education came with the development of interactive television (ITV) courses in the 1980's which simulated interaction between instructor and students similar to that of more traditional, face-to-face instruction (Skylar, 2004). The first comparison studies between ITV courses and their face-to-face counterparts were conducted in the 1980's and 90's. Preliminary studies indicated that student achievement in both environments was similar; however, students seemed to prefer more traditional modes of instruction indicating limited interaction among students

and being uncomfortable with the medium as reasons to support their preference for classroom instruction (Skylar, 2004).

According to Linda Harasim (2000), online distance education began with the invention of email in 1971 followed closely by computer conferencing in 1972. The early Internet-based courses were operated much like the correspondence and teleconferencing courses of the late 19th and early 20th Centuries featuring faster and more efficient modes of communication between instructor and student (Harasim, 2000; Johnson, 2003; Matthews, 1999). The first completely online courses and programs emerged in the early 1980's along with networked classrooms targeting primary, secondary, higher, and adult educational sectors including professional development and online degree programs emerging later that decade (Matthews, 1999). The dawn of the Internet in 1989 prompted the world's first large-scale online course offered by The United Kingdom's Open University (Harasim, 2000; Johnson, 2003).

The invention of the World Wide Web (WWW) in 1992 dramatically increased the possibilities for online distance education. The WWW's ability to support multimedia welcomed a wider range of disciplines to deliver their course work via the Internet (Harasim, 2000). This expansion in Internet-based online education neatly packaged print-based materials, email and conferencing capabilities, audio, and video into one learning environment (Matthews, 1999). In 2001, the Massachusetts Institute of Technology made a large contribution to the open courseware community and made all of its course materials freely available on the WWW even outside of the formal learning network in place (Baggaley, 2008). Moreover, as more advances in technology emerge

to include more sophisticated course management systems and Internet-based applications, teaching and learning online has become more commonplace in our society. These newer tools have made the creation of virtual classrooms and learning communities easier for institutions to develop, for instructors to create, and for students to participate in.

The original concept of the WWW was that of a read-write web that enabled individuals to share text, images, and eventually audio and video; but this level of access was only granted to those individuals with the skill and expertise required for web-authoring at the time. The rise of Web 2.0 technologies in 2004 made the read-write web accessible for the would-be consumers to become contributors of content online via an array of user friendly authoring tools. In this way, Web 2.0 is not merely an addition to the WWW, but a realization of its original purpose (Albion, 2008).

Since the turn of the 21st Century, most institutions in The United States have placed their primary focus on designing and delivering web-based instruction for students on and off campus. Many institutions have followed the lead of the Open University, offering 100% of its courses via distance education. Enrollments at the Open University more than a decade ago exceeded 100,000 students per year with a collective estimate of over 2.8 million DE students worldwide at that time (Potashnik & Capper, 1998). In fact, a study conducted in 2000-01 by the National Council for Educational Statistics revealed that the number of postsecondary educational institutions in The United States offering complete degree programs online had increased exponentially since previous studies conducted in 1994-95 and 1997-98 (Waits, Lewis, & Greene, 2003). In a later report by

the National Center for Educational Statistics (2008), the U.S. Department of Education announced that 65% of postsecondary institutions reported offering college credit DE courses and 23% reported offering non-credit courses. Of those courses being offered in 2006-07, 77% were housed online (Parsad, Lewis, & Tice, 2008).

Although institutions throughout The United States have focused on widespread use of online learning environments as the preferred method for distance education, other countries across the globe have been more reluctant to adopt Internet-based methods-remaining true to more traditional forms of distance education. For example, Japan widely utilizes sophisticated satellite broadcasting as their preferred method of distance education and China primarily employs the use of a more traditional broadcasting system. These countries and others use Internet-based technologies, but to a far lesser extent than that of The United States (Baggaley, 2008).

This overview of the evolution of distance education in The United States and abroad provides perspective for understanding newer versions of distance and online learning environments (Harasim, 2000). Investigations of distance education have informed and prompted the development and implementation of new technologies and perspectives to support transformations in the ways we teach and learn from a distance, particularly in the development of online learning environments.

Synchronous vs. Asynchronous Distance Education

The first phase in the evolution of distance education, correspondence courses, prompted the emergence of two primary pedagogical perspectives based on the management and organization of learning and communication from a distance. Liberal

programs “emphasized the free pacing of progress through the program by the student”, while other, more rigid structures were centered on an established schedule of lessons (Schlosser & Simonson, 2006, p. 8).

Those time-based structures have evolved with distance education are most often implemented to some degree or variation of synchronous or asynchronous. In his 2008 article, Stefan Hrastinski distinguishes the two methods and the learning purposes that each supports. Synchronous DE refers to distance learning that occurs in real time through the use of videoconferencing and chat capabilities. Students have specific time requirements to adhere to although they are completing their coursework from a distance. It has been said that students participating in exact synchronous DE reap the benefits of a truly interactive learning experience with the instructor and fellow students, however, participation in these kinds of learning experiences often requires more sophisticated equipment and a faster Internet connection- factors that may actually exclude certain populations from accessing the learning community (Baggaley, 2008; Dede, 1996; Hrastinski, 2008).

Asynchronous DE is characterized by learning that does not occur in real-time, but rather when the learner deems it most convenient, requiring students to take responsibility of and monitor their own progress. Although students are not typically online at the same time, asynchronous learning does not occur without interaction- often students interact with each other and the instructor via email and discussion boards. Asynchronous DE yields a more flexible learning experience where students log on at all hours of the day and/or night (Harasim, 2000; Hrastinski, 2008).

According to a study conducted by the National Center for Educational Statistics in 2006-07, asynchronous technologies were the most widely used methods of instructional delivery in U.S. distance education courses. Higher education institutions offering distance education courses for credit reported using asynchronous technologies to a large extent in 75% of their courses and in 17% of their courses to a moderate extent (Parsad, Lewis, & Tice, 2008). This represents a change from what Baggaley (2008) calls "pre-modern [DE] delivery methods" (p. 42) placing importance on direct contact between instructor and student to an asynchronous model characterized by indirect communication and interaction as the best option available for the distance teacher and learner.

Several studies have been conducted to examine the advantages and disadvantages of both synchronous and asynchronous communication in online learning. Overall, results indicate strong cases for and against the use of either method and seem to depend, in part, on the goals of the course coupled with the instructors' pedagogical preferences. In a study of factors contributing to the success of online learning environments, Menchaca and Bekele (2008) found that students preferred asynchronous communication tools (e.g. discussion and bulletin boards) while faculty in the study mentioned a higher level of preference for synchronous chat. Instructors surveyed seemed more comfortable with synchronous communication because of the requirement for students to be present at specified times and identified this as an important factor attributing to the success of the course.

Similar studies have revealed that asynchronous communication tools can be used to effectively simulate the dynamics of real-time discussion while minimizing limitations imposed by the environment and/or by typical rules of communication that can be difficult to moderate from a distance (Tallent-Runnels et al., 2006). In this way asynchronous discussion provides an outlet for multiple voices and viewpoints to be heard. DE instructors have also indicated that because of the true anytime, anywhere and student friendly qualities of asynchronous DE, students have more time to refine their contributions to the learning community and often produce more thoughtful work than synchronous DE students (Hrastinski, 2008; Tallent-Runnels et al., 2006). Still, others have criticized asynchronous communication as lacking important qualities of conversational language- indicating that thoughts and ideas presented in asynchronous discussion remain inconsistent and often go unchallenged impeding the development of cohesive discussions and often a lesser degree of new knowledge construction (Tallent-Runnels, 2006).

A meta-analysis comparing classroom and online instruction by Bernard and colleagues (2004) examined prior research on asynchronous versus synchronous communication for each learning environment. By subcategorizing student achievement outcomes in each, researchers found that effect sizes for asynchronous communication favored the distance learning environment while synchronous communication is better suited for use in the classroom (Bernard et al., 2004).

In a study of synchronous and asynchronous online seminars, Hrastinski (2008) researched two online learning seminars- one synchronous and one asynchronous-

focusing on the purposes of each. Students participating in the asynchronous online learning seminar were able to process information at deeper levels and exhibited more reflective capacities while students participating in the synchronous online learning seminar had higher levels of motivation to interact and participate. Hrastinski concluded that asynchronous online leaning is best applied when reflecting on complex issues is important and/or when synchronous meetings cannot be scheduled. He recommends the use of synchronous online learning in order to discuss less complex issues, when getting acquainted, and/or when planning tasks. In short, when deciding how to integrate discussion, whether synchronous and/or asynchronous, research suggests that online learning instructors need to decide which method or variation thereof is the best fit for the learning community they are working to develop and goals they are working to accomplish (Hrastinski 2008).

Online Learning Environments (OLE)

One description of an online learning environment is one in which "instruction [occurs] through a connection to a computer system at a venue distant from the learner's personal computer" (Larreamendy-Joerns & Leinhardt, 2006). For the purposes of this review, this definition distinguishes online education from the sole use of online instructional tools to support face-to-face classroom instruction.

No matter the method of distance education, there is no question that its widespread use has made a dramatic impact on the when and where of learning. The use of The Internet as a mode of instructional delivery alone will not result in automatic improvements in student learning. Rather, acknowledging and taking into consideration

the complex interplay of various factors and the importance of each can equip instructors with the appropriate pedagogical tools and mindset to be successful in the online environment (Taylor, 2000). Important success factors revealed in numerous studies investigating online learning environments include factors related to pedagogy and instructor roles, Internet-based technology use, learner characteristics and participation, and communication and collaboration.

Success Factors Related to Online Pedagogy and Instructional Roles

Just as distance education has evolved to encompass online learning, so have instructional methods for online learning environments. Related literature points to constructivist learning strategies as the most successful in creating quality online learning environments (Harasim, 2000; Johnson, 2001; Jonassen, 1995; Tam, 2000). A learning experience designed according to a constructivist pedagogy is one in which learning occurs by doing- that is, when meaning is built from experience requiring the learner to actively engage in and interact with the surrounding environment in order to formulate an understanding (Johnson, 2001; Jonassen, 1995; Tam, 2000).

Constructivist learning strategies differ from objectivist strategies in the ways knowledge is acquired. In an objectivist learning environment, knowledge is something that is finite and transmitted from instructor to learner (Tam, 2000). Rather, true constructivist models are built upon the complex relationships between and among learners and the instructor who each bring existing knowledge, skill, and experience to work toward a shared goal of solving a complex problem (Johnson, 2001; Tam, 2000). The instructor's role in a constructivist-learning environment is that of facilitator or coach

who helps learners to find and develop learning strategies to support the acquisition of their goals (Johnson, 2001).

In an application of constructivist theory for online learning, Palloff and Pratt (2003) emphasize the importance maintaining a focus on learning in order to achieve a truly learner-centered online learning environment. The authors make some suggestions for best practices in online learning environments, some of which include: changing the balance of power, changing the role of the instructor, and changing the responsibility for learning (p. 125-127).

Changing the balance of power refers to the role of the instructor as a facilitator or guide rather than the omniscient authority and provider of knowledge (Jonassen et al., 1995; Palloff & Pratt, 1999, 2003, Tam, 2000). Part of that shift relates not only to the role of the instructor, but in the presentation of content. The authors suggest that "good online learning course design makes learning resources and instructional activities available to students instead of providing [formal] instruction" (Palloff & Pratt, 2003, p. 126).

Instructors of online learning environment also need to remain flexible and ready to take on any role necessary (e.g. guide, coach, and/or student) in order to keep the focus on learning in the limelight. Students in Menchaca and Bekele's (2008) study of critical success factors in online learning gave emphasis to the importance faculty played in the OLE to monitor the learning environment, to support student motivation, to provide timely feedback, and to provide clarification when necessary (Menchaca & Bekele, 2008).

In order to support interactivity in online learning environments, instructors of online courses need to re-think their pedagogical approach and incorporate constructivist learning strategies in order to create interactive communities of inquiry (Lock, 2002; Swan, 2004). In a study of instructors' pedagogical perspectives, Keller and Hrastinski (2008), surveyed instructors of online learning environments at an institution of higher education. Overall results indicate that university teachers lacked the confidence necessary to create constructivist communities of inquiry and felt more comfortable using online course structures to support objectivist strategies. In contrast, instructors in this study communicated a desire to use online media to support interaction but were uncertain on how to deal with and develop these tasks and experiences successfully in the online environment. Consequently, those instructors surveyed who reported that they had tried to develop interactive learning experiences in the past did not feel that their efforts were effective. The authors suggest more sophisticated and meaningful training in the use of online technologies to support the development of successful online interaction and constructivist learning experiences, specifically through successful models in action (Keller & Hrastinski, 2008).

Success Factors Related to Internet-Based Technology Use

The identification of critical success factors for the development of online learning environments informed Menchaca and Bekele's study (2008) on the development of a new online master's program in educational technology. Results indicated that the most important technology-related factor was the use of multiple tools for learning by students and teachers. The use of multiple tools facilitated students'

ability to contribute to the learning experience by providing and receiving peer feedback, participating in discussions, and in accessing, processing, and understanding content. Instructor identified factors related to the use of multiple tools to support teaching and learning included the ability to appeal to varied learning styles, to provide timely accurate and meaningful feedback, and to easily incorporate scaffolding structures for short and long term assignments (Menchaca & Bekele, 2008).

According to a similar survey of students at 70 institutions, Tallent-Runnels and colleagues (2006) also found that having access to and using a variety of tools as well as the extent to which the course and instructor were effective at accommodating learning preferences were equally important technological factors.

In order to be a successful online teacher or learner, research suggests a base-level of comfort with and prior experience using technology- specifically Internet and computer-based technologies (Menchaca & Bekele, 2008; Swan, 2004; Tallent-Runnels et al., 2006; Zhao et al., 2005). According to Tallent-Runnels et al. (2006), instructors and students often spend a great deal of time learning new skills that they must possess in order to be successful in the online environment. Time spent on these kinds of tasks in an effort to lessen severity of the steep learning curve may be necessary, it is often not related to the learning of course content. In Mechaca and Bekele's study (2008), students surveyed recommend a higher base level of technological proficiency than their instructors did. Responses were subdivided revealing that 14.5% of students felt that no prerequisite technical skill was necessary, while 47.3% of students felt that basic skills were necessary for success, 34.5% recommended moderate skills, and 3.6%

recommended advanced skills. Interestingly, their instructors felt that no prerequisite technical knowledge (33.3%) or that only basic rudimentary knowledge (66.7%) was necessary. Overall, students and instructors agreed that individuals with higher levels of technological proficiency would inevitably attain higher levels of satisfaction with online learning experiences (Menchaca & Bekele, 2008).

Shih, Muñoz, and Sánchez (2004) conducted a study on the effect of previous experience with technology on performance in an online course. Undergraduate students (N=120) were asked to complete two questionnaires, one at the beginning and one at the end of the study. The initial questionnaire gathered information about students' prior use of technology, specifically information and communication technologies (ICT) in their personal lives and/or in prior coursework. The end questionnaire gathered information about students' overall learning experience. Results indicated that students with more prior experience with ICT were more efficient and used less time organizing their work and visited fewer pages in each instructional session (Shih, Muñoz, & Sánchez, 2004). This supports the belief that students should have a basic level of prerequisite computing skills prior to enrolling in a web-based course (Menchaca & Bekele, 2008; Swan, 2004; Tallent-Runnels et al., 2006; Zhao et al., 2005).

The issue of technology proficiency came up in another similar study on critical success factors for online learning conducted by Soong, Chan, Chua, and Loh (2000). Researchers completed a multiple-case analysis at a higher education institution in Singapore. They found technological competency on the part of both students and instructors was crucial to the overall success of the online learning experience.

Success Factors Related to Online Participation, Communication, and Collaboration

Online course activity and participation present a completely new view of student involvement. Most students are participating most all of the time (day and night) in constructivist based online learning environments; this differs greatly from most traditional environments where the instructor directly controls the flow of communication and participation. Interaction between students is frequent and typically in the form of response rather than in the form of new posts (Harasim, 2000).

The design of the online learning environment has a significant impact on the overall success of the overall learning experience. Lock (2002) emphasizes the four cornerstones of communication, collaboration, interaction, and participation as forming the foundation of a successful online learning community. Interactions with the online course interface significantly afford and/or constrain the quality and quantity of interactions between and among students and the instructor, which dictate learner satisfaction with the overall learning experience (Lock, 2002; Swan, 2004; Wikersham & McGee, 2008; Zhao et al., 2005).

According to Taylor (2000), the facilitating structures, accountability mechanisms, and rules of engagement as they are exhibited in the instructional design of the online course influence participation. To exemplify this, the author collected empirical evidence in the form of online course statistics to investigate levels and type of student and faculty participation. Results indicated that, over a period of 16 weeks, interaction in the online learning environment accounted for approximately 75% between people and only 25% between course and study materials. Moreover, of those interactions, the ratio of teacher

to student interaction was 1:8 with a total of 11.4% of teacher interactions to 88.6% of student interactions. Results also indicated that students, in particular, made more use of the flexible nature of the online learning environment than their instructors did by accessing the course at all times of day and night throughout the entire semester (Taylor, 2000).

Taylor (2000) examined individual levels of interaction in the discussion board area and delineated levels of participation within three distinct groups- termed proactive, peripheral, and parsimonious. The first group identified, the proactive participation group, made above average contributions to the discussion area through posting of frequent messages and responding quickly to others' posts. The second group, the peripheral participation group, made less than average contributions to the discussion but visited that portion of the course regularly indicating that these individuals participated in and followed discussions assuming a read-only role. The third and final group, the parsimonious participation group, made only one-third of the postings to the discussion area and also visited this area less than 50% of the class average.

These varied levels of participation are important to the understanding of the impact these groups had on academic performance and inform assessment of online interaction and engagement. Not surprisingly, the proactive participation group achieved the highest level of academic performance, followed by the peripheral participation group, and lastly by the parsimonious participation group (Taylor, 2000). There was only a slight difference between the proactive and peripheral participation groups (0.02 average GPA points), indicating that genuine participation in the read-only mode results in

valuable learning as well. Conversely, results indicated that students in the parsimonious group are at a serious risk of failure as evidenced by eight students identified as members of this group having not achieved a minimum acceptable level of academic performance. Taylor (2000) does not go as far as to describe minimal or optimal levels of participation for online discussion groups, but does point to this as an area in need of in-depth research in order to more completely understand the dynamic of online participation. However, the author concludes that it is critical for instructors of online courses, particularly those utilizing asynchronous communication, to clearly and concisely define course rules for engagement (Taylor, 2000).

Two separate studies investigated a possible correlation between student perception of teaching presence and their reported satisfaction with the online learning experience. Researchers in both studies found significant correlations between students' belief that teaching presence of the instructor as well as their fellow classmates were significant contributors to their overall satisfaction with the course (Swan, 2004). These findings indicate that participation and online presence of the course instructor and students are related and similarly important.

Soong, Chan, Chua, and Loh (2000) studied 120 undergraduate students completing an online course and their three instructors and found that it is equally important for instructors to invest adequate time and effort into the development of resources for online learning as it is for students to actively engage in the learning experience. Researchers clarify that this investment of time and effort on the instructor's part also refers to the promotion of and motivation for student use of these resources-

particularly at the beginning of the course. Additionally, researchers found that this contributes to the degree to which students perceive resources and tools as user-friendly and supportive of their learning goals (Soong et al., 2000).

Most literature related to collaborative learning in the online environment points to constructivist theory and pedagogy as a guide for conceptualizing the design of the learning experience (Bernard et al., 2000). Collaboration and community are interdependent- each plays an important role in student motivation and participation as well as the overall development of the online community- critical success factors attributed to achieving success in the online learning environment (Dede, 1996; Harasim, 2000; Jonassen et al., 1995; Lock, 2002; Rovai, 2002; Swan, 2004; Tam, 2000). In a study of factors contributing to the success of online learning environments conducted by Menchaca and Bekele (2008), students and instructors indicated a strong belief that group work and collaboration are critical for the success of the online learning environment and the development of community. Several additional studies have investigated the complex process of online collaboration and the relationship between collaborative online learning experiences and the development of the online community.

An, Kim, and Kim (2008) investigated factors that promote and factors that impede online group work. Groups were each given a group discussion board and encouraged to use other types of communication including email, phone, and chat if they felt it was necessary. The instructor did not referee any group processes, and only answered questions about the project itself. Data were collected from volunteer students in the form of an exit survey consisting of open-ended questions related to the

collaborative experience. Researchers found that factors contributing to the success of the online group experience were individual accountability, affective team support, the presence of a positive leader, the group's consensus building skills, and clear instructions. Factors linked to impeding group work were lack of individual accountability, challenges related to text-based communication, other technology problems, unclear instructional guidelines, schedule conflicts, lack of a positive leader, and lack of consensus building skills (An, Kim, & Kim, 2008).

Johnson et al. (2002) conducted a similar mixed-methods study of 36 graduate students enrolled in an online course. Participants were divided into teams of five or six students and were grouped based on geographical location to minimize the effect of differing time zones on interaction. Researchers used two surveys and collected electronic logs of interactions among team members for analysis. Results indicated that teams evolved through roughly the same project timeline of initiating group contact and becoming acquainted, making decisions about group standards for procedure, and then performing responsibilities. Teams typically interacted online in order to discuss and make decisions for establishing schedules and time frames for working on and completing assignments (Johnson et al., 2002).

Specifically, team performance was contingent upon their ability to establish clear procedures and expectations, resolve conflicts, and collaborate effectively. Survey results identified significant critical factors reported by most individuals across all teams. The consensus revealed that all group members needed to adhere to specific norms and expectations including punctual communication, effective and timely knowledge and

information sharing, active participation, and timely feedback in order for the collaborative experience to be successful (Johnson et al., 2002).

Problems with virtual teams did arise. These problems found to impede collaborative work were attributed to lack of willingness to participate, lack of planning, schedule conflicts, and/or individual disagreements. While most participants acknowledged that they missed face-to-face interaction, they answered that this was not essential to their success as they were able to complete all assignments without in-person meetings (Johnson et al., 2002).

The role of team leadership was not consistent across all teams; in fact, only two teams established a leadership role and appointed a leader for their group while still maintaining a successful collaborative experience. Survey responses related to team leadership revealed that for four of the seven groups, the leadership role changed hands throughout the task-oriented phases of the project. For the remaining groups, one leader kept track of due dates and initiated interaction throughout the entire process (Johnson et al., 2002).

Another study conducted by Curtis and Lawson (2001) examined a text-only online learning environment and the extent to which this environment enhanced or inhibited the collaboration of small project-based groups. Researchers collected logs of interaction among groups of students and coded their interactions based on type and behaviors. Results indicated that the online medium influenced collaboration along several dimensions. Students participating in the study seemed to be somewhat reluctant to utilize discussion groups and instead preferred communication via email. Additionally,

students in this study seemed to engage in chat sessions several times throughout the project despite scheduling conflicts-- these results suggest the importance of the availability of tools for real-time communication within asynchronous online learning models. Other issues surrounding communication were augmented when others did not maintain the agreed upon schedule and when dealing with issues of placing trust on others to complete tasks on time (Curtis & Lawson, 2001).

The influence of the medium in this study indicates that the online text-only mode of communication supported student interactions, but authors recommend further development of the online courseware to better support pedagogical and technical support to facilitate collaboration including streamlining access to the discussions forum and the ability to create email groups. The authors also suggest that technology factors related to the influence of the medium including student familiarity with the medium and the ease of use of the courseware seem to be the most important factors contributing to successful collaborative learning online (Curtis & Lawson, 2001)

In another study of an online interactive course based on collaboration, Moallem (2003) investigated two semesters of an online graduate level course. Moallem utilized two different course management tools-- *Eduprise Database* during the first semester and *WebCT* during the second semester. Results from this study also indicate that the course management and delivery system appeared to influence their interaction. The author's experience with each course management tool led to the conclusion that the main portion of designing a successful interactive and collaborative course was "more of a pedagogical issue than a technological issue" (p. 99). Similarly, the structure of the collaborative

learning task used for this study influenced the nature and quality of student interactions in the study. The results of this study provide evidence for the importance of well-defined tasks including clear expectations, parameters, and evaluations of student performance and accountability as well as support structures to reduce student confusion along the way (Moallem, 2003).

Additional analysis also provided evidence for improving the quality of collaborative group interactions by supplementing group work with individually completed tasks (Moallem, 2003). The instructor asked students to explore underlying project related concepts individually prior to introducing the collaborative task. In this way, the instructor was able to successfully support and provide feedback to individual learners before introducing the group dynamic (Moallem, 2003).

Lastly, Moallem (2003) found that students in an interactive online course need time and instructional support in order to adjust to new technologies and communicating in different ways. In this case, the instructor found it helpful to remind students of issues related to online communication including how to reply to one another's online post, how to disagree but maintain respect, and how to reflect and reform ideas.

Another study on virtual collaboration by Karpova, Correia, & Baran (2009) investigated why and how student learning teams used various technologies to support online communication. Students were divided into teams of three to four students each and no student reported having any prior virtual collaboration experience. All communication between teams was computer mediated through the use of the WebCT learning management system, Skype, Adobe Acrobat Connect Professional, Google Docs,

and/or email. Results revealed that student teams utilized at least three of the five types of technology to support a different purpose. Email and discussion boards were used to establish initial contact with group members. Audio/video conferencing tools with simultaneous chat (Adobe Connect and Skype) were utilized primarily for their synchronous discussion providing immediate feedback in order to facilitate brainstorming and formulate problems to be addressed. WebCT was used primarily to share resources, information, and for overall organization of the project (Karpova, Correia, & Baran, 2009).

Students rationalized that each of the available technologies had certain advantages and disadvantages for facilitating and impeding group work depending on the task at hand. Even through the use of multiple tools to support collaboration, participants identified factors of time difference and lack of nonverbal cues as making the process more challenging to complete from a distance. Secondary to the online collaborative experience itself, students also identified learning benefits gained from learning new technologies while being part of a virtual team going through the same, collective, experience (Karpova, Correia, & Baran, 2009).

Assigning students to groups in the online learning environment, or in any learning environment for that matter, does not mean that they will be effective at working collaboratively. Research suggests that instructors of online learning environments need to consider and plan for specific issues when developing online collaborative experiences. The online collaborative experience must be appropriate and well constructed providing students with a clear description of the project or assignment, instructions for how to go

about group work and complete the project, as well as specific guidelines for how they will be assessed (An et al., 2008; Johnson, 2002; Lock, 2002; Moallem, 2003). Additionally, students should be given guidance in how to collaborate online and in which tools are appropriate and available for their use on various tasks in order to successfully complete the project (Karpova, Correia, & Baran, 2009; Moallem, 2003).

Success Factors Related to Learner and Instructor Characteristics

Instructors and learners must possess certain characteristics in order to experience success in the online learning environment. Tallent-Runnels (2006) found specific personal and learning traits were contributing factors found to contribute to overall student success in a study of online students at more than 70 institutions. Students who have good study habits, set personal goals, and maintain a healthy lifestyle were found by researchers to be significant contributors of success. The authors recognize that these are desired qualities for all students, but found that they particularly magnified in the online learning environment (Tallent-Runnels et al., 2006).

Learner characteristics relate to a wealth of research on problems associated with distance learning in general including high attrition rates and low quality of learning achievement (Bernard et al., 2000, Swan, 2004). Several researchers have studied the effect of certain learner characteristics on the quality of the online learning experience; citing student feelings of isolation, procrastination, and difficulty self-regulating (Bernard et al., 2000; Lock, 2002; Swan, 2004), in addition to limited experience with technology (Dede, 1996) as potential causes associated with these common problems. Other

characteristics linked to success online were high levels of motivation, self-regulatory skills, and self-efficacy (Swan, 2004).

The development of an effective online learning environment requires students to change the way they approach online learning in order to take a participatory role in self-regulating their own learning and in the development of the learning community as a whole (Lock, 2002; Palloff & Pratt, 2003). Attitudinal change including tolerance for ambiguity and flexibility were deemed significant factors in the development of a successful online learning community as reported by both student and instructor responses (Menchaca & Bekele, 2008). These results indicate that it is just as important for students as it is for instructors to be motivated and not resistant to change in order for the online learning environment to thrive.

Face-to-Face vs. Online Learning Environments

Educational institutions, particularly higher education institutions, have taken unprecedented steps to accommodate a diverse population of learners on-campus and from a distance. These institutions and their stakeholders have invested a lot of time, effort, and money into the simultaneous development of programs on and off campus via the use of online learning environments. Naturally, this has ignited a debate between proponents of more traditional face-to-face environments and proponents of online environments about the quality of learning one can achieve online.

Numerous studies have compared online learning to face-to-face learning environments; and, largely, prior research and literature related to comparisons of online and face-to-face learning environments report no significant difference (Bernard et al.,

2004, Zhao et al., 2005). Various online courses have attempted to mimic their traditional versions and others have no traditional basis from which to build making comparisons between the two environments complex (Tallent-Runnels, 2006). Indeed, there are similarities and differences between the two learning environments and a wide array of variables to consider-- it is because of this that some researchers are unsure of whether or not it is purposeful to compare learning in either environment (Bernard et al., 2004, Tallent-Runnels, 2006). Still, numerous studies have taken on the task and have come up with somewhat conflicting results.

Which Learning Environment Do Students Prefer?

Several studies have investigated whether or not online students differ from face-to-face students. Research by Halsne and Gatta (2002) supports that students electing to take online courses are typically older enrolled part-time while simultaneously working full-time and face-to-face students are more likely to be full-time students who work part-time if at all (as cited in Swan, 2004). These results are supported by Tucker (2001) who found age to be a significant difference between online and face-to-face students in a comparison study of the two learning environments.

Results on age, however, are conflicting. A report by the National Education Association (2000) found that most online courses have an equal distribution of full and part time students over and under the age of 25. Likewise, Christensen, Anakwe, and Kessler (1999) surveyed 399 graduate and undergraduate students at two private universities in the northeastern United States on receptivity to online learning. No correlational or mean differences between students were found with respect to gender,

student status, employment status, or age on general online learning receptivity (Christensen, Anakwe, and Kessler, 1999).

Placing the issue of student age and enrollment status aside, evidence has shown varied reasons for why some students prefer to take an online learning course to the traditional course. Some students choose to take online courses in order to save time and/or to fit more classes into their schedule (O'Malley, 1999; Wuensch, Aziz, Ozan, Kishore, & Tabrizi, 2008) while others choose the online format because they prefer the enhanced social interaction they receive online resulting a higher quality learning experience (Harasim, 2000). Additional evidence related to learning preferences inform reasons why students decide on one course format over another. Swan (2004) cites research to support that students with independent learning styles are more often successful in the online environment while students who are more dependent upon the instructor or fellow students favor face-to-face classrooms. Additional research conducted by Halsne and Gatta (2002) suggests that visual learners favor online learning while auditory and/or kinesthetic learners favor the face-to-face environment (as cited in Swan, 2004). This relates to another study in the same review by Kolb (1984) that found online students to prefer reflective observation and abstract concepts while face-to-face students prefer to actively conduct experiments (as cited in Swan, 2004).

A study of 33 students enrolled in the traditional, online, or hybrid version of an undergraduate course in social work compared student learning and preferences in each learning environment. Results revealed that students in the traditional class showed the most improvement from pretest to posttest. Most students reported not feeling

comfortable with the online learning medium and preferred listening to rather than reading course material. Students also communicated the need for more instructor feedback online (Faux & Black-Hughes, 2000).

In an evaluation of the previous study, Tallent-Runnels et al. (2006) and Thurmond and Wambach (2004) indicate multiple issues confounding the results of the study. First, the course design appeared to be more instructor-centered rather than based on student learning preferences for any learning environment examined. Second, students participating in the course and in the study were not willing to take responsibility for their learning in any environment. In fact, Brown and Liedholm (2002) examined another, larger study of 710 students yielding results that student effort was an indicator of performance based on the learning environment. Face-to-face students in the Brown and Liedholm study spent three hours in class each week while students in the online equivalent class reported spending less than three hours per week (as cited in Tallent-Runnels et al., 2006, p. 98).

In a study on student receptivity to online learning, Christensen, Anakwe, and Kessler (1999) surveyed 399 graduate and undergraduate students at two private universities in the northeastern United States. Overall results indicated that students were slightly more receptive to distance learning than traditional learning environments. Based on student responses to the survey, authors speculate that this can be attributed to students' perception of distance learning as a "tool to help them to fulfill their needs (e.g. graduate on time) and less of a substitute to traditional studies" (p. 269). This finding relates to the significant correlation found between flexibility and accessibility and online

learning (Swan, 2004; O'Malley, 1999, Wuensch et al., 2008). However, other research suggests that a student may choose either format because of previous student recommendations, that the course appears easier, and/or more convenient rather than making a decision based on which environment would maximize their learning gains (Allen, Bourhis, Burrell, & Mabry, 2002).

Students in this study by Christensen, Anakwe, and Kessler (1999) were also significantly more receptive to more interactive than less interactive forms of technology use in distance learning. Technological factors of usefulness and familiarity were also examined, each resulting in a significant and positive relation to distance learning receptivity- encompassing general, interactive, and non-interactive technologies. Technology accessibility was not a significant factor in students' receptivity to distance learning. Authors reasoned that all respondents had access to a variety of technologies to support distance learning and/or "expected that if they needed access they could get it" (Christensen, Anakwe, and Kessler, 1999, p. 272).

Overall, the most prominent of all results was the importance of perceived technology usefulness for distance learning in general as well as interactive and non-interactive forms of DL (Christensen et al., 1999). This provides evidence to support the idea that technology use alone is not enough, but rather it is the way(s) in which technology is supported and viewed as useful to students. In addition, results indicate that interaction is essential to create a quality experience in online distance learning (Christensen et al., 1999; Zhao et al., 2005).

How Does Each Environment Impact Student Satisfaction?

Research on student satisfaction favoring one learning environment over another is inconclusive as well. According to a meta-analysis of research comparing distance learning to face-to-face learning by Allen, Bourhis, Burrell, and Mabry (2002), there is little difference in student satisfaction between the two learning environments.

Shelly, Schwartz, and Cole (2008) developed two studies to investigate an online course versus its face-to-face equivalent taught by the same instructor. The first study investigated four online sections and two face-to-face sections taught between 2004 and 2006 and resulted in no significant differences between the two learning environments on student satisfaction. The second study investigated two online sections and one face-to-face section taught during the 2006-2007 school year. Student satisfaction with the course overall and with the instructor was found to be significantly higher for face-to-face students than online students in the second study (Shelly et al., 2008). The authors point to issues related to sample size and differing participation rates as problems with the first study and researchers took steps to lessen these limitations prior to the second study. These results provide overall support the finding that the online learning environment is at least as effective as the face-to-face learning environment in terms of student satisfaction.

Wikersham and McGee (2008) completed an action research project to study a deeper learning experience in the online setting and the effect on student satisfaction with the learning environment. Students reported overall satisfaction with the online course, but indicated differing degrees of dissatisfaction with online learning in general. These

results explain that the “experience within the environment” is the aspect that most directly influences satisfaction (Wikersham & McGee, 2008, p. 81). The authors explain that adjusting to individual differences is more difficult in the online learning environment because each learner is essentially within his or her own learning context whereas in the traditional classroom the instructor has more direct control of the physical learning context (Wikersham & McGee, 2008).

Another study investigated differences in student satisfaction based on prior experience, or lack thereof in online learning environments. Wisan, Nazma, and Pscherer (2001) recognized that students are not always separated into distinct online or face-to-face groups; in an effort to gain a better understanding of student satisfaction in either environment, researchers scrutinized results in terms of the number of online classes students had taken. They found that students who had taken only one online course favored face-to-face instruction, while students who had taken four or more online courses favored online courses citing reasons of students’ ability to develop critical thinking skills as well as the level of academic rigor and scholarship provided via online learning.

What are the Effects on Student Achievement?

Naturally, researchers and instructors want to know the degree to which their students are achieving the objectives of the course; this is true no matter the learning environment. Many comparison studies have attempted to determine which learning environment, online or face-to-face, is better for student achievement, but many fall short of providing conclusive results. For example, in a general comparison of an online

course versus a face-to-face course, Aragon, Shaik, Palma-Rivas, and Johnson (1999), found significant difference between the two learning environments, although instructors were pleased with achievement in both. This research supports a growing body of inconclusive results implying that online learning can be as effective as face-to-face and vice versa (Tucker 2001).

In another investigation specifically comparing student achievement in online and face-to-face learning environments, Thirunarayanan and Perez-Prado (2001-2002) found no significant differences between the two learning environments. However, there was a statistically significant difference between students' pretest scores; face-to-face students performed better on the pretest than online students did. This is particularly informative because the differences between online students' pretest-posttest scores were markedly higher than face-to-face students. These results suggest that students in the online environment learned slightly, but not significantly more than face-to-face students.

What are the Pedagogical Characteristics Influencing Each Environment?

Wuensch et al. (2008) investigated additional pedagogical characteristics influencing online and face-to-face comparisons. Overall results present cases for and against each learning environment. Students preferred the flexible nature, self-pacing, and convenience of online learning environments, but rated face-to-face instruction as superior in a number of other areas. Students felt that face-to-face communication with other students was better and helped them to learn material that is more difficult. In addition, students reported easier communication with the face-to-face instructor, who they felt was better suited to evaluate their work. Additional results suggest that students

in this study rated face-to-face classes as being more organized and pleasant leading to a better understanding of the course material.

As described in the review of online learning environments, students in any learning environment benefit from learner-centered, constructivist-based course structures. A large part of a learner-centered learning environment is built upon the development of community (Bernard et al., 2000). In an analysis of the differences between online and face-to-face learning environments, Rovai (2002) investigated the classroom community in either learning environment. Rovai found there to be no significant differences in overall community development in either learning environment, but did find a significant difference in the overall structure of community within each. Seven traditional courses and seven online courses were examined in the study. A secondary analysis of the online courses found that the five online courses with the highest community ratings had a significantly higher rate of community development than the face-to-face courses investigated. The author highlights this piece of information to suggest that the development of community in online learning environments is "more sensitive" to course design and pedagogy than face-to-face learning environments (Rovai, 2002, p. 52). This also counteracts previous reports of student isolation in online learning and points to individual course design and pedagogy as the driving factor behind these feelings, not the online learning system itself.

The success of collaborative experiences are largely contingent upon the successful development of community. In a study of student-centered collaborative learning experiences in both face-to-face and online learning environments, Ellis (2001)

investigated the similarities and differences for each. Students in this study indicated that online communication felt limited in that the asynchronous tools did not provide immediate interaction and non-verbal cues. Similarly, instructors noted difficulty communicating and motivating students via the online text-only medium citing that prompting students online was more difficult. In general, however, online postings were more thoughtful than face-to-face interactions, with the exception of a few "assessment-driven students" (Ellis, 2001, p. 172). Online students did appreciate the permanency of content, which proved easier to follow and keep track of over the long term. Overall, students and instructors identified advantages and disadvantages for each, but found the face-to-face learning environment to provide a more natural flow of communication.

In a similar comparison study, Tutty and Klein (2008) compared online versus face-to-face collaboration. Their results indicated that online students performed significantly better than face-to-face students; however, face-to-face students performed better on the follow-up individual posttest. These results support that both online and face-to-face collaborative experiences can be equally effective as long as careful consideration is given to the design of the learning experience in both environments.

How Can Instructors Use Face-to-Face Experience to Inform Online Instruction?

Several studies have documented the time commitment required to design, develop, and facilitate an online course- this often requires more if not twice the amount of time it takes to develop an equivalent course presented face-to-face (Moallem, 2003, Palloff & Pratt, 1999; Dabbaugh, 2001). Instructors with experience teaching face-to-face can use what they know and apply that prior knowledge to facilitating learning in an

online setting (Richards, Dooley, & Lidner, 2004). The advantage of starting with a live audience is that the direct contact with face-to-face students can inform instructors and equip them with knowledge to modify procedures and instructions for online-only instruction (Bernard et al., 2000).

Related literature points to constructivist learning strategies as the most successful in creating quality online learning environments (Harasim, 2000; Tam, 2000; Johnson, 2001; Jonassen, 1995). In order to develop a constructivist learning environment online, instructors need to shift the way they view themselves; in the online learning environment the instructor will serve as a facilitator and guide- someone to come to with problems or when seeking advice (Jonassen et al., 1995; Palloff & Pratt, 1999, 2003, Tam, 2000). The other side of the coin requires that students take responsibility of their own learning by self monitoring and self regulating the acquisition of their goals (Harasim, 2000; Hrastinski, 2008; Palloff & Pratt, 1999, 2003). For most students, this will not happen automatically. Instructors need to structure the online learning environment to be user-friendly and to foster the development of an online community in which students are the primary contributors as well as providing ready access to support resources and guidance (Bernard, 2000; Hrastinski, 2008; Harasim, 2000; Jonassen et al., 1995; Lock, 2002; Swan, 2004; Tam, 2000).

Are Face-to-Face and Online Learning Environments Comparable?

For varied reasons, students will continue to take courses in both online and/or face-to-face modes, so research will continue to compare these two environments. However, many critics of comparison studies of online versus face-to-face learning

environments say that the problem lies in the research methodology. Lockee, Burton, and Cross (1999) articulate that comparisons of student achievement between an online and face-to-face group of participants guarantees that the desired outcome will be achieved- that online learners perform as well as face-to-face learners. Other researchers and critics have highlighted the wasted time and effort in comparing these two environments only yielding results of non-significance as not providing any real or usable information about either learning environment (Bernard et al., 2004; Clark, 1983). According to Lockee and colleagues (1999), comparison studies can be appropriate, but should be published as local findings and should not be generalized to the theoretical knowledge base. With regard to student achievement, researchers suggest reporting of other types of data- specifically instructional design, participant characteristics, issues of implementation, technology-related issues, etc. - to provide a more comprehensive description adding value to the results (Lockee et al., 1999). Although most research has produced inconclusive results, researchers and stakeholders alike recognize that the quality of online and face-to-face learning environments will continue to approach a common ground, causing another shift in focus from the medium to the instructional talents of instructors in either environment (Turoff, Discenza, & Howard, 2004).

The present study seeks to build on this literature by investigating the similarities and differences between face-to-face and online learning environments. It is the intent of the present study to compare the two learning environments in a way that more accurately describes the learning experience in each. This will provide a clearer understanding in

order to more accurately answer the questions of "why" and "under what conditions" of both face-to-face and online learning.

Technology and Teacher Education

Teacher quality is likely the most pressing issue faced at the local, state, national, and international level. In fact, some researchers point to teacher quality as the single most significant factor in effecting student achievement and the extent to which improvements in education can be made at all levels (Darling-Hammond, 2006; Imig & Imig, 2007; Townsend & Bates, 2007). There is, however, a much lesser consensus of how teacher quality can be operationalized. The *No Child Left Behind Act* of 2001 attempted to do just that. Under the *NCLB* act, a highly qualified teacher "must hold a bachelor's degree, have full state certification, and demonstrate competency in the core academic subjects they teach" (U.S. Department of Education, 2006, p. 1). As of the 2005-06 school year, all teachers in The United States are required to have highly qualified status in the subject(s) they teach. Because of the high stakes related to teacher quality, teacher educators and schools across the country face a very complex problem of developing future educators who are not only highly qualified, but also developed and prepared for teaching and learning in the 21st Century. Linda Darling-Hammond describes the 21st Century teacher as a professional who has the skills necessary to construct and manage the classroom efficiently, can communicate well, can use technology in meaningful ways, and can reflect on their practice and consistently improve (Darling-Hammond, 2006).

Schools of today look and operate distinctly different from the industrialized schools of the past. Teachers face larger classes coupled with the most diverse student population The U.S. has ever experienced (Imig & Imig, 2007). Today's students proceed through a K-12 education, some attend college, but all are competing at the international level for employment opportunities. Today's teachers are required to adhere to more rigorous standards in addition to tackling the responsibility to prepare students for entering the work-force as contributors to a global society and a global economy (Imig & Imig, 2007).

The stakes are high for institutions of higher education, specifically teacher education programs, as well. Like elementary and secondary schools, higher education institutions are also dealing with large enrollments. Programs of teacher education alone saw an enrollment increase of more than 7% from the previous year in 2003-04 (U.S. Department of Education, 2006). In an effort to accommodate larger numbers and better prepare students for the 21st Century teaching profession, many schools of education have ramped up their traditional programs in addition to investing in and developing alternative routes and distance education courses targeted at professional development of current teachers as well as current teacher candidates (Darling-Hammond, 2006; Sujo DeMontes & Gonzales, 2000).

Teacher educators face greatly increased expectations for the preparation of new teachers. Upon graduating, teacher-candidates are required to be developed into highly qualified teachers in the 21st Century. This encompasses a much higher degree of knowledge and preparedness in the areas of technology, pedagogy, content knowledge,

and the combinations of each- known as the TPCK Framework (Mishra & Koehler, 2006). The application of this framework presents programs of teacher education with a structure for meeting the complex challenges they face; in particular, the challenge of developing teachers who are not only proficient in the use of technology, but also in the use of technology for education and learning.

In addition to the TPCK Framework, the International Society for Technology in Education (ISTE) has developed *National Educational Technology Standards* (NETS) for students, teachers, and administrators based on the effective use of technology for education. In addition, the National Council for the Accreditation of Teacher Education (NCATE) has adopted those standards and now recommends that schools of education have a plan to infuse teacher education programs with technology across the curriculum (Beyerbach, Walsh, & Vannatta, 2001; ISTE, 2002, 2007, 2008; NCATE, 2004).

Programs of teacher education have taken different approaches to address the question of how to prepare their teacher candidates to effectively use technology in their classrooms. Some teacher education programs have taken the single course route, requiring teacher candidates to complete an educational technology course to successfully finish the program (Beyerbach et al., 2001; Hargrave & Hsu, 2000; Kay, 2006, Wetzel et al., 2008-2009). This required course is typically completed during the first years of the program and covers a wide range of technologies and basic computer skills. Others have taken an integrated approach in which the use of technology is intertwined into all teacher education courses (Beyerbach et al., 2001; Kay, 2006; Lambert & Cuper, 2008; Pope, Hare, & Howard, 2002). The use of multimedia has also been a strategy to supplement

coursework in the form of electronic portfolios, educational technology workshops, and/or online courses (Kay, 2006). In addition, programs of teacher education have begun work on transforming the views and improving the technology skills of faculty to encourage and support integration and modeling within their individual courses as well as to collaborate with colleagues (Kay, 2006). The nationally funded grant program, Preparing Tomorrow's Teachers to Use Technology (PT3) has also aided in these efforts. The PT3 program awarded educational institutions monies to foster and support faculty development, reorganization of courses, online courses, electronic portfolios, as well as collaboration between teacher education programs, school districts, and communities beginning in 1999 (U.S. Department of Education, 2006).

Although teacher education programs are better supported through the resources cited above, they do not tackle the task of preparing teacher candidates to use technology effectively without obstacles. In fact, these programs face difficulties internally such as: lack of time, negative perspectives and incompetent technological skills of program faculty, fear of technological problems, lack of a clear understanding of the problem and how to address it, in addition to insufficient access to technology to support their plans (Kay 2006, p. 384). Moreover, teacher education programs face the task of developing and sometimes transforming the epistemological beliefs and attitudes of teacher candidates related to the role of technology in schools.

Teacher Candidates and Technology Integration in Teacher Education

Prensky (2005-2006) coined the terms "digital native" and "digital immigrant"- distinguishing students who have grown up in the digital age from educators from the

industrial age. Prensky notes that natives have reached a level of mastery with a variety of technological tools that most members of the digital immigrant group will never reach. Prensky's views prompted researchers and programs of teacher education to question whether or not these digital natives are more prepared to teach with technology, and if so, what kind of teacher training do they need. To address this question, researchers have investigated teacher candidates' prior knowledge and use of technology. They have found most teacher candidates indeed have a more sophisticated background in technology, but their prior use has proven to be limited in scope and focused on personal use and productivity (Guo, Dobson, & Petrina, 2008; Lambert & Cuper, 2008; Lei, 2009).

In a study of digital natives as teacher candidates, Lei (2009) examined teacher beliefs and attitudes in addition to the level of their prior technology use. Results indicated that the teacher candidates had strong positive beliefs about the role of technology in education, but only moderate levels of confidence. Students were very proficient in the use of basic technologies and prior use was mostly centered around social communication and not on learning-related technologies. In addition, most had a very limited scope in the use of Web 2.0 technologies, lacking experience in the use of these tools for educational application. Lei concludes that today's teacher candidates may be digital natives, but are not yet digital teachers and that clear systematic technology preparation is still critical to the development of quality teachers for the 21st Century.

In a similar study of teacher candidate competency, Guo, Dobson, and Petrina (2008) sought to examine the intersection of age and technology use, specifically

information and communication technology (ICT). The authors found no significant difference in ICT capabilities between different age groups prior to or after completion of the teacher education program. These results indicate that the apparent divide between digital natives and digital immigrants is not as definite as their descriptions imply; rather, these two populations may learn and acquire technology proficiency in different ways, but do not result in statistically significant differences in their capabilities (Guo, Dobson, & Petrina, 2008).

In a study that sought to understand how teacher candidates pictured their use of technology in their future classrooms, Doering, Hughes, and Huffman (2003) found that participants in the study started the program with strong negative beliefs about the role of technology in education. Specifically, teacher candidates were skeptical about the availability of technology resources, felt that technology should only be used after students had reached a base level of knowledge or skill, and imagined the use of technology as a means of finding information and keeping records. After completing methods and educational technology coursework, the same teacher candidates were able to identify strategies and ideas for integrating technology in their future classrooms, but still held fear and reservations related to the possibility of something going wrong (Doering et al. 2003).

Hargrave, Walsh, and Vannatta (2001) completed a two year evaluation of their program's effectiveness in changing teacher candidates perceptions about the role of technology in education. Results from their two-year study revealed that students felt that they needed to learn more about educational technology earlier in the program

through a single technology course coupled with infusion throughout the program and field experiences. Students cited reasons of marketability for the job market as the driving factor for wanting more hands-on experience earlier. Students participating in the study also acknowledged collaborative experiences in the uses of technology as contributing extensively to their ability to learn and use technology in meaningful ways. In addition, many students reflected on their prior generic beliefs about technology in the classroom and how far they have come to envision more sophisticated use (Beyerbach et al., 2001).

Another study by Lambert and Cuper (2008) focused on teacher candidates' perceived computer ability and attitudes toward computers in education. Participants completing an educational technology course were pretested at the beginning of the course and post tested at the end to measure the effect of the single technology course's impact on their perceptions and attitudes. Researchers found that this course was successful in impacting students' perceived computer ability but not their general attitudes toward computers in education. In addition, the extent that course instruction can influence students' ability to understand effective computer use for educational purposes is contingent upon prior technology experience and the extent that instruction accommodates differing levels of prior knowledge and experience. The authors present implications pointing to the importance of multiple strategies and differentiated instruction in educational technology courses (Lambert & Cuper, 2008).

The question of which approach to integrating technology into teacher education programs and which strategy is best has been the topic of serious debate and has

prompted research to investigate just that. In his review of literature, Kay (2006) evaluated the research surrounding the various strategies used by teacher education programs to integrate technology into their programs. In his analysis, Kay identified ten strategies including: offering a single technology course; offering mini-workshops; integrating technology in all courses; modeling how to use technology; using multimedia; fostering collaborative relationships between students, mentor teachers, and faculty; supporting technology practice in field experiences; focusing on faculty use and perspectives; focusing on mentor teachers; and improving access to hardware, software, and technology support (Kay, 2006, p. 383). Kay presented advantages and disadvantages of each, but due to the limitations and inconsistencies in research methodology used, she did not report on which strategies are best. Rather, initial results indicate that teacher education programs that employ a combination of the strategies listed are most successful at preparing teacher candidates to use technology in meaningful ways (Kay, 2006; Strudler & Wetzel, 1999).

The Innovations Mini-teach

Teacher educators today face the dual challenge of preparing students for teaching in the 21st Century while simultaneously maintaining current knowledge of the rapid developments in technology, particularly Web 2.0 technologies. The *Innovations Mini-teach* was born from an effort to confront these challenges head on and develop teacher candidates into lifelong learners (Foulger et al., 2008; Wetzel et al., 2008-2009). The project also sought to better prepare teacher candidates for future professional collaboration that mirrors 21st century teaching and learning as outlined by the ISTE

NETS for Teachers and Students (Foulger et al., 2008; Wetzel et al., 2008-2009).

Through background research of instructional design principles, constructivist work of Vygotsky (1978), and consideration of the plethora of technological tools available at the university level, instructors created a project built from a communal constructivist model where "students and teachers work together to develop their own understandings… [and where] knowledge students generate is meant for their personal benefit and for the benefit of their instructor and other students" (Foulger et al., 2008, p. 29). The project was designed to change and evolve each semester in order to adapt to new and emerging technologies.

The *Innovations Mini-teach* project was first piloted in six sections of a required introductory educational technology course taught by three instructors; a total of 126 students were enrolled and completed the course and project the piloting semester. The overarching goal of the *Innovations Mini-teach* project is for students to learn about new and evolving technologies and their applications to 21st century teaching in pre-kindergarten through twelfth grade education "in an atmosphere where they could help each other to learn their assigned technology, better understand how technology can be integrated, and contribute to their collection of teaching ideas and materials via the class wiki" (Foulger et al., 2008, p. 31). In order to successfully complete the project, students worked in teams of 2-4 students to achieve the following outcomes:

- To learn one innovative technology and its possible classroom application(s)
- To learn to work together taking advantage of each other's strengths
- To design and deliver instruction (of their innovative technology)

- To collect usable resources for future class assignments and possible use as a teacher
- To learn from peers about other innovative technologies and their possible classroom applications
- To use a class wiki to archive and disseminate innovation resources beyond the future of the course. (Foulger et al., 2008, p. 31)

Instructors gathered feedback and collected data to investigate the process involved, student perceptions, and outcomes resulting from the project. Data were collected through purposeful sampling of students to participate in focus group sessions of 4-8 students, N=24 (Foulger, et al., 2008). Data from end-of-semester course effectiveness evaluation, analysis of students' final projects, and the class wiki were used to triangulate data from student focus group sessions and to confirm trustworthiness. Results of the first implementation and data analysis of the project provided great promise and implications for the short and longer term. Instructors' direct conclusions and reflection on the project resulted in evidence that,

> …students gained high levels of expertise with their assigned innovation and became familiar with the range of innovations covered by their classmates and archived in the class, students took ownership of their own learning, and the class wiki provided a situation in which the knowledge gained by one group was also owned by others (Foulger et al., 2008, p. 36).

Since the piloted semester, the project has been shared with and adapted to accommodate similar needs of the educational technology course required for completion

of the elementary and secondary teacher education program at another university. The project was first piloted at the receiving institution in three face-to-face sections of the required educational technology course- two elementary sections and one secondary section of the course (Grove et al., 2008). The project was integrated into the course with few modifications and additions from the original model.

The *Innovations Mini-teach* project is still evolving and maturing but has shown positive implications for the development of strategies that aid teacher educators to effectively assist teacher candidates to learn about and learn with technology- specifically Web 2.0 technologies. The project also has implications for the bigger picture and addressing the challenge of preparing teacher candidates for 21st Century teaching and learning through fostering positive attitudes toward technology in education, building collaborative capacities, and developing the foundation for lifelong learning and continual professional development.

The present study seeks to extend the research on the *Innovations Mini-teach* by investigating the project for the first time in an online learning environment. Because the project has been a successful component of face-to-face educational technology courses at the original institution as well as the receiving institution, it is necessary to investigate the adaptability of the project for the online setting. This study will seek to describe the similarities and differences in the implementation of the project simultaneously in both environments.

CHAPTER 3

METHODOLOGY

Triangulation is a common analytical research technique used to combine methodologies in the study of the same phenomenon to enhance credibility and account for weaknesses present in the application of a single research method. A holistic triangulation design, *Simultaneous* (Concurrent) *Triangulation*, was used as the model for research design. In this sense, triangulation was not only used to examine the same phenomenon from multiple viewpoints but also to enhance understanding by allowing for new and deeper breadth of knowledge and understanding of the *Innovations Mini-teach* project to emerge. (McMillan, 2008; Plano-Clark & Creswell, 2008).

This study was conducted to investigate the similarities and differences between an online and face-to-face version of an undergraduate course for elementary teacher candidates titled, *Preparing Teachers to Use Technology*. Specifically, the common course project, *The Innovations Mini-teach* was the focus of the investigation.

Research Questions

The *Simultaneous Triangulation* model of mixed methods research design afforded empirical, descriptive, and theoretical analysis of qualitative and quantitative data collection for the study (McMillan, 2008; Plano-Clark & Creswell, 2008; Reiser & Dempsey, 2007). The following research questions led the investigation.

1. What are the similarities and differences between face-to-face and online versions of the *Innovations Mini-teach* as it was orchestrated in an introduction to educational technology course for teacher candidates?
2. What is the nature of the learning experience involved in the *Innovations Mini-teach* project implemented in the face-to-face section of the course?
    a. Can the project be modified to make it viable in an online environment?
    b. What accommodations are necessary to implement the project without synchronous face-to-face interaction? How does this impact the learning experience?
    c. Are there differences in learning outcomes resulting from the face-to-face versus the online section of the course?

Participants and Instructional Setting

Participants in the study were students enrolled in a required educational technology course for teacher candidates studying elementary education. Participants began and completed the course during the spring 2009 semester. Participants included 24 students enrolled in the face-to-face section of the course, and 22 students enrolled in the online section of the course. Students in the face-to-face section met twice weekly in an on-campus computer lab for 75 minutes per class session while students in the online version of the course met under the scheduled asynchronous model of distance learning. Both sections of the course were taught by the same instructor and utilized the WebCampus online learning system to access materials, assignments, and discussions.

Instrumentation

The instruments used in this study included an Interest Form (Appendix B), Pretest and Posttest (Appendix C), and Feedback Survey (Appendix B). These instruments were administered to students enrolled in both face-to-face and online versions of the course, *Preparing Teachers to Use Technology* during the spring 2009 semester. These instruments were designed, distributed, and compiled electronically using Survey Monkey, an online-based survey software.

Interest Form

As a first step for both sections, students were asked to complete an electronic Interest Form (Appendix B) related to their prior technology skill and experience. The form asked students to rate their prior experience with each of the fourteen technologies listed as possible topics for the semester on a scale from one to five. The scale started with "1. I don't know what this technology is" on the low end to "5. I'm a pro with this technology" on the upper end. After rating their prior experience with the list, students were asked to select four of the technologies that they would like to learn more about. Students also provided additional information about their overall technology comfort and skill from "1. I have very little experience using technology" to "5. I'm a technology pro and like new challenges". The information gathered from the Interest Form was used by the instructor to select and pair students with an innovation.

Pretest

In addition to the interest form used to assign groups for the project, students also completed a twenty-seven item pretest (Appendix C) designed to assess prior knowledge

of the list of fourteen technology innovations from the Interest Form. Students completed the multiple-choice assessment electronically prior to starting the project during the second week of the spring 2009 semester. Of the twenty-seven pretest items, three questions were focused on gaining information about how students access WebCampus (e.g. from home, work, and/or school), the operating system, and the type of Internet connection they use most often for class. The remaining twenty-four items were prior knowledge and skill items.

Posttest

The thirty-nine item posttest (Appendix C) followed the last *Innovations Mini-teach* presentation and was administered during the fifteenth week of the spring 2009 semester. Items one through twenty-four were the same knowledge and skills items from the pretest taken at the beginning of the semester. Items twenty-five through thirty were multiple choice and open-ended response questions specifically focused on the *Innovations Mini-teach* and asked students to provide feedback and reflect on the project. The final nine items (31-39) were also a combination of multiple choice and open-ended response and asked students to reflect and provide feedback related to the course as a whole.

Feedback Survey

Students in both sections of the course completed the seven-item Feedback Survey (Appendix B) after each *Innovations Mini-teach* presentation. Students rated each presentation using a Likert-scale on qualities related to organization, focus, facilitation, and resources used. In addition, students listed two things that they learned

from each presentation and provided optional comments. The results from the Feedback Surveys were complied and provided to each group of presenters with names and identification numbers for evaluators removed.

Research Procedure

The research study was conducted in five phases. Per the guidelines outlined by the model for simultaneous triangulation research design, data were collected and analyzed throughout the research process with a final accumulation and end analysis (McMillan, 2008; Plano-Clark & Creswell, 2008).

Phase One

A total of twenty-four students enrolled in the face-to-face section and twenty-six students enrolled in the online section were asked to participate in the study. All face-to-face students and twenty-two online students agreed to participate and completed informed consent forms (Appendix A). The instructor of the course also agreed to participate and signed an informed consent form (Appendix A). The *Innovations Mini-teach* project was introduced in both sections during the second week of the semester.

Unstructured interviews with the instructor were completed at the beginning of the semester, prior to the introduction of the project. The purpose of these interviews was to prepare, review, and post materials for the project. Students in the face-to-face section were given a face-to-face explanation and overview of the project by the instructor as part of their scheduled class time. Students in the online section were introduced to the project utilizing the weekly learning module (Appendix B) and podcast created and designed by the course instructor detailing the background and procedure for completing

the project.

Phase Two

Students in both sections were asked to complete the electronic Interest Form (Appendix B) during the second week of the semester to provide the instructor with information about their prior technology skill and experience. The instructor used the information gathered to assign students to ten collaborative groups for each section. Ten of the fourteen technologies were selected and assigned to groups as topics for presentation. Students completed the Pretest (Appendix C) electronically prior to receiving their group and innovations assignments.

Students were directed to the *Innovations 09 Wiki- Front Page* (Appendix B) for step-by-step instructions for how to join the wiki. The front page provided an entry point for the course from which face-to-face and online students accessed their individual course wiki. Students in both sections were also provided with itemized instructions (Appendix B) listing required content for the presentation and a model wiki to show an example of how their wiki could be organized (Appendix B). Students were given opportunity to review the model wiki and participate in the learning activity and acclimate themselves to using the wiki in order to gain perspective about how to approach the project successfully. In addition, tutorials, help resources, and a practice area were posted to help students learn how to create and develop their wiki pages.

Phase Three

Student presentations began during the fourth week of the semester. Face-to-face presentations consisted of a ten to fifteen minute "live" collaborative presentation of their

wiki detailing the required information about their assigned technological innovation. The face-to-face presentations were video recorded and presenters were provided with electronic copies of their presentations. Online presentations used the wiki as the main platform for their presentations. Students were required to have completed their wiki with all required information by the Wednesday of their presentation week. Following the scheduled asynchronous model, students visited the wiki to learn about the innovation and presenters were responsible for monitoring the wiki and answering questions through Friday of the same week.

Weekly non-participant observation sessions of face-to-face and online sections of the course included collection of revision histories of the *Innovations 09 Wiki*, discussion forums and email records in WebCampus. Observation of the *Innovations* project presentations consisted of direct observation of the "live" face-to-face student presentations and three-day online presentations via the *Innovations Wiki*.

Following each presentation, students in both sections of the course completed an online Feedback Survey (Appendix B) to provide presenters information related to the effectiveness of their presentation. Students were given points for completing the surveys and then their identifying information was removed and given to the presenters. Students responsible for presenting were required to submit a Self-Peer Evaluation Form (Appendix B) to provide the instructor with information about how well students were able to collaborate to complete the project. Revision histories from the wiki were gathered as evidence to support or refute students' claims. The instructor used a rubric (Appendix B) to evaluate the success of each student based on the information gathered

from the self-peer evaluations, wiki revision histories, and content of the wiki presentation.

Phase Four

A posttest followed completion of the project for analysis and identification of any differences as a result of the project. The posttest consisted of the same questions as the pretest and also provided students opportunity for reflection on the experience of completing the project including the collaborative experience and the impact they think the project may have on their future course work and teaching experience.

Student reflections on the *Innovations Mini-teach* project were gleaned from an end-of-semester assignment, the *Technology Journey Two* essay. Students used this opportunity to compose a written reflection of their growth over the course of the semester. Per the requirements for the assignment, students were asked to reflect specifically on the *Innovations Mini-teach*. This section was extracted from each student's assignment and compiled by section (face-to-face or online).

Phase Five

Following the *Innovations Mini-teach* project, focus group sessions with both sections were scheduled to provide deeper understanding from the student perspective. Groups were kept intact for these sessions. A small group of six face-to-face student volunteers met on campus for an hour-long recorded session. Six Online students met from a distance through a "course" set up in WebCampus specifically for conducting the focus group separate from their required course. The online session lasted one week. Participation in both focus group sessions was voluntary. Each session provided further

understanding and evidence for in-depth description and understanding of students' learning experience in each environment.

One semi-structured interview with the instructor of the course was scheduled post-instruction and focused on the design and development of the project for both learning environments as well as the experience of simultaneously facilitating the project in two environments.

Treatment of the Data

Data from the pretest and posttest were analyzed to determine learning outcomes related to the list of fourteen original technology innovations in each section of the course as a result of the *Innovations Mini-teach* project. The qualitative non-equivalent pretest-posttest design and statistical Analysis of Covariance (ANCOVA) was used to inform relationships between and among background characteristics and test items in terms of learning outcomes. The ANCOVA statistical test was selected because groups were intact prior to quasi-experimental intervention and this test can partially adjust for preexisting differences among students in the face-to-face and online sections. (Hinkle, Wiersma, & Jurs, 2003). The Statistical Package for the Social Sciences (SPSS) version 16.0 was used for quantitative data calculation and analysis.

Quantitative data complemented qualitative sources of data collection and analysis affording triangulation of research results. All qualitative data including open-ended responses to the pre and posttest, email records, discussion posts, *Technology Journey Two* essays, and transcripts from focus groups and final interview with the instructor were coded using HyperRESEARCH version 2.8 qualitative analysis software.

Guided by the research questions for the study, codes were developed and used for analysis and data reduction of data sources. Codes were revised throughout the process and categorized to identify themes. A total of 30 codes were used to analyze the data and were categorized into the following main comprehensive topics: learner characteristics, learning environment, instructor roles and strategies, collaboration and communication, and reflection.

Comprehensive development of results pertaining to the overall similarities and differences between the two learning environments under investigation involved a final triangulation and end analysis of all data. This included re-examination of quantitative and qualitative data sources in addition to field notes compiled over the course of the semester detailing the development of the project in each section of the course throughout the spring 2009 semester.

CHAPTER 4

RESULTS

This study was conducted to investigate the similarities and differences between an online and face-to-face version of an undergraduate course for elementary teacher candidates titled, *Preparing Teachers to Use Technology*. Specifically, the common course project, *The Innovations Mini-teach* was the focus of the investigation.

Research Questions

The study sought to answer the following research questions related to the *Innovations Mini-teach* project in both face-to-face and online sections of the course:

1. What are the similarities and differences between face-to-face and online versions of the *Innovations Mini-teach* as it was orchestrated in an introduction to educational technology course for teacher candidates?
2. What is the nature of the learning experience involved in the *Innovations Mini-teach* project implemented in the face-to-face section?
    a. Can the project be modified to make it viable in an online environment?
    b. What accommodations are necessary to implement the project without synchronous face-to-face interaction? How does this impact the learning experience?
    c. Are there differences in learning outcomes resulting from the face-to-face versus the online section of the course?

The *Simultaneous Triangulation* model of mixed methods research design afforded empirical, descriptive, and theoretical analysis of qualitative and quantitative data collection for the study (McMillan, 2008; Plano-Clark & Creswell, 2008; Reiser & Dempsey, 2007). In accordance with this model, various forms of data were collected and analyzed throughout the research process including: the Learning Module, Interest Form, Feedback Survey, Self-Peer Evaluation, and Evaluation Rubric (Appendix B); the Pretest and Posttest (Appendix C); the *Technology Journey Two* essay reflection essay; observation field notes, WebCampus Discussion Forums and Email Records; focus group sessions (Appendix D); semi-structured instructor interview (Appendix E); and student contributions to the *Innovations 09 Wiki* (Appendix B).

Participants and Demographic Data

Students enrolled in the course during the Spring 2009 semester were asked to participate in the study. The face-to-face section had 24 undergraduate students and the online section had 22 undergraduate students who agreed to participate. The same instructor taught both versions of the course simultaneously. Students in both versions of the class held similar class standing; the majority of students were sophomores or juniors at the beginning of the spring 2009 semester. Students in both sections were mostly female Elementary Education majors or pre-majors. Students in the online class were asked how many online classes they had taken prior to enrolling in this course for the spring 2009 semester. Most students reported having little prior online coursework experience with 41% of online students reporting no prior experience and 39% of online students reporting only one to three prior courses taken online.

Table 1. *Student Demographics Spring 2009*

Characteristics		Face-to-Face (n=24)	Online (n=22)
Gender	Male	1	2
	Female	23	20
Class Standing	Freshman	4	3
	Sophomore	9	5
	Junior	7	9
	Senior	4	5
Major	Elementary	14	15
	Early Childhood	3	2
	Elementary Special Ed.	5	0
	Other	2	5
Previous	10 or more	N/A	2
Online Course	7 to 9		0
Experience	4 to 6		3
	1 to 3		8
	0		9

Research Question One

What are the similarities and differences between face-to-face and online versions of the *Innovations Mini-teach* as it was orchestrated in an introduction to educational technology course for teacher candidates?

The instructional methods and materials used to introduce and facilitate the project were slightly different for each section. The project was introduced in both sections of class during the second week of instruction. For the face-to-face section of the course, classroom instruction included the use of PowerPoint, lecture, and discussion. WebCampus was used as a supplement to face-to-face instruction and out-of-class communication. For the online section of the course, the instructor utilized WebCampus to introduce and facilitate the project. The learning module (Appendix B) was developed to introduce and explain the background of the *Innovations Mini-teach* project. In addition to the learning module within WebCampus, students were directed to a podcast developed by the instructor to introduce and explain the project. Students in both face-to-face and online sections of the course accessed the provided Self-Peer Evaluation (Appendix B) and Evaluation Rubric (Appendix B) used for the project within WebCampus. WebCampus email, chat, and asynchronous discussion tools were used for communication and interaction between and among students and the instructor of the course.

The free version of the online collaborative service, PBworks (formerly PBwiki), was used as the platform for developing the *Innovations Mini-teach* collaborative project in each section of the course. The front page (Appendix B) provided an entry point from

which students in each section could access and collaboratively construct the site. Here, students were provided with specific step-by-step instructions for how to join the wiki and begin creating their individual pages for the project. The Model Wiki- Google Docs (Appendix B) was provided for each class to use as a model in addition to the Innovations 09 Instructions page (Appendix B) detailing exactly what content and information was required for the project.

Interest Form

After introducing the project in each class, the instructor asked each student to complete an electronic interest form (Appendix B) to learn about their prior experience with a list of fourteen technologies. The list included wikis, video conferencing, blogs, social bookmarking, smartboards, podcasting, Google Earth, Voice Thread, screencasting, electronic gradebooks, Google Docs, online photosharing, RSS feeds, Skype, WebQuests, special needs adaptations, and listservs. Students rated their prior experience with each technology on a scale from one to five, starting with "1. I don't know what this technology is" on the lowest end to "5. I'm a pro with this technology" on the highest end of the scale. See Appendix F for the face-to-face and online section's summary chart displaying students self-reported prior experience with each of the fourteen technology innovations. Table 2 provides a brief summary of where students ranked their prior use on the scale from one to five. The majority of students reported that they were either not familiar with or had not used the fourteen technologies listed.

Table 2. *Average Self-Rating of Prior Use of Technology Innovations*

	Face-to-Face	Online
1= I don't know what this technology is	55.88%	54.81%
2= I know what this technology is, but I haven't used it	23.77%	27.54%
3= I have had some experience with this technology	14.46%	9.09%
4= I'm pretty good with this technology	4.17%	7.22%
5= I'm a pro with this technology	1.72%	1.34%

After rating their prior experience with the technology innovations listed, students were asked to select four of the technologies that they would like to learn more about. Students also provided additional information about their prior overall technology comfort and skill. Students self-ranked overall comfort, experience, and skill using technology on a similar scale from "1. I have very little experience using technology" to "5. I'm a technology pro and like new challenges". Table 3 provides a summary of these results. The majority of students in both sections indicated that they had very little or only basic prior experience using technology overall. The information students provided in the Interest Form was used by the instructor to form ten collaborative groups in each class for the assignment. Students were paired with an innovation that they had little or no previous experience with. In some cases, students with higher levels of self-rated technology skill and expertise were paired with more complex innovations and/or with students reporting very little prior technology experience.

Table 3. *Students' Self-Rated Overall Comfort, Prior Experience, and Skill with Technology*

	Face-to-Face	Online
1. I have very little experience using technology.	12.50%	4.55%
2. I have some basic experiences and skill using technology.	37.50%	50.00%
3. I am fairly comfortable with technology and have pretty good skills.	29.17%	40.91%
4. I am confident with technology and have good skills.	20.83%	0.00%
5. I am a technology pro and like new challenges.	0.00%	4.55%

As a result of the information gathered from the Interest Form, the instructor selected ten technologies to be covered in each class during the spring 2009 semester. Like previous implementations of the *Innovations Mini-teach* project in the face-to-face section of the course, new technologies were added and older technologies were removed from the previous semester's list. This is done in an attempt to keep up with rapidly changing technologies and their educational applications. Technologies presented in the face-to-face and online sections of the class varied slightly. Table 4 lists the innovations selected for each course in chronological order as they were scheduled for the spring

2009 semester in each section of the course. New technologies that had not been presented in previous iterations of the project are noted with an asterisk.

Table 4. *Chronological List of Presentations by Course, Spring 2009*

Face-to-Face Section	Online Section
Wikis	Wikis
Blogs	Blogs
Smart Boards	Smart Boards
Social Bookmarking	Video Conferencing
Google Earth	Google Earth
Voice Thread*	Voice Thread*
Podcasting	Podcasting
Screencasting*	Screencasting*
Video Conferencing	Social Bookmarking
WebQuests*	Electronic Gradebooks

Note. *= new technology for the spring 2009 semester

Weekly group presentations were scheduled and began during the fourth week of the semester. In the online section of the course, one group was scheduled to present per week for a period of ten weeks (excluding the university-scheduled spring break). Online presentations were based on the use of the *Innovations Wiki* as a platform. Groups collaboratively prepared their wiki and began their asynchronous presentation on the

Wednesday of their presentation week through Friday. During this three-day window for online presentations, students went to the wiki to learn about the technology innovation topic for the week. Students reviewed the content of the site and the resources provided. Most all online presentations posted videos and tutorials explaining use of their innovations as well as creating links to additional sites supporting educational use of the technology in the classroom. At the bottom of each wiki page, students were invited to leave comments and/or ask questions of presenters. Moreover, students were asked to follow the link to complete the Feedback Survey (Appendix B) for each presentation.

In the face-to-face section, presentations were scheduled in a similar fashion. Typically, one group was scheduled per week to present their innovation within the first ten to fifteen minutes of the class period. In some instances, two groups were scheduled to present in one week, but never during the same class period. Presentations in the face-to-face section consisted of a "live" collaborative presentation of their wiki followed by a hands-on experience or demonstration when available and concluded with an opportunity for students to ask questions. The instructions for completing the project were the same for both sections of the course (Appendix B).

Feedback Surveys

Students in both sections of the course completed online Feedback Surveys (Appendix B) after each presentation. These feedback surveys were required and tracked using student identification numbers to allot points for completed surveys. Students provided feedback to presenters based on their ability to deliver an effective, well-organized and focused presentation in both sections of the course, the presenter's ability

to answer questions and manage discussion, as well as the usefulness of the resources that were provided. The majority of students in both classes reported that the presentations were effective and the resources provided were useful. Students in both sections were also asked to list at least two things they had learned. The majority of responses focused on newly acquired information about the technology itself for personal and classroom applications. Students were also able to provide optional additional comments at the end of the survey. Tables 5 and 6 summarize data gathered from student Feedback Survey responses from both sections of the course.

The overwhelming majority of the additional comments provided in the face-to-face section of the course pertained to the live presentation and issues of eye contact, volume and intonation of presenter's voices, quality of hands-on learning experiences, and disparities in presenter's knowledge and expertise with the technology they presented. The following additional comment exemplifies the type of feedback face-to-face students provided: "The presenters were always looking at the projection screen. Also, while one was speaking, the other was hidden behind the computer screen. Both presenters should be visible throughout the presentation."

In the online section, however, students provided additional comments related to the layout and content of the wiki presentation and the presenter's ability to engage learners online through effective organization, display, and selection of resources used to explain their technologies (e.g. videos, examples of classroom use, tutorials, etc.). For example, one online student simply stated, "Your page was organized very well and explained the material clearly."

Table 5. *Peer Feedback Survey Summary on Effectiveness of Innovations Mini-teach Presentations*

Criteria	Course	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Organization of Materials	F2F	58.85%	34.93%	6.22%	0.00%	0.00%
	Online	71.04%	26.70%	1.36%	0.90%	0.00%
Clear and Thoughtful Focus	F2F	58.85%	35.41%	4.31%	1.44%	0.00%
	Online	72.40%	26.70%	0.90%	0.00%	0.00%
Discussion	F2F	55.50%	38.28%	5.74%	0.48%	0.00%
	Online	63.35%	21.72%	14.93%	0.00%	0.00%
Overall Engaging Learning Experience	F2F	58.85%	34.93%	5.74%	0.48%	0.00%
	Online	71.04%	26.70%	1.36%	0.90%	0.00%

Table 6. *Peer Feedback of Resources Presented in Both Learning Environments*

How helpful were the resources presented in informing your knowledge of the technological innovation and its application(s) for teaching and learning?					
Course	Extremely Helpful	Mostly Helpful	Neutral	Somewhat Helpful	Not Helpful At All
F2F	54.55%	40.67%	3.83%	0.96%	0.00%
Online	66.52%	29.41%	2.26%	1.81%	0.00%

Each wiki page included a comments section where students could pose questions to presenters in both sections of the course; however, face-to-face presentations concluded with an opportunity for students to ask questions. No questions were asked of presenters in the online section of the course using the comments section of the wiki or the discussion board in WebCampus. Follow-up questions and discussions were common in the face-to-face section and followed each presentation; presenters would field questions, often with the instructor supplementing and elaborating on the topic with additional information.

Innovations Mini-teach Resources

In addition to answering questions about the technologies themselves, students were given opportunity to provide feedback and information related to their use of the resources provided to them for the *Innovations Mini-teach* project including the *Innovations Mini-teach* Learning Module, directions in assignments, Help! discussion forum, *Innovations Mini-teach* Questions discussion forum, instructor's podcast, model wiki on Google Docs, PBwiki help resources, *Innovations Wiki* sites from previous semesters, and group members. Students ranked their use of each source listed as very helpful, helpful, unsure, not helpful, or didn't use. Not surprisingly, students in the face-to-face and online sections of the course reported different resources as most helpful. Students in the face-to-face course rated the directions and rubric posted in the assignments section of WebCampus, previous semesters' wiki sites, and their innovations partners as the top three most helpful resources they used. Online students, however, rated the *Innovations Mini-teach* learning module, directions and rubric posted in the

assignments section of WebCampus, and the model wiki on Google Docs as the three most helpful resources.

During focus group sessions, students in both sections communicated the simple step-by-step instructions and evaluation rubric coupled with the model wiki and students' projects from previous semesters were useful in that they helped students structure and organize the content of their wikis. Moreover, students in the face-to-face focus group pointed to the first *Innovations Mini-teach* presentation on wikis as a helpful resource. Not only did they feel more confident to use the wiki after learning about it, but also saw a successful model of what their wiki project and presentation should entail. As one face-to-face student noted, "Once I saw the first group explain what a wiki was, like, half of my fears just went away…. because I had no idea really what to do or what to expect until I saw theirs".

In contrast, the first presentation in the online section of the course was notably different. In fact, it almost did not happen at all. The instructor explained in the follow-up interview that the students in the online section simply let their presentation date come and go without doing anything for the project or asking any questions. She took the initiative to provide substantial scaffolding and support to get this group going and postponed their presentation date to the following week- doubling up presentations within the same week. With additional support, these students developed their presentation quickly and received positive feedback from students communicating that they better understood how to use the wiki and felt more prepared to complete their own for the

project. It was the instructor's belief that had she not reached out to these presenters, they would not have done anything for the project.

It is reasonable to conclude that the success of the first presentation, purposefully assigned to cover wikis, was critical to the development of the project in both environments and served as a useful model and resource for subsequent presentations. In both sections of the course, the instructor used what she knew about students from the first weeks of the semester in addition to the information they provided on the Interest Form to purposefully select motivated students to ensure that the project started with success. Her inclination was clearly correct for the face-to-face students she selected, however, *reading* students in the online environment presents a challenge.

Communication and Collaboration

Students in both learning environments expressed somewhat differing views related to the collaborative experience they had completing the project in the different learning environments. Based on students' open-ended responses to posttest questions asking for feedback about the project, students in the face-to-face section were far more receptive to the collaborative nature of the assignment than online students were.

No structured instructional time was given to students in the face-to-face class in order to prepare and plan their presentations. Still, most all of the students in the face-to-face section reported that the experience of working in a group was positive and contributed to their overall success on the project. Face-to-face students who participated in the focus group session explained that they were able to complete the project meeting for a short time before and/or after class. One pair explained that they each researched

their technology innovation independently, and would discuss their progress briefly before and after class. They each assumed responsibility for individual sections of the wiki and live presentation. Self-peer evaluations revealed that development of the wiki was distributed equally among group members in the face-to-face section. Instructor evaluations for each project largely reflected the same conclusion, often praising students for their ability to work effectively as a group. Student feedback surveys and instructor evaluations reported only a few instances of imbalanced presentation skills and/or participation in the live presentations.

Students in the online section of the course expressed that the collaborative experience was what they enjoyed the least about the project, often citing reasons related to their learning preferences and time constraints. For example, one online student commented, “I didn’t like working in groups, I took an online class because I don’t have time to meet with people, so the groups were a little bit of a nuisance”. This was echoed in other students’ responses reporting that it was difficult to coordinate schedules so that they could “meet up” to complete the project. The data from student feedback about the project revealed that most online students thought it was necessary to meet face-to-face in order to successfully complete the project.

Additionally, some online students reported difficulty contacting and communicating with group members. This proved to be problematic and negatively affected the successful completion of the project for some. Self-peer evaluations from one online student in particular revealed that after unsuccessful attempts to contact her group, she took the initiative to complete the project independently. One of her group

members surfaced at that point and made minimal contribution to the site, while the third group member never participated in the project to add to her group's wiki or provide feedback to other presenters.

A few students reporting positive experiences collaborating online pointed to their ability to develop and agree upon a clear plan and to delegate responsibilities. These students reported using email as the primary method of initial communication and then adding their information individually to the wiki. These students found online collaboration using the wiki effective, meaningful, and were content with the overall experience.

Research Question Two

What is the nature of the learning experience involved in the *Innovations Mini-teach* project implemented in the face-to-face section of the course?

Students in the face-to-face section of the course reflected on their learning experience completing and participating in the *Innovations Mini-teach* project over the course of the spring 2009 semester. Most students reported positive reflections on the project and the impact the project had on their personal growth in use of technology as well as their changing perception of themselves as teachers who will teach with technology.

Whenever possible, students were encouraged to include some hands-on experience using their technology in their presentation. Although there were a few technical problems, most presentations successfully incorporated a meaningful hands-on learning experience for the class to use technology. For example, students were able to

use Google Earth as a portion of the in-class presentation while future classroom applications were discussed. Many students reported that this experience, like others, was critical to their understanding of the technology, but that they wanted more practice beyond what the ten to fifteen minute time frame allotted.

Students acknowledged that they were able to learn about a variety of technological tools in addition to those covered in class by the instructor. They found the *Innovations Mini-teach* presentations effective at opening their eyes to new technologies and innovations and their specific use in the classroom.

When asked if the project would have been as meaningful if the instructor had covered all of the innovations, students in the focus group session indicated that it would not have been nearly as meaningful for a number of reasons. One student explained, "We're all coming from a similar place and we all kinda see these technologies in a different way than she [the instructor] does, and so maybe we're more excited about exploring them and finding things that we can actually see…". Students saw this as a meaningful opportunity to learn from their peers and pull from each other's perspectives and experience acknowledging the meaningful experience of being exposed to varied teaching styles represented through the project. Students had the goal of acquiring meaningful information related to the technology presented as well as learning from the models exhibited by their peers.

Reflective responses in the face-to-face section were balanced between use of technology and the experience of teaching with technology. Because students in the face-to-face section prepared a live presentation to teach the class about their assigned

technology, they expressed that the teaching experience was as valuable as learning about each technology was. For many students, this was their first time teaching in front of their peers or in front of a large group of people, let alone teaching with technology.

Many students acknowledged that the project helped them to realize the amount of time and preparation that goes into developing an effective presentation and learning experience. In addition, some learned that although they planned and prepared what they wanted to say, once they were in front of the group, it did not come as easily as they rehearsed. One student noted, "I need to take note that I don't look uncomfortable up there, because what I'm teaching won't come off as important if I can't present it confidently". Other students noted the importance of body language, volume and tone of voice, and eye contact as areas of future growth. Issues related to the dynamics of the live presentation were corroborated in face-to-face students feedback surveys as well.

In addition, students in the face-to-face section found the collaborative experience was positive and attributed to their successful completion of the project. Self-peer evaluations and reflections evidenced that students were able to take full advantage of the constructive nature of the collaborative experience, drawing from each other's expertise and prior experience. One face-to-face student noted the importance working in a group had on the learning experience stating, "I learned a lot more working with Anna* than I would have if I had worked by myself".

Students in the face-to-face section of the course saw the nature of the learning experience as one in which they were able to effectively learn about a variety of technological innovations and their applications to future classroom instruction. In

addition, students saw this as a meaningful collaborative experience in which they could effectively learn from each other to reach a common goal.

Research Question 2a

Can the project be modified to make it viable in an online environment?

Students in the online section of the course reflected on their learning experience completing and participating in the *Innovations Mini-teach* project over the course of the spring 2009 semester as well. Most students reported positive reflections on the project as a whole but some were less satisfied about specific aspects of the project as it was implemented in the online section.

Most online students noted specific examples of how the project influenced their personal and professional growth in use of technology as a resource for future teaching. However, because of the nature of the presentations in the online learning environment, no students pointed to the project as an opportunity to gain experience teaching with technology. It was evident in student reflections that online students viewed the project as a presentation of and not teaching of their assigned innovation. This was the most notable difference in the nature of the learning experience in both sections of the course. Whereas students in the face-to-face section experienced and communicated a change in their perception of themselves as teachers who will teach with technology, online students seemed to reflect only on their projected use of the technologies covered in the *Innovations Mini-teach*.

Far fewer online students saw the collaborative learning experience as having a positive impact than students in the face-to-face section. Although the wiki as a tool is

meant to facilitate collaboration particularly in an online learning environment, most online students indicated that the collaborative part of the project was the one component they were least satisfied with. Many suggested that working in online groups for the project should be optional because it was too difficult to work together from a distance. In fact, many students decided to meet face-to-face in order to complete the project rather than to take advantage the wiki platform to support collaboration. The majority of online students did not seem to understand or appreciate the collaborative component of the project; consequently, there was a far lesser degree of interaction and development of the online community surrounding the project. Students in this class had little prior online learning experience, and collaborating online was not a natural process. Because of this, it is evident that online students need a much higher level of instructional support for ways to collaborate online rather than resorting to face-to-face meetings to complete the project.

Results suggest that the project itself can be modified, as evidenced in student and instructor reflections on the success of the project. This first iteration of the project in the online environment informed how the project will develop into a more successful model of online collaboration in future semesters. During the follow-up interview, the instructor confirmed that she would keep the *Innovations Mini-teach* as a component of her online course; especially after seeing evidence that students in the online course found the experience meaningful and that the vast majority of them achieved the learning outcomes she desired as a result of the project. She noted that the "trial by fire" method is often useful to inform what works and what does not work and that she will go into the next

semester equipped with the lessons learned from this first experience to improve for the next semester. She plans to keep many components of the project as it was implemented this time around, but will simplify the overall process and look closely at the purpose of the project in each learning environment.

Research Question 2b

What accommodations are necessary to implement the project without synchronous face-to-face interaction? How does this impact the learning experience?

The first necessary accommodation for implementing the project in the online setting was addressing the question of how to introduce the project in the online setting. Because the project was introduced in the face-to-face section during scheduled class time, the instructor felt that she was able to maintain tighter control of whether the information was received and understood in this setting. In the online learning environment, however, she relied on students to read the provided learning module presenting the same content in a text-based form. She explained that she put a lot of effort into the development of this resource and applied her experience with the project in the face-to-face setting to anticipate student misunderstandings. Because of this, she thought that the learning module would be the most useful resource for online students. Her expectation was supported by students' feedback related to the most helpful resources- online students rated the learning module as most helpful of all resources provided.

However, once the project was introduced, the instructor saw little evidence that the majority of online students had actually read the learning module detailing the project,

but rather that they had simply gone immediately to the assignments section for information where they found only the self-peer evaluation form and evaluation rubric. After fielding the same questions from concerned and confused students in numerous emails, she quickly developed some additional resources with online students in mind. She created a discussion forum within WebCampus specifically for *Innovations Mini-teach* questions as well as a podcast further explaining the project. She noted that these resources were effective at alleviating student concerns as evidenced in the drastic drop in emails after those resources were posted.

Although students did not rate the additional resources posted-- the podcast and discussion forum-- as helpful as the original resources the instructor provided, it is reasonable to expect that students might not have read or understood the explanation of the project from the Learning Module alone when the project was first introduced. The additional resources likely offered support for their developing understanding of the project in combination with the learning module and assignment resources. In addition, students may not have been accustomed to first reading the posted Learning Module near the beginning of the course, each providing background information and instructions directing students to seek additional information from the assignments section. This procedure was likely learned over the course of the semester as students were provided with weekly learning modules and assignments in this manner.

The second notable accommodation relates to the ways students communicate and collaborate in the online learning environment in order to complete their projects. As noted previously, students in the online learning environment explained that the

experience of collaborating online was not something that they enjoyed and they would rather have done the project independently. However, a few online students were successful at collaborating from a distance, and many face-to-face students indicated that they followed a similar process of working together outside of class. These successes resulted from a shared and agreed upon procedure for completing the project in which, as one online student put into words, "everyone was comfortable with their individual task(s)". The process of collaborating from a distance, as explained by students in both focus groups began with delegating and accepting responsibility for individual tasks, completing independent research related to their individual tasks, adding their own information to the wiki, and refining others' work with additional resources or information found.

In addition, students in the online class were responsible for monitoring discussion and answering questions related to their innovation using the comments section located at the bottom of their wiki pages. Responses and feedback about presentations was frequent in the online class, but typically focused on the quality of the presentation rather than questions related to the technology innovation that was presented. In fact, very few questions were asked of presenters about their technologies. The face-to-face students frequently asked questions following presentations that contributed to their understanding of the innovation and its classroom application.

Students in the face-to-face section appreciated the hands-on learning experiences with the technological innovations presented in class. While not all of the presentations included a hands-on component, most provided at least a live demonstration. Students in

the face-to-face were strongly encouraged to provide hands-on experience and/or live demonstration as part of their presentations, but online students were not encouraged to incorporate these kinds of activities to the same degree. This may have attributed to online students viewing the project as more of a presentation rather than a teaching experience.

Students in the online section of the course communicated that they would have appreciated more hands-on learning experiences rather than being left to their own devices to explore the technologies that they were exposed to via the *Innovations Mini-teach* wiki presentations. Online students most commonly reported smart boards as a technology they needed more hands-on experience with. The issue of hands-on learning poses a serious obstacle for the online learning environment, particularly for technologies like smart boards that students do not have ready access to from a distance. If nothing else, students should be informed of where they can access and practice using these kinds of tools (e.g. local libraries and/or schools). However, the vast majority of technology innovations covered were Web 2.0 technologies freely available on the WWW. Because of this, online students will likely require more facilitation and support from the instructor to generate ideas to incorporate hands-on learning experiences from a distance as part of their online presentations.

Research Question 2c

Are there differences in learning outcomes resulting from the face-to-face versus the online version of the course?

Knowledge-Based Tests

Students in both sections of the course completed a pretest to measure prior knowledge of the list of fourteen innovations from the interest form as well as a posttest made up of the same questions following the project. Both the pre and posttest consisted of twenty-four questions-- sixteen multiple choice and eight true false-- designed to measure students' basic knowledge and skill in the use of the fourteen technology innovations from the Interest Form. Descriptive and inferential statistics were used to compare posttest mean scores for both sections of the course to determine if the learning environment- face-to-face or online- had an effect on learning outcomes related to the *Innovations Mini-teach* project as it was implemented in both versions of the course. Table 7 summarizes the mean scores and standard deviations for both the pretest and posttest in both versions of the course. The sample sizes for the pretest and posttest in the face-to-face section of the course are not equal due to attrition.

Data from the pretest and posttest were analyzed using the quantitative analysis of covariance (ANCOVA) test with the alpha level set at 0.05. The dependent variable for this study was the posttest scores and the independent variable for this study was the course (face-to-face or online). The pretest scores were used as a covariate for analysis. The summary of the results from the ANCOVA between groups test is presented in Table 8.

The results of this test revealed that there was no significant difference between mean pretest scores for students in the face-to-face section and students in the online section. However, differences in mean posttest scores between the two sections of the course were statistically different; $F(2, 42)= 8.60$, $p = 0.005$. Students in the face-to-face

section of the course scored significantly higher on the posttest than students in the online section.

Table 7. *Summary of Correct Responses on the Pretest and Posttest*

	Pretest			Posttest		
Course	n	SD	Mean	n	SD	Mean
Face-to-Face	24	16.12	32.67	23	11.57	67.00
Online	22	11.57	32.58	22	7.77	58.52

Table 8. *Summary of ANCOVA Between Groups on Posttest with Pretest as the Covariate*

Source	df	Sum of Squares	Mean Square	F	*p*
Covariate (pretest)	1	354.82	354.82	3.87	0. 56
Between Groups	2	789.51	789.51	8.60	0.005
Error	42	3854.33			
Corrected Total	44	5016.90			

Note. *$p < 0.05$

Reflection on the Project and Implications for Future Use of Technologies

Students in the online learning environment did benefit from working on the project. Although this is not reflected in the statistical results from the pretest and posttest, the benefit the project had was evidenced in their reflections on the project and

their growth over the course of the semester as described in their *Technology Journey Two* essays. For example, one student from the online section noted, "Video conferencing in the classroom can be done by showing guest speakers or by communicating with other teachers and classrooms. It is something I will definitely keep in mind for my future classroom."

Students in both sections expressed similar thoughts related to the *Innovations Mini-teach* project in their reflections. Many students in both sections acknowledged the impact the project had on their view of technology in their *Technology Journey Two* essays. Students felt that the project was meaningful in that they were able to effectively learn about a variety of technological innovations and their educational applications. Both sections acknowledged that they planned to use these technologies in their future classrooms citing specific examples, many of which were not related to the innovations that they presented themselves. Some students distinguished specifically between their use of the technologies covered for personal and professional use.

Although students in both sections credited the experience of completing the project to transforming their beliefs about technology use in education, neither group realized that the wiki could be used as a resource beyond the scope of the semester. This is evidenced in a number of students from both sections reporting that they plan to draw on the lessons they learned from the wiki presentations because they printed out the pages and resources from the semester. When asked if they were likely to use the wiki as a resource for future coursework, field experiences, or in their future classrooms, students participating in the focus group sessions were unsure if it would be available to them.

Once they realized the permanence of their work on the project, like those presentations from previous semesters, they expressed gratitude and relief that they would have access to a reliable resource that they worked to develop.

Summary

This first implementation of the Innovations Mini-teach project in the online learning environment provided valuable insight into how the project fits into the online setting. The nature of the learning experience proved to be both similar and different in each learning environment. Perhaps the most notable results from this study reveal that the project can be successful in both face-to-face and online learning environments, but they don't necessarily need to look and act the same. This first iteration of the project in the online environment equipped the instructor with the knowledge and experience to better meet the needs of students completing the project in both sections of the course. Conclusions and recommendations for future implementations of the project in both learning environments are described in greater detail in Chapter 5.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This study sought to compare face-to-face and online versions of the same educational technology course for elementary teacher candidates. The intent of this study is not to generalize specific results to the theoretical knowledge base. However, the overall results of the study corroborate prior research comparing learning in face-to-face versus online learning environments supporting the growing body of research that the two learning environments are both similar and different, and that they need not be identical (Bernard et al., 2004; Lockee et al., 1999; Turoff et al., 2004). In their book detailing effective strategies for online learning, Palloff and Pratt (1999) describe the relationship between face-to-face and online learning environments:

> "Successful online distance education is a process of taking our very best practices in the classroom and bringing them into a new arena. In this new arena, however, the practices may not look exactly the same." (Palloff & Pratt, 1999, p. 6).

The instructor used her experience facilitating the project in the face-to-face setting to modify the *Innovations Mini-teach* for the online version of the course. Whenever possible, instructors should use what they know about the strengths of teaching and learning in the face-to-face environment to inform and build online learning experiences to apply similar strengths (Bernard et al., 2000; Wuensch et al., 2008). The instructor had implemented the *Innovations Mini-teach* in her face-to-face course for

three semesters- adjusting the project slightly from the original pilot of the project in the face-to-face setting at another institution- but had never implemented the project in the online section of the same course. In order to move the project online, she made use of her experience teaching the course and facilitating the project in her face-to-face classes to design an online learning experience that built on the strengths and successes she had experienced in the face-to-face setting.

The results of this research study confirm that the nature of the learning experience in the face-to-face and online settings were very much the same in some ways, but very different in others. The organization and structure of the learning task required for the project was similar for both sections of the course-- students in both sections completed the project in a similar fashion and utilized many of the same resources.

Prior research comparing online and face-to-face learning environments, particularly focusing on success factors of online learning, point to the importance of using multiple tools to support learning (Menchaca & Bekele, 2008; Swan, 2004; Tallent-Runnels et al., 2006; Zhao et al., 2005). The findings of this study are consistent with these prior accounts that online students needed additional resources using varied tools and strategies to support understanding, differentiate instruction, and facilitate feedback from the instructor. By employing the use of additional resources, the instructor was able to effectively support online students learning goals and minimize confusion without face-to-face interaction.

Online students need time to adjust to new technologies and procedures with which they are not accustomed to (Dabbaugh, 2001; Moallem, 2003). This was clearly

the case for students participating in this study. Most online students reported having little prior experience with the online learning environment. This undoubtedly played a role in the ways they organized their time and likely contributed to their confusion and apprehension in the beginning. As the semester progressed, online students seemed to become more efficient learners in the online context- even rating the learning module as the most helpful resource they used for the *Innovations Mini-teach* project. This supports the notion that not only do online students need time to adjust, but that students who have a base level of technology expertise are more efficient and successful online learners (Lambert & Cuper, 2008; Menchaca & Bekele, 2008; Swan, 2004; Tallent-Runnels et al., 2006; Zhao et al., 2005).

Additionally, prior research related to the success of online learning encourages the development of the online learning community to foster meaningful collaboration and communication (Beyerbach et al., 2001; Harasim, 2000; Johnson, 2001; Jonassen et al., 1995; Lock, 2002; Rovai, 2002; Swan, 2004; Tam, 2000). The collaborative experience for students in both learning environments was possibly the most distinguishing factor between both sections of the course.

Face-to-face students reported positive experiences collaborating on the project, both face-to-face and from a distance. Face-to-face self-peer evaluations and instructor evaluations illustrated the success of their collaborative efforts. In contrast, many online students reported that the collaborative nature of the project was what they enjoyed the least, and, for some online students this was detrimental to their performance on the project. Many online groups felt it was necessary to meet face-to-face in order to

complete the project, and did not take advantage of the collaborative affordances the wiki provided. This provides evidence that students were either uncomfortable collaborating from a distance and/or they did not know how to approach collaboration from a distance. They chose to fall back on what they knew about collaboration and working in a group--and that required face-to-face interaction. These results support prior research on collaboration in online learning environments suggesting that online students need specific instruction and guidance for how to communicate and collaborate online (Johnson, 2001; Moallem, 2003).

The results of the project also elaborated on prior research related to technology in teacher education. Student reflections related to the *Innovations Mini-teach* and the course as a whole provide support for the single educational technology course as an important experience for students early in their programs (Beyerbach et al., 2001; Hargrave & Hsu, 2000; Kay, 2006, Wetzel et al., 2008-2009).

The *Innovations Mini-teach* was a successful addition to the online learning environment in that it promoted change in the ways students viewed the use of technology in their future classrooms. Student reflections and projections to future use indicated that they understood the importance of being lifelong learners in order to stay current with the ever-changing technological tools for classroom application. In addition, students reported that they developed personal skills for professional application. In their reflections on the project, students provided evidence that they had moved beyond the use of technology innovations for personal use and began to formulate ideas for using technology in their future classrooms by citing specific ways they planned to integrate the

technologies covered in meaningful ways. This change supports prior research indicating that successful technology preparation in teacher education promotes more sophisticated and advanced use of technology rather than simply developing generic skills for personal use (Beyerbach et al., 2001; Lei, 2009).

Results suggest that the single technology course is effective in that it lays the foundation for technological pedagogical content knowledge (TPCK), but students come out of the class wanting more (Hargrave, Walsh, & Vannatta, 2001; Mishra & Koehler, 2006). Students in both sections of the course communicated that they wished the course would go on another semester and provide them with more advanced opportunities to develop their skills and experience teaching with technology.

Moreover, the success of the *Innovations Mini-teach* in both learning environments supports prior research stating that the best approach to helping teacher candidates to learn about Web 2.0 technologies specifically is to provide learning experiences in which they learn with Web 2.0 technologies (Albion, 2008; Lei, 2009). Students accounts and improved scores from pretest to posttest provide evidence that students in both learning environments were able to effectively learn with and learn about the various Web 2.0 technologies covered for the project. Simultaneously learning with and learning about Web 2.0 technologies provides students with a better understanding of learning new technologies for the first time and provides them with the confidence to continue to do so (Albion, 2008).

Recommendations for Future Iterations of the Innovations Mini-teach

It is important to take the lessons learned from this pilot of the project in the online setting and apply them to the growing body of knowledge surrounding the project so that the experience in both environments can become better, more efficient, and more effective. Based on the current study's findings, I have the following recommendations for future implementations of the *Innovations Mini-teach* project in the online and face-to-face learning environments:

1. Reexamine How to Introduce the Project in the Online Learning Environment

Without doubt, one of the most pressing issues to be resolved for the next implementation of the project, particularly in the online environment is how and when to introduce the project. Students in the face-to-face section clearly benefitted from the real-time introduction of the project and the opportunity to ask questions and receive immediate answers to clarify anything they were uncertain about. Online students had a difficult time inferring meaning and understanding of the project from the initial resources they were given in the form of the text-based learning module and resources posted in the assignments section (evaluation rubric and self-peer evaluation).

The resources provided (podcast and discussion forum) to accommodate online students misunderstanding and confusion employed additional tools and seemed to alleviate many online students concerns. These resources were successful at accommodating and scaffolding student understanding of the project. Now that they have been developed, these resources should undoubtedly be made available to students

in addition to the text-based resources from the time the project is introduced. In addition, the instructor should actively promote the use of and motivate students to utilize the resources provided-- research suggests that this instructional support is critical to developing student perceptions of resources and tools as user-friendly and supportive of their learning goals (Soong et al., 2000).

Because of the initial misunderstanding and confusion surrounding the project in the online class, the issue of when to introduce the project should also be considered carefully. The results of this first implementation of the *Innovations Mini-teach* in the online setting suggest that the introduction of the project in the online learning environment perhaps should occur later in the semester when students are accustomed to the learning environment and procedures. In addition, the project itself would most likely be better received later in the course after providing students with more time to interact and establish a greater sense of community.

2. *Explore the Use of Additional Tools, both Synchronous and Asynchronous, to Support Online Learners*

The initial confusion online student experienced from the introduction of the project using text-based resources was alleviated by adding additional resources. The addition of the podcast and discussion forum proved to be effective additions, but the instructor might also explore the use of synchronous tools as well. For example, the instructor could schedule online office hours each week using synchronous chat or video conferencing technologies to provide an opportunity for online students to ask questions and receive immediate answers. This would likely minimize confusion and reduce the

overwhelming number of questions in the form of emails to the instructor immediately following the introduction of the project.

Future iterations of the project in the online environment can make use of the lessons learned through facilitating the project in both the face-to-face and online environment. The instructor will be able to better anticipate and prevent student misunderstandings before they happen by developing and promoting resources for students to use throughout the process. Because many students emailed the instructor with similar questions and concerns and very few utilized the online discussion forum for questions; providing students with a frequently asked questions resource would likely be a useful source of information for students. This is an example of how the instructor could present students with an outlet for where to find help when they need it, which is critical to the development of problem-solving skills (Lei, 2009).

3. Promote Successful Collaboration by Providing Instructional Support

Students completing the project in both learning environments need instructional support for collaboration. The success of future implementations of the project, specifically in the online learning environment, will depend greatly on the successful development of the collaborative nature of the project in the online setting. Toward that end, the instructor should develop ways to monitor group interactions and intervene with suggestions for making the overall process more efficient and positive. For example, setting up common areas or discussion forums for groups to use will supply students with an avenue for collaboration and communication while providing the instructor with the ability to monitor group interactions. Instructor support will inevitably require technical

assistance as well as promoting the use of the wiki and other tools to facilitate online communication and collaboration. Enforcing the requirement for collaborative teams in both learning environments to develop a timeline and delegate responsibility will also support effective and efficient collaboration.

The lessons learned from a few groups who were successful at collaborating from a distance can be applied to support online collaboration for the next implementation of the project online. These groups reported initially communicating via email, agreeing upon specific tasks and responsibilities, executing their individual tasks, and then adding additional information and resources where needed-- no face-to-face meetings required.

4. Move Away From Exact Replication of Both Learning Environments

Just as the nature of the learning experience in both environments is both similar and different, so too should be the learning goals and resources for the project. Face-to-face student reflections revealed that the experience of teaching in front of their peers was as meaningful as learning about each of the technologies in class. They gained valuable insight and various strategies from watching and participating in other students' lessons. Future implementations of the project in the face-to-face setting should continue to support students to develop and reflect on their teaching skills through the project. Feedback in the face-to-face setting should, as was the case for previous semesters, provide students with information related to their skills as a teacher. Feedback about eye contact, volume, and tone of voice are important for face-to-face students, but not relevant for online asynchronous presentations. Continuing to video-record students in the face-to-face setting and providing them with a copy of their presentation will also

promote student reflection on one of their first experiences teaching. Additionally, these lessons could be used to provide future students with a model of what a good presentation entails.

Similarly, online students need to better understand and relate the goals of the project to not only learn about their assigned technology innovation, but also to teaching with technology. Providing support and direction for online students to understand that they are filling the role of teacher even though they are in the online setting will be important in their development of teaching strategies to effectively use and integrate technology. Just as face-to-face students are encouraged to incorporate hands-on experiences and demonstrations, so too should online students. This will likely require additional technical support and development of creative capacities, but will provide more transferrable learning skills for online students to teach with and learn about technology.

The initial group in the face-to-face section set the precedent for subsequent presentations in the class by successfully teaching students the purpose of and how to use the wiki. Students communicated that this first presentation was essential in developing their skills and providing them with the confidence they needed to approach their learning tasks. Because this model was so pivotal in the face-to-face setting, and online students did not benefit from a similar experience, changing the model wiki for the online course may be necessary to ensure that the project gets a successful start. Abandoning the current model on Google Docs and creating a successful instructional model about wikis would not only provide students with valuable knowledge and resources for future

teaching, but would also support the use of the tool for collaboration on the project. Moreover, introducing the use of the wiki through modeling would provide technical support for addressing common student questions including how to get started, how to gain access to the class wiki, and how to create a page.

5. Simplify the Overall Process of Data Collection

The tools and strategies used for data collection to investigate the first implementation of the project in the online setting provided valuable data and information related to the success of the project. However, it proved to be a lot of additional work-- a daunting reality reflected by the instructor in the follow-up interview indicating that she would quickly be overwhelmed with monitoring and collecting data using the same methods. Many of these data collection tools were separate from WebCampus and required additional steps to organize and record data within the courseware system. Overall simplification will be essential to streamline data collection for the purpose of facilitating the course in both learning environments to provide feedback and evaluation as well as to gather meaningful information for future research.

Recommendations for Future Research

Investigating the *Innovations Mini-teach* in the online learning environment was a necessary step to truly understand adaptability of the project. This study proved to be a valuable learning experience. Future research and further development of the *Innovations Mini-teach* project should continue to examine the similarities and differences in both learning environments. As technology develops so too will teaching and learning in both face-to-face and online learning environments.

The *Innovations Mini-teach* itself has come a long way since the project was first piloted in the face-to-face setting, but there is still a lot to learn. Research surrounding the project should continue to examine the nature of the overall learning experience in an effort to better understand the role of the project in both learning environments. Future investigations should examine ways to better accommodate student learning and facilitate collaboration in the online learning environment. Specifically, the use and impact of synchronous tools for online communication and collaboration should be explored. In addition, investigating the nature of the learning experience surrounding the *Innovations Mini-teach* for students with varied levels of prior experience with technology and with teaching would likely inform the ways the project is structured and facilitated for students at different levels. Researchers should also analyze the role the *Innovations Mini-teach* has on transforming both face-to-face and online students' beliefs about the role of technology in education and development of 21st Century teaching and learning.

APPENDIX A

INFORMED CONSENTS SPRING 2009

FACE-TO-FACE STUDENT

ONLINE STUDENT

INSTRUCTOR

Face-to-Face Student

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

INFORMED CONSENT
Department of Curriculum and Instruction

TITLE OF STUDY: A Comparison of Face-to-Face and Online Learning Environments to Prepare Teachers To Use Technology
INVESTIGATOR: Dr. Neal Strudler, Principal Investigator
Ashley Addis, M.S. candidate Curriculum and Instruction
CONTACT PHONE NUMBER: 702-895-1306

Purpose of the Study:
You are invited to participate in a research study because you are enrolled in the course, EDU 214E. The purpose of this study will be to describe the similarities and differences present in the face-to-face and online learning environments surrounding a common course project and student learning outcomes.

Participants:
You are being asked to participate in the study because you are taking the course EDU 214E, *Preparing Teachers to Use Technology*.

Procedures:
If you volunteer to participate in the study, you will be asked to agree to the following related to your coursework on the project, the *Innovations Mini-teach*:

(a) Collection and analysis of your responses to the pretest and posttest administered by your instructor.
(b) Allow for observation of your participation in in-class and/or online discussions regarding the project.
(c) Allow for observation and recording of your presentation including copies of the electronic feedback you give to and receive from other individuals in the course.
(D) You will be invited to participate in a voluntary focus group session to be scheduled prior to the end of the spring 2009 semester and lasting no more than one hour. I will record this session. Your participation in this focus group is not required.

Data from this study will be used only for the purposes outlined in the research questions of this study and will not be used or effect any coursework evaluation.

Benefits of Participation:
There may be benefits to you as a participant in this study. I hope to learn and describe the similarities and differences present in face-to-face and online versions of this course related to the *Innovations Mini-teach* project. Students who participate in the study will have the opportunity to express their thoughts regarding the project, overall learning experience, and potential use of the project for future coursework and teaching. The results of the study may have implications for improving instruction in future face-to-face and online versions of this course.

Risks of Participation:
There are risks involved in all research studies. The risks for participating in this study are minimal. You may be nervous having a UNLV researcher observe your participation in class, present your project to the class, and/or participate in a voluntary focus group. However, all efforts will be made to provide a comfortable environment and put you at ease during these times. Outside of class observations and focus group session, your participation in this research requires no more effort on your part than your course syllabus describes.

Cost/ Compensation:
There will be no financial cost to you to participate in this study. Participation in this study will involve minimal time in addition your regular course requirements. You will not be compensated for your participation in this study.

Contact Information:
If you have any questions or concerns about the study, you may contact either myself, Ashley Addis, via email at addisa@unlv.nevada.edu. You may also contact my master's thesis advisor and principal investigator for this study, Dr. Neal Strudler at (702)895-1306.For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the **UNLV Office for the Protection of Research Subjects at (702)895-2794.**

Voluntary Participation:
Your participation in this research is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without penalty or prejudice to your relations with the university. You will be given opportunity to withdraw your data related to this study after course grades have been submitted. You are encouraged to ask questions about this study at the beginning or at anytime during the research study.

Confidentiality:
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for a maximum of one calendar year after completion of the study. After the storage time, the information gathered will be destroyed.

Participation Consent:
By marking an "X" by "Yes" below, I affirm that I am at least 18 years of age, have read the above information and agree to participate in this study and that data related to my participation may be used for research purposes, or mark an "X" by "No" if you do not wish to participate in this study.

[ ] YES [ ] NO

_____ _____

Participant Signature Date

_____

Participant Name (Please Print)

Informed Consent

Department of Curriculum and Instruction

TITLE OF STUDY: Similarities and Differences Present in Face-to-Face and Online Learning Environments
INVESTIGATOR(S): Dr. Neal Studler, Principal Investigator and Ashley Addis, M.S. Candidate Curriculum and Instruction Emphasis in Technology Leadership
CONTACT PHONE NUMBER: 702-895-1306

Directions:

The information below provides specifics related to the research study, followed by a check box to provide your consent.

Please be aware that your participation requires no more than what you are already completing for class.

Purpose of the Study:
You are invited to participate in a research study because you are enrolled in the course, EDU 214E. The purpose of this study will be to describe the similarities and differences present in the face-to-face and online learning environments surrounding a common course project, the Innovations Mini-teach.

Participants:
You are being asked to participate in the study because you are currently enrolled in EDU 214E, Preparing Teachers to Use Technology.

Procedures:
If you volunteer to participate in the study, you will be asked to agree to the following related to your coursework on the assignment, the Innovations Mini-teach:
(a) Collection and analysis of your responses to the pretest and post-test administered by your instructor.
(b) Allow for observation of your participation in in-class and/or online discussions regarding the project.
(c) Allow for observation and recording of your presentation including copies of the electronic feedback you give to and receive from other individuals in the course.
(d) You will be invited to participate in a voluntary focus group session to be scheduled prior to the end of the spring 2009 semester and lasting no more than one hour. I will record this session. Your participation in this focus group is not required. Data from this study will be used only for the purposes outlined in the research questions of this study and will not be used or effect any coursework evaluation.

Benefits of Participation:
There may be benefits to you as a participant in this study. I hope to learn about and describe the similarities and differences present in both face-to-face and online versions of this course related to the Innovations Mini-teach assignment. Students who participate in the study will have the opportunity to express their thoughts regarding the assignment, their overall learning experience, and their views on the potential use of the project for future coursework and teaching. The results of the study may have implications for improving instruction in future face-to-face and online versions of this course.

Risks of Participation:
There are risks involved in all research studies. The risks for participating in this study are minimal. You may be nervous having a UNLV researcher observe your participation in class, present your project to the class, and/or participate in a voluntary focus group. However, all efforts will be made to provide a comfortable environment and put you at ease during these times. Outside of class observations and focus group session, your participation in this research requires no more effort on your part than your course syllabus describes.

Cost/ Compensation:
There will be no financial cost to you to participate in this study. Participation in this study will involve minimal time in addition your regular course requirements. You will not be compensated for your participation in this study.

Contact Information:
If you have any questions or concerns about the study, you may contact either myself, Ashley Addis, via email at addisa@unlv.nevada.edu. You may also contact My Master's Thesis Advisor and Principal Investigator for this study, Dr. Neal Strudler at (702)895-1306. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office for the Protection of Research Subjects at (702)895-2794.

Voluntary Participation:
Your participation in this research is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without penalty or prejudice to your relations with the university. You will be given opportunity to withdraw your data related to this study after course grades have been submitted. You are encouraged to ask questions about this study at the beginning or at anytime during the research study.

Confidentiality:
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for a maximum of one calendar year after completion of the study. After the storage time, the information gathered will be destroyed.

Participation Consent:
By checking "Yes" below, I affirm that I am at least 18 years of age, have read the above information and agree to participate in this study and that data related to my participation may be used for research purposes, or check "No" if you do not wish to participate in this study.

- ◡ Yes
- ◡ No

Enter your full name (first, last) in the textbox below.

Date

Enter the date in the boxes provided. MM / DD / YYYY

Submit

Instructor

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

INFORMED CONSENT

Department of Curriculum and Instruction

TITLE OF STUDY: A Comparison of Face-to-Face and Online Learning Environments to Prepare Teachers To Use Technology

INVESTIGATOR(S): Dr. Neal Strudler, Principal Investigator
Ashley Addis, M.S. Candidate in Curriculum & Instruction

CONTACT PHONE NUMBER: (702) 895-1306

Purpose of the Study

You are invited to participate in a research study because you are the instructor of EDU 214e, *Preparing Teachers to Use Technology*. The purpose of this study will be to describe the similarities and differences present in the face-to-face and online learning environments surrounding a common course project, the Innovations Mini-teach.

Participants

You are being asked to participate in the study because you are the EDU 214e course instructor for the On-Campus and Distance Education versions of the course.

Procedures

If you volunteer to participate in this study, you will be asked to agree to the following related to the Innovations Mini-teach Assignment for both the On-Campus and the Distance Education versions of your course:

a. Allow for observation, data collection, and analysis of both versions of your course in WebCampus regarding the Innovations Mini-teach assignment.
b. Allow for collection and analysis of the Interest Form, Pretest, and Posttest you use to gather information from your students about the Innovations Mini-teach assignment.
c. Allow for observation and recording of your Innovations Mini-teach Wiki site.
d. Allow for observation and recording of class presentations including copies of the electronic feedback survey completed after each presentation.
e. Allow for two 30-minute unstructured interviews to be scheduled at the beginning and end of the semester to discuss the Innovations Mini-teach assignment.

Benefits of Participation

There may be direct benefits to you as a participant in this study. However, we hope to learn to learn about and describe the similarities and differences present in both face-to-face and online versions of this course related to the Innovations Mini-teach assignment. The results of the study may have implications for improving instruction in future face-to-face and online versions of this course.

Risks of Participation
There are risks involved in all research studies. The risks for participating in this study are minimal. All efforts will be made to provide a comfortable environment and put you at ease during these times.

Cost /Compensation
There will not be financial cost to you to participate in this study. Outside of the work you already do to teach both versions of the course, the study will take an additional hour of our time for two 30-minute interviews. You will not be compensated for your time.

Contact Information
If you have any questions or concerns about the study, you may contact either myself, Ashley Addis, via email at addisa@unlv.nevada.edu. You may also contact My Master's Thesis Advisor and Principal Investigator for this study, Dr. Neal Strudler at (702)895-1306. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office for the Protection of Research Subjects at 702-895-2794.**

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be destroyed.

Participant Consent:
I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

_____ _____
Signature of Participant Date

_____
Participant Name (Please Print)

APPENDIX B

INNOVATIONS MINI-TEACH , SPRING 2009

LEARNING MODULE

EVALUATION RUBRIC

SELF-PEER EVALUATION

INNOVATIONS 09 WIKI- FRONT PAGE

INNOVATIONS 09 INSTRUCTIONS

MODEL WIKI, GOOGLE DOCS

INTEREST FORM

FEEDBACK SURVEY

EDU214E: Preparing Teachers to Use Technology

Innovations Mini Teach

Introduction

Teacher education faculty at Arizona Sate University (ASU) originally developed this Innovations Mini-Teach Assignment. It was designed to help prepare prospective teachers to effectively integrate technology into classroom instruction. One challenge facing teachers is the constant growth of new technology tools and resources for classroom use. While these digital tools provide powerful additions to classroom learning landscapes, a dilemma lies in how to expose teacher candidates to these various tools and techniques for using them. So, this assignment was designed to help you as prospective teachers address that challenge of "learning how to learn" 21st Century innovative tools and prepare you for future professional collaboration that mirrors 21st century teaching with these tools as outlined by the *National Educational Technology Standards for Teachers 2008*.

After attending a presentation from ASU faculty at a national technology conference, we have started a collaborative project and wiki site based on this assignment. We presented a paper on the collaborative project at the Annual Meeting of the *Society for Technology in Teacher Education* (SITE) in March, 2008 and have started a research project to collect continuing data. This semester a graduate student here at UNLV, Ashley Addis, is planning to conduct research to gather data on this assignment in UNLV courses for her thesis project. It is QUITE exciting to have such an opportunity. While you will have a choice in whether or not you choose to participate in the research (and I will not have access to that information as it is anonymous), *you will need to complete all parts of the assignment as part of the course work to earn your points.* I do hope you will agree to participate in the research study with Ashley - and know that YOU are part of the national research that is moving us forward on innovative technology use in teacher education.

For those of you who are interested, attached on the side is the research paper we presented with ASU on this assignment: - EDU214 Innovations SITE Paper.

Now ... on to the criteria!

Menu

Purpose of Assignment

- To learn at least one innovative technology very well and share its possible classroom application(s)
- To acquire a range of understanding about a variety of innovative technologies
- To practice designing and delivering instruction
- To collect usable resources for future class assignments and possible use as a teacher
- To learn how to use and design web-based resources for teaching and learning

Rationale

There will be several demanding constants in your teaching career. One will be the need to learn about new and evolving technologies and how you can apply them to your teaching in pursuit of the ever-present goal of improving student learning. The other is to interact successfully with your peers.

Collaborative teachers shift between the roles of teacher, learner, group member, contributor, and mentor as needed in the common pursuit of professional development and school improvement. This assignment will be very dependent upon collaborative roles and it promises to acquaint you with new and evolving technologies, to help you better understand how technology can be integrated, and will contribute to your collection of teaching materials.

Description

In this assignment, you will learn about an innovative technology and then design and implement a mini-lesson for the rest of your classmates. You will partner with other students (as assigned by your instructor) to become an expert in one innovative technology, then design a 10-15 minute web-based group presentation for your classmates on our class wiki site. One innovation topic will be presented per week. Your instructor will coordinate the dates.

Your web-based mini lesson presentation/wiki page should:

- Explain the innovative technology
- To the greatest extent possible/practical, engage your classmates in using the innovation for classroom oriented purposes
- Make explicit connections to uses of the innovation in classrooms
- Provide web links to ideas and materials for uses in a variety of classrooms (grade ranges, subject areas, special needs)
- Provide web links to digital resources for future use by peers including tutorials, informative web sites, and suggestions for classroom uses via the class WIKI. http://innovations08.pbwiki.com/
- Have a comments section on your page for peers in our class to post messages or ask questions.
- Have a link to the Feedback Survey form for peers to provide feedback. You can copy and paste the link from the **sample** "Google Docs" page to your page.

Note: A **sample** "Google Docs" page is posted to give you an idea of what you need to do.

Requirements following your presentation:

- Share your presentation materials (PowerPoints, videos, links, etc.) by posting them on the wiki
- Complete a self and peer evaluation form

Collaboration

Each group member will receive the same grade unless problems with the collaborative process indicate members did not EQUALLY contribute. It is expected that the group will make frequent communication a priority to minimize misunderstandings. Should problems occur, professionalism is expected. If you cannot handle problems within the group, please be proactive and ask for instructor assistance. In most cases, if it is not too late, I can mediate group processes, and will be happy to do so.

Technology Innovation Mini Teach Procedure:

NOTE: All materials can be found online. Check

- Our wiki site - follow the links for "Grove 2009 " http://innovations08.pbwiki.com/
- WebCampus - Learning Modules - Innovations Mini-Teach
- WebCampus Assignments - Innovations Mini-Teach

1. Complete:
    - TheInnovations Interest Form to provide background information on your level of skills and interest in various innovations.
    - The research study inofrmed consent link will be ready soon.
2. Once forms are completed, you will be assigned into groups and obtain your assigned topic. Your instructor will facilitate this process and post groups on the Course Content page.
3. Follow the directions on our Wiki site to join our wiki (*Select the correct section for your course* - online or on-campus)
4. Meet with your group (online, or face-to-face (f2f)) and prepare a group contract plan (method of communication, list of tasks and responsibilities, dates/times/locations of any f2f meetings (see ***Innovations Group Contract Plan*** posted in the Assignment). All members develop one plan together and Emailone copy of this plan to your instructor for approval (include all group members in the email message). There is a form posted for this plan.

- Prepare your Mini Teach and locate resources to build your wiki site.
- Everyone should demonstrate their proficiency with the innovation and help post resources to the wiki site.
- Edit/review/revise your plan and materials as needed. Upload everything to your Innovations WIKI. (See *Innovations Instructions* link posted on the site fo rinformation on what to include. Also listen to the Innovations podcast for more details.)

5. Have your mini-lesson completed and ready for peers by 5:00 p.m. on your assigned date.
   - Include a **comments section** on your page so peers can comment or ask questions. You will need to monitor this discussion section to answer any questions, or respond to comments for 48 hours after your initial presentation.
   - After your presentation, each group member will **submit the self/peer evaluation form** (*see **Innovations Mini-Teach_Self-PeerEval*** form) in the Innovations Mini-each Assignment in WebCampus no later than one week after your presentation. (YourLastName_Mini-TeachSelf-Peer_Eval)
   - A sample site can be found at: http://edu214espring2009grove.pbwiki.com/Google+Docs-+SAMPLE
6. You will be required to submit a **Feedback Survey Form** for the other nine presentations (9 @ 5 pt.s each). The links to these Survey Forms will be on each wiki page.

Resources

Previous Innovation Wiki Sites

Collaborative wiki site with links to ASU (Arizona State University) and UNLV class wikis from previous courses (follow the links to find our on-campus and distance education (online course) sites

http://innovations08.pbwiki.com/

To help you understand your role as a collaborative learner in this process

Collaborative Learning

Instructional Strategies Online - Cooperative Learning

Cooperative and Collaborative Learning

Collaborative Learning: Group Work and Study Teams

EDU214E
Technology Innovation Group Mini-Teach

Group Evaluation

Assigned Topic:
Presentation Date:
Group Members:

Expectation (Based on Project Overview)	**Points Issued**
Expertise: ▶ Evidence indicated that all team members are now advanced users of the innovation.	/5
Conceptual Information Presented: Explained the innovation, its features, and its general uses. ▶ Comprehensively shared in Wiki	/5
Wiki Presentation Appearance: ▶ Prepared a robust visually pleasing site with adequate resources	/10
Resources for Future Learning: Provided 3-4 digital resources (in the wiki) such as tutorials, templates, software downloads, etc. which will assist classmates to independently learn the new technology at a later date.	/10
Application to Future Teaching: Provided 5-6 URLs (in the wiki) that support classmates using the innovation for future teaching in a variety of situations (e.g., lessons, handouts, articles).	/10
Wiki Design & Usability Wiki content is ▶ Organized, error-free, and concisely communicated. ▶ Enhanced with appropriate visual images. ▶ References are included for information sources and media sources (other than links). ▶ No grammatical or linking errors	/10
Wiki Comments Discussion: Comments section was included - all members actively monitored and provided any necessary responses for 48 hour after initial presentation	/5
TOTAL per group member*	/55

NOTE: In any situation where groups have major issues with collaboration, your gradebook score may be adjusted.

Innovations Mini-Teach Self/Peer Evaluation

Submitted within one week after the mini-teach lesson is presented

Mini-lesson topic:_____
Presentation Date:_____

Use the following numeric scale to rate each person's performance on the items below. 4 – Always 3 – Usually 2 – Sometimes 1 – Rarely 0 – Never	Group Member Names		
	Your Name:	Member 2:	Member 3:
1. Attended group meetings (face to face and/or virtual)			
2. Communicated in a timely manner with other group members outside of meetings			
3. Prepared for meetings in advance			
4. Completed assigned responsibilities in a timely manner			
5. Contributed good to excellent work quality to the group wiki			
6. Engaged/cooperated with all group members			
7. Use the following scale to rate the overall performance for each member of your group. 4 – Excellent 3 – Very Good 2 – Satisfactory 1 – Marginal 0 – Poor			

8. Who uploaded presentation documents and entered information/resources to the wiki discussion?

9. List at least 2 things you learned about teaching as you completed this assignment.

Innovations 09 Wiki- Front Page

http://edu214espring2009grove.pbworks.com/

EDU 214E Preparing Teachers to Use Technology - Spring 2009 (Grove)

Innovations Mini-teach Wiki Sites:

On-Campus Class (Section 001)

Distance Education Class (Section 210)

This is the collaborative site for a course assignment in which students will work in small groups to learn about an innovative technology and then design and implement a mini-lesson on a wiki page to teach the rest of their classmates about their innovation.

To join this Wiki:

1. Click on the "EDIT" tab at the top of this page and the "request access" link.
   - Type in your email address (Use your UNLV Rebelmail address)
   - In the message box, type:
     - "EDU 214E" +
     - (Your name) +
     - "Online" or "On-Campus" (depending on your course enrollment)
   - Confirm by entering the letter requested.
   - Click "Send to administrator", the message will be sent to Ashley, and she will grant you access.

2. When you receive the email message granting access, follow the link given in the email.
   - Enter your email
   - Create and confirm your password
   - **Please**, write down your password so that you don't forget it! (Dr. Grove)

3. Follow the link to begin your Wiki editing adventures!

Free help:

1. Learn how to use PBwiki: **The PBwiki Manual**
   - Specific help for "**How to create a page**"
2. If you prefer video, watch a recording of our popular webinar: **PBwiki 101: Your Guide to Wiki Basics**.
3. Need more help? Sign up for a **Free introductory webinar**

Sandbox Page:

Here is a link to a page where you can explore and practice those basic skills! **Sandbox**

Innovations09 Instructions

last edited by Ashley 1 wk ago Page history

Return to Front Page

When you create/ name your page, include the last names of your group members in the title

Information to be posted on your wiki page:

1. **Name of the innovation, your name(s), and the date**
2. **What is it? (the innovation)**
   - Explain what it is
3. **History**
   - How did it start
4. **How can it be used in the classroom**
   - Ideas on for how to use it
5. **Resources for Future Learning**
   - Provide 3-4 digital resources (URLs) such as tutorials, templates, software downloads, etc. which will assist classmates to independently learn the new technology at a later date
6. **Application to Future teaching**
   - Provide 5-6 URLs that support classmates using the innovation for future teaching in a variety of situations (e.g., lessons, handouts, articles).
7. **Be sure to invite others to comment or ask questions about your Innovation wiki page.**
8. **Be sure and include a link to the feedback survey. Note, you can simply copy and paste this link in your page.**

- Note 1: You are not required to create and post a PowerPoint presentation on your wiki page. Your wiki page IS the presentation of information on your innovation!
- Note 2: While you will use other web sites as resources for information, you may not copy and paste their text word for word - that is plagiarism. Please re-state the information using your own words and list the site as a resource. (For more information see the UNLV Policy page.)
- Note 3: For any graphics or videos that you use on your site, please include the link for the resource.

Comments (0)

VIEW EDIT

Google Docs- SAMPLE

last edited by Ashley 17 hrs ago Page history

Return to Front Page

By Ashley Addis

What is Google Docs?

Google Docs is a free web-based service provided by Google. It allows you to create, upload, store, share, and collaborate in real-time on documents, spreadsheets, presentations, PDFs and forms. Your documents are stored on Google's server. This means you can create, edit and collaborate on documents from anywhere through an internet connection. You also have the option of downloading your work in various file formats to your computer. The user can control who has access to their work by sharing their documents with others as viewers or collaborators. The best part: no more attachments! Documents are shared through email, but the recipient receives a web link, no downloading required. The programs are scaled down for ease of use on the Internet, but all of the basic functions and tools are available. You will experience using the different programs later in the presentation.

History of Google Docs:

Google Docs was created in 2006 when Google acquired the Upstartle company. Upstartle designed the web-based word processor used for Google Docs. Two programs were combined to form Google Docs; the Writely program created by Upstartle and Google Spreadsheets created by Google. Presentations came in September of 2007 when Google acquired Tonic Systems which wrote the program for creating web-based slide presentations. You can check out more of the history of Google at the Google Corporate Information Site.

How does Google Docs work?

Check out this short video: "Google Docs in Plain English"

Form

Tell us what your favorite color is. You will immediately see your response in the spreadsheet!

* Required

Name

What is your favorite color? *

- ☐ Red
- ☐ Orange
- ☐ Yellow
- ☐ Green
- ☐ Blue
- ☐ Purple
- ☐ Other:

STEP 2. Follow the link to Log in to Google Docs

****Although you do not need a gmail account to use Google Docs, you will need to use the following login information for this activity:**

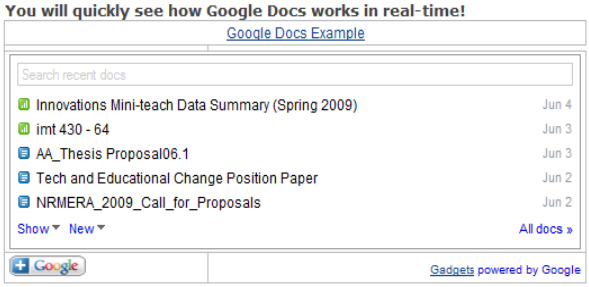
Login= student.edu214e@gmail.com

Password= student2009

STEP 3. Visit each of the four Google Docs and follow the directions for each:

1. Document- add a sentence to the story
2. Spreadsheet- Type your name and tell something about yourself
3. Presentation
4. Form- Check out the responses to the form
5. PDF- Look through the upoaded PDF about Google Docs and Spreadsheets!

You will quickly see how Google Docs works in real-time!



How can Google Docs be used in the classroom?

There are many innovative ways teachers have used Google Docs for their classrooms, here are a few examples:

- **Collaboration:** Students and Teachers can work together collaboratively, creatively and easily. They can work on a single doc in real time, whether or not they are in the same school or classroom! Students can work together on a shared presentation from school or home and then present to the class. Through the revisions history, you can also keep track of group participation. Teachers can share and collaborate on lesson plans or share class projects over time.
- **Data**: Keep track of grades, attendance, etc. Share these docs with other teachers to track students you share between classes. Also, share information with parents and students to track their own progress. Create quizzes and/or tests using the Forms feature; your students answers will automatically be timestamped and organized in a spreadsheet.
- **Monitor Progress and Give Feedback:** Encourage your students to write and make revisions in a document shared with you. You can check up on their work at any time, monitor their revisions, provide feedback and help using the comments feature before the final product is due.
- **Communicate:** Keep parents, administrators and other teachers/ classes up to date with what's going on in your class. Create and share documents including class projects, news letters, announcements, etc. No more worrying about whether or not those papers make it home or not!

Google Docs resources for future learning:

Google Docs Home and Sign In
Google Docs Tour
Google Docs Help Center
Using Google Docs in the Classroom: Tips and Tricks
Getting to Know Google Docs

Google Docs applications for future teaching:

Example Classroom Projects Using Google Docs

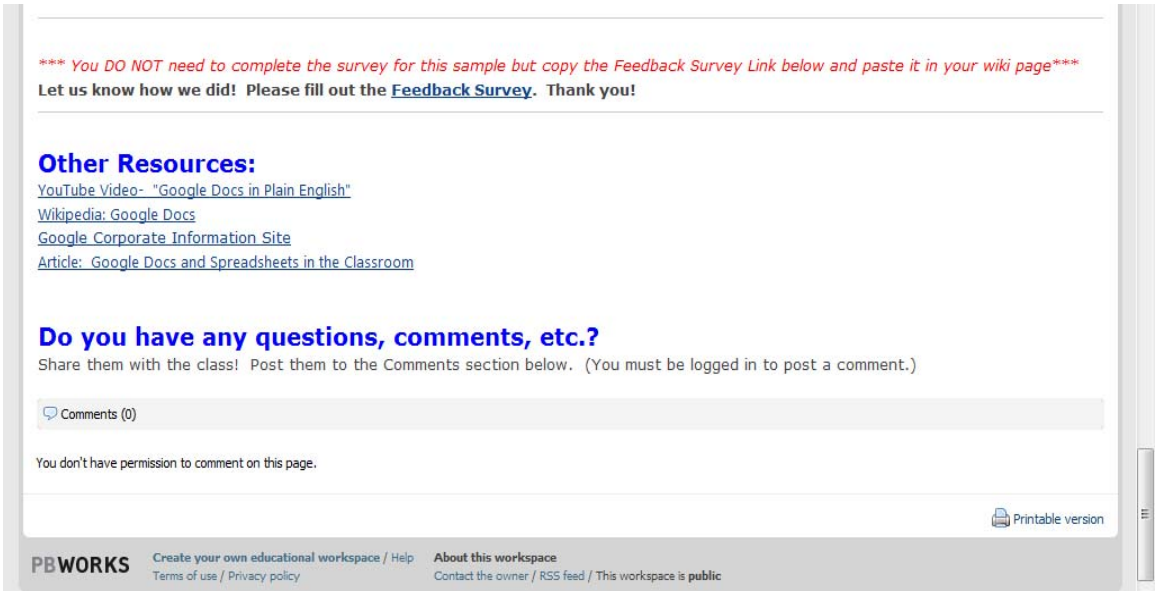
Marble Experiment
Halloween Story (Also visit their classroom Wiki, "Smarties of 203" explaining the project)
Candidate Watch Spreadsheet
Charting with Google Tools Spreadsheet

Teacher Sites

Google For Educators: Google Docs
Idea: Docs for Teachers - Google Docs Help Center

Articles and Presentations

Google Docs & Spreadsheets: Collaborating in the Library or Classroom By Christopher Case, Teacher, Miller Creek Middle School, Marinwood, California
Google Docs: An Overview for Educators
Google Teacher Academy- Docs and Spreadsheets in the Classroom.pdf


*** You DO NOT need to complete the survey for this sample but copy the Feedback Survey Link below and paste it in your wiki page***
Let us know how we did! Please fill out the Feedback Survey. Thank you!
Other Resources:
YouTube Video- "Google Docs in Plain English"
Wikipedia: Google Docs
Google Corporate Information Site
Article: Google Docs and Spreadsheets in the Classroom
Do you have any questions, comments, etc.?
Share them with the class! Post them to the Comments section below. (You must be logged in to post a comment.)
Comments (0)
You don't have permission to comment on this page.
Printable version
PBWORKS
Create your own educational workspace / Help
Terms of use / Privacy policy
About this workspace
Contact the owner / RSS feed / This workspace is public

Innovations Mini-teach

Interest Form

Please answer the following questions for the Innovations Mini Teach Assignment. Your responses will be used to form groups for the assignment.

Identification

Name (Last, First)

Last 4 digits of your phone number (example 1082)

Course

Rate your prior experience with each of the following technology innovations.

	1. I don't know what this technology is	2. I know what this technology is, but haven't used it	3. I have had some experience with this technology	4. I'm pretty good with this technology	5. I'm a pro with this technology
Wikis					
Video Conferencing					
BLOGS					
Social bookmarking					
Smartboards					
Podcasting					
Google Earth					
Voice Thread					
Screencasting					
Electronic Gradebooks					
Google Docs					
Online Photosharing					
RSS feeds					
Skype					
WebQuests					
Special Needs Adaptations					
LISTSERV					

Please note any other technologies which you are interested in for this project.

Rate your overall technology skill.

	1. I have very little experience using technology.	2. I have some basic experiences and skill using technology.	3. I am fairly comfortable with technology and have pretty good skills.	4. I am confident with technology and have good skills.	5. I am a technology pro and like new challenges.
I...	○	○	○	○	○

Select AT LEAST 4 of the following technologies that you would be interested in learning more about.

- ☐ Wikis
- ☐ Video Conferencing
- ☐ BLOGS
- ☐ Social bookmarking
- ☐ Smartboards
- ☐ Podcasting
- ☐ Google Earth
- ☐ Electronic Gradebooks
- ☐ Google Docs
- ☐ Other (please specify)

[ ]

Done

Innovations Mini-teach

Feedback Survey

Complete the following feedback survey questions for the Innovations Mini-teach presented this week. Your responses will remain anonymous. The last four digits of your phone number will be removed from the results prior to being given to the presenters.

Innovation Presented

Date

Please enter today's date in the boxes provided. MM / DD / YYYY

Enter the last four digits of your phone number.

(example: 1082) This information will verify that you have completed this survey.

Course

Presenters Names

1.
2.
3.

Use the following scale to rate the Innovations Mini-teach presentation:

	strongly agree	agree	neutral	disagree	strongly disagree
The materials were nicely organized and presented.					
The focus for resources presented was clear and thoughtfully planned.					
Presenters were effective at answering questions in discussion.					
Overall, presenters did a nice job creating and delivering a worth while and engaging learning experience.					

How helpful were the resources presented in informing your knowledge of the technological innovation and its application(s) for teaching and learning?

	Extremely helpful	Mostly helpful	Neutral	Somewhat helpful	Not helpful at all
The resources presented were:					

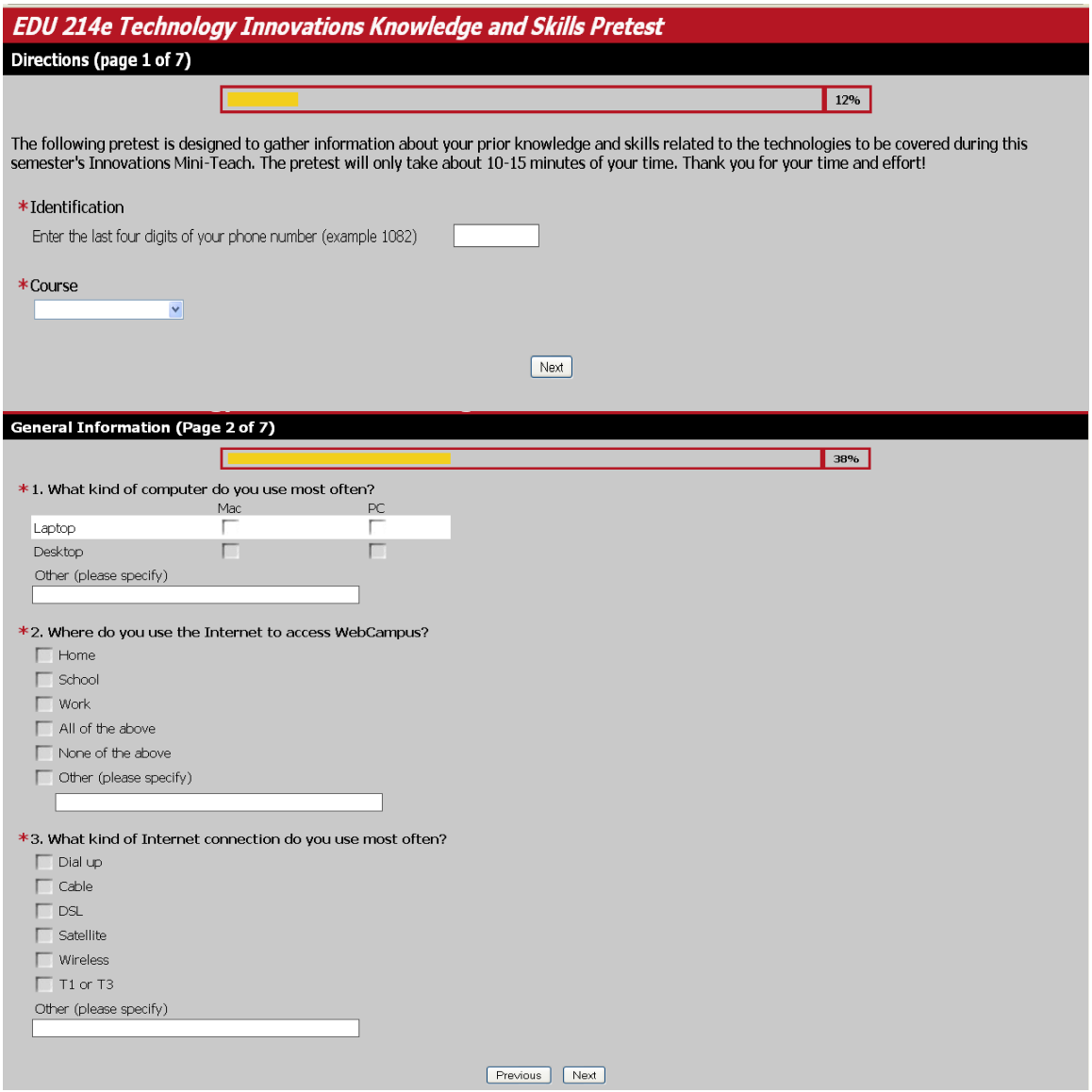
List two or more things you learned from the Innovations wiki and/or presentation. You may include how you might use what you learned for future coursework or teaching.

Additional Comments (optional):

Done

APPENDIX C

PRETEST AND POSTTEST, SPRING 2009



EDU 214e Technology Innovations Knowledge and Skills Pretest

Directions (page 1 of 7)

12%

The following pretest is designed to gather information about your prior knowledge and skills related to the technologies to be covered during this semester's Innovations Mini-Teach. The pretest will only take about 10-15 minutes of your time. Thank you for your time and effort!

*Identification

Enter the last four digits of your phone number (example 1082)

*Course

Next

General Information (Page 2 of 7)

38%

*1. What kind of computer do you use most often?

	Mac	PC
Laptop		
Desktop		

Other (please specify)

*2. Where do you use the Internet to access WebCampus?

- Home
- School
- Work
- All of the above
- None of the above
- Other (please specify)

*3. What kind of Internet connection do you use most often?

- Dial up
- Cable
- DSL
- Satellite
- Wireless
- T1 or T3

Other (please specify)

Previous Next

Multiple Choice (Page 3 of 7)

50%

*4. Which of the following is a page or collection of pages that individuals can edit and collaborate on to create content for the Internet?

- Social bookmark
- Webquest
- Wiki
- LISTSERV
- All of the above
- None of the above
- I don't know

*5. Blog posts are

- organized with the latest material placed at the top of the page.
- organized with the latest material placed at the bottom of the page.
- organized however the administrator wants.
- not organized.
- I don't know

*6. Which Google Doc do you use to create a survey?

- Spreadsheet or Form
- Presentation
- Document
- None of the above
- Any of the above
- I don't know

*7. Which of the following is a NOT social bookmarking site?

- Digg
- StumbleUpon
- Del.icio.us
- Clipmarks
- Jing
- I don't know

*8. A screencast is...

- a digital recording of your computer screen that usually includes audio narration
- just like a screenshot, a picture of your computer screen that you can paste into a document or save
- a digital video you create to audition for a casting call
- almost like a screenshot, but the picture is automatically uploaded to an online photosharing site
- I don't know

*9. Which of the following do you need to participate in a video conference?

- Webcam
- DVD player
- iPod or mp3 player
- All of the above
- None of the above
- I don't know

Previous Next

Multiple Choice (Page 4 of 7)

62%

*10. What does the image to the right represent?

- Audio
- RSS Feed
- Comment
- Social Bookmark
- I don't know

*11. When using a Smartboard, how do you convert hand-written words to typed text?

- On the Smartboard, press and hold on the text you want to convert for one complete second
- On the Smartboard, double click on the word(s) you want to convert with your finger
- Use the computer mouse to select and convert the text
- This isn't possible
- I don't know

*12. Which of the following about social bookmarking is FALSE?

- You need to be signed in to use a social bookmarking service
- You can bookmark any site and access it from anywhere with an Internet connection
- You can tag and share bookmarks with others
- All of the above
- None of the above
- I don't know

*13. Which of the following is an online photosharing site?

- Flikr
- Wikipedia
- TiVo
- Adobe Photoshop
- All of the above
- None of the above
- I don't know

*14. Skype is a(n)...

- Social Bookmarking site
- WebQuest service
- Online chat and video conferencing service
- Online photosharing site
- All of the above
- None of the above
- I don't know

*15. Which of the following about RSS Feeds is FALSE?

- All RSS Feeds are free
- RSS Feeds provide a person with information that they are interested in reading
- RSS Feeds consolidate all desired information to one centralized location
- All websites have an RSS Feed
- I don't know

Previous Next

Multiple Choice (Page 5 of 7)

75%

*16. You are teaching a lesson on probability using your SmartBoard. You pick up the green marker from the tray and write "What is the probability of selecting a blue marble?" You put the marker down on your desk and pick up a bag of marbles. You left the green marker on your desk, so you pick up the black marker to use instead. What happens?

- The words, "What is the probability of selecting a blue marble?" changes from green to black
- Anything you write with the black marker will still show up green
- Anything you write shows up black, but you can change it later
- The SmartBoard shuts down and all of your notes are lost
- I don't know

*17. Which tool can you use to embed a video to play in your Wiki page?

- Insert Plugin
- Insert Link
- Allignment
- Sidebar
- Any of the above
- None of the above
- I don't know

*18. LISTSERV is a(n)...

- email mailing list manager
- a website teachers can use to search for spelling lists
- a service that allows you to consolidate all of your email, social networking and bookmarking, and chat accounts.
- I don't know

*19. How can you participate in a Voice Thread? (Select all that apply.)

- [ ] telephone
- [ ] webcam
- [ ] microphone
- [ ] text
- [ ] file upload
- [ ] all of the above
- [ ] none of the above
- [ ] I don't know

Previous Next

True/ False (Page 6 of 7)

88%

*20. A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet.

- True
- False
- I don't know

*21. You need an iPod to view a podcast.

- True
- False
- I don't know

*22. A Blog enables users to post comments and information on the web for others to view and respond to.

- True
- False
- I don't know

*23. Using Google Earth, you can view any location in the world in real time.

- True
- False
- I don't know

*24. You must have a Gmail account to use Google Docs.

- True
- False
- I don't know

*25. When you comment in a Voice Thread, your comment is displayed permanently, just like a regular online chat or discussion.

- True
- False
- I don't know

*26. You need to be logged in to a messenger service to participate in a video conference.

- True
- False
- I don't know

*27. When you upload photos to an online photosharing site, anyone can see and use your photos, even if you don't choose to make them public.

- True
- False
- I don't know

Previous Next

Thank You! (Page 7 of 7)

100%

Thank You!

You have completed the Technology Innovations Knowledge and Skills Pretest.

Don't forget to click "Submit Answers" before closing this window.

Previous Submit Answers

EDU 214e Posttest and Course Feedback

Purpose of the Posttest

14%

The purpose of this assessment is for you to provide information about your learning experience throughout this semester in EDU 214e. This should take about 15-20 minutes to complete.

PLEASE REMEMBER- you need to put an answer for ALL REQUIRED questions in order to earn full points.

This assessment is divided into three sections:

Section 1. Information Section used to gather your personal information to track who has completed the assessment.

Section 2. Innovations Mini-teach Section used to gather information about your development of technological knowledge and skills related to the innovations covered this semester and to gather your feedback about the project as a whole. Remember, your feedback makes a difference in how this project develops for future semesters.

Section 3. Course Feedback Section used to gather information and feedback about the course as a whole.

Next

Section 1. Information

29%

Please answer the following information honestly.

****This information will remain separate from your responses to the Posttest questions and will only be used to confirm who has completed the assessment.****

Name

Enter the last four digits of your phone number

(e.g. 1082)

Course

Previous Next

Section 2. Innovations Mini-teach Multiple Choice (1-8)

43%

Please answer the following questions related to the innovations covered this semester to the best of your ability.

1. Which of the following is a page or collection of pages that individuals can edit and collaborate on to create content for the Internet?

- Social bookmark
- Webquest
- Wiki
- LISTSERV
- All of the above
- None of the above
- I don't know

2. Blog posts are

- organized with the latest material placed at the top of the page.
- organized with the latest material placed at the bottom of the page.
- organized however the administrator wants.
- not organized.
- I don't know

3. Which Google Doc do you use to create a survey?

- Spreadsheet or Form
- Presentation
- Document
- None of the above
- Any of the above
- I don't know

4. Which of the following is a NOT social bookmarking site?

- Digg
- StumbleUpon
- Del.icio.us
- Clipmarks
- Jing
- I don't know

5. A screencast is...

- a digital recording of your computer screen that usually includes audio narration
- just like a screenshot, a picture of your computer screen that you can paste into a document or save
- a digital video you create to audition for a casting call
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- I don't know

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- Webcam
- DVD player
- iPod or mp3 player
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- None of the above
- I don't know

7. What does the image to the right represent?

- Audio
- RSS Feed
- Comment
- Social Bookmark
- I don't know

8. When using a Smartboard, how do you convert hand-written words to typed text?

- On the Smartboard, press and hold on the text you want to convert for one complete second
- On the Smartboard, double click on the word(s) you want to convert with your finger
- Use the computer mouse to select and convert the text
- This isn't possible
- I don't know

Previous Next

Section 2. Innovations Mini-teach Multiple Choice (9-16)

57%

Please answer the following questions related to the innovations covered this semester to the best of your ability.

9. Which of the following about social bookmarking is FALSE?

- You need to be signed in to use a social bookmarking service
- You can bookmark any site and access it from anywhere with an Internet connection
- You can tag and share bookmarks with others
- All of the above
- None of the above
- I don't know

10. Which of the following is an online photosharing site?

- Flikr
- Wikipedia
- TiVo
- Adobe Photoshop
- All of the above
- None of the above
- I don't know

11. Skype is a(n)...

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- WebQuest service
- Online chat and video conferencing service
- Online photosharing site
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- RSS Feeds provide a person with information that they are interested in reading
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- I don't know

13. You are teaching a lesson on probability using your SmartBoard. You pick up the green marker from the tray and write "What is the probability of selecting a blue marble?" You put the marker down on your desk and pick up a bag of marbles. You left the green marker on your desk, so you pick up the black marker to use instead. What happens?

- The words, "What is the probability of selecting a blue marble?" changes from green to black
- Anything you write with the black marker will still show up green
- Anything you write shows up black, but you can change it later
- The SmartBoard shuts down and all of your notes are lost
- I don't know

14. Which tool can you use to embed a video to play in your Wiki page?

- Insert Plugin
- Insert Link
- Allignment
- Sidebar
- Any of the above
- None of the above
- I don't know

15. LISTSERV is a(n)...

- email mailing list manager
- a website teachers can use to search for spelling lists
- a service that allows you to consolidate all of your email, social networking and bookmarking, and chat accounts.
- I don't know

16. How can you participate in a Voice Thread? (Select all that apply.)

- [ ] telephone
- [ ] webcam
- [ ] microphone
- [ ] text
- [ ] file upload
- [ ] all of the above
- [ ] none of the above
- [ ] I don't know

Previous Next

Section 2: Innovations Mini-teach True/ False (17-24)

71%

Please answer the following questions related to the innovations covered this semester to the best of your ability.

17. A WebQuest is an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet.

- True
- False
- I don't know

18. You need an iPod to view a podcast.

- True
- False
- I don't know

19. A Blog enables users to post comments and information on the web for others to view and respond to.

- True
- False
- I don't know

20. Using Google Earth, you can view any location in the world in real time.

- True
- False
- I don't know

21. You must have a Gmail account to use Google Docs.

- True
- False
- I don't know

22. When you comment in a Voice Thread, your comment is displayed permanently, just like a regular online chat or discussion.

- True
- False
- I don't know

23. You need to be logged in to a messenger service to participate in a video conference.

- True
- False
- I don't know

24. When you upload photos to an online photosharing site, anyone can see and use your photos, even if you don't choose to make them public.

- True
- False
- I don't know

Previous Next

Section 2: Innovations Mini-teach Feedback (25-30)

86%

Help us understand your learning needs for the Innovations Mini-teach assignment. Please answer the following questions related to your experience completing the assignment this semester.

25. Please rate your use of the following resources for the Innovations Mini-teach assignment and list any additional resources you found helpful that we can use for future classes.

	Very Helpful	Helpful	Unsure	Not Helpful	Didn't use
Innovations Mini-teach Learning Module					
Mini-teach Directions posted in Assignments					
Help! Discussion Forum					
Innovations Mini-teach Questions Discussion Forum					
Dr. Grove's Podcast					
Ashley's Podcast					
Google Docs- SAMPLE wiki site					
PBwiki help pages					
Innovations wiki sites created by previous students					
Innovations partner(s)					

Others (please list):

26. How useful was the feedback summary provided to you and your group members after your presentation?

- Very useful
- Somewhat useful
- Neutral
- Not useful at all
- I didn't look at it

27. Did you watch the video recording of your presentation? (On-campus students only)

- Yes
- No

28. What did you like about the Innovations Mini-teach project?

29. What didn't you like about the Innovations Mini-teach assignment?

30. Do you have any suggestions for ways we can we improve the assignment? If so, what are they?

Previous Next

Section 3. Course Feedback (31-39)

100%

Help us understand your learning experience and needs for the entire course. Please answer the following questions related to your overall experience in EDU 214e this semester.

31. What was your favorite part of this course?

32. What was your least favorite part of this course?

33. What do you think should be added to this course to prepare you to teach with technology? (e.g. what do you need to learn more about?)

34. What do you think should be dropped from this course? Why? (e.g. think about the Exercises, etc.)

35. What was one important thing you learned in this course about teaching with technology?

36. Learning is a lifelong process and becoming a great teacher involves continual learning! Learning how to deal with change is an important factor in successfully using technology. There will always be something new on the horizon. Briefly describe the first step you would use to learn new technologies (e.g. What if you were asked to create a podcast to welcome parents and new students- where would you start?)

37. For the readings in this course, would you rather:

- Take quizzes over the content;
- Post messages and responses in online discussions as we did;
- Mix it up - half quizzes and half discussions

Other (please specify):

38. In your opinion, what reading topic do we need to add (e.g. something you want to learn more about)?

39. In general, rate your overall technology skills

- Low
- Medium
- High

This is the last section of the assessment. Remember, your feedback is very important to the future development of this course. You can go back and edit your answers if needed.

When you are happy with your responses, click "SUBMIT" to send your responses.

Previous Submit Answers

APPENDIX D

FOCUS GROUP QUESTIONS

FACE-TO-FACE AND ONLINE STUDENTS, SPRING 2009

Focus Group Session (F2F)- on campus

Date/Duration: April 21, 2009 10:30-11:00am

Focus Group Session (Online)- WebCampus Discussion

Date/Duration: April 17, 2009 through April 23, 2009

Focus Group Questions

1. When you began the Innovations Mini-teach , what did you see as the main purpose(s) of the project? Did that purpose change over the course of the semester? If so, how has your view changed?

2. Think about the resources and instructions provided to you. What resources were most helpful and why? Which were least helpful and why? Do you have any recommendations?

3. Explain your experience in creating your wiki to prepare for your online presentation. What steps did you take to prepare to complete the project?

4. Did you develop any new skills as a result of completing the Innovations Mini-teach? If so, what are they? If not, please explain why.

5. What are the advantages or benefits resulting from completing this project?

6. What are the disadvantages or concerns resulting from completing this project? What frustrated you? Are there elements of the project that could be made easier, reduced, or eliminated?

7. Were you and your group member(s) able to effectively complete the project in a timely manner? What factors do you think contributed to your ability or inability?

8. Has this project specifically impacted your thoughts on the use of technology in your future classroom? Do you think this project has impacted the way(s) you approach

learning new technologies for use in your future classroom?

9. Do you plan to use the wiki as a resource for future coursework, field experiences, and/or after you graduate? Will you continue to add to it? Use lessons from it? Use it with your students?

10. Think back to your experience completing the project. Has it been worth your investment of time and effort? Why or why not?

APPENDIX E

SEMI-STRUCTURED INTERVIEW QUESTIONS

INSTRUCTOR, SPRING 2009

Semi-Structured Interview, Instructor, Spring 2009

Date: Wednesday May 6, 2009

Duration: 0:22:40.0

Semi-Structured Interview Questions

1. What do you see as the similarities and differences between the f2f and online versions of the Innovations Mini-teach?
2. What accommodations or adaptations did you make from the existing model to make it work for the online class?
3. Of the resources you provided, which did you anticipate being most useful for students online? Face-to-Face? If different, then why?
4. Which factors do you think contributed to students ability or inability to create an effective presentation in each environment?
5. Have you noticed any difference in achievement of learning outcomes and objectives from online students related to the project?
6. Do you think that students have met the objectives and desired outcomes for the project in the online class? F2F?
7. How did the F2F class performance compare to previous semesters?
8. Will you keep the Mini-teach as a component of the online course? Why or why not?
9. What will you do differently next time?
10. Explain your overall experience facilitating this project in two different environments simultaneously.

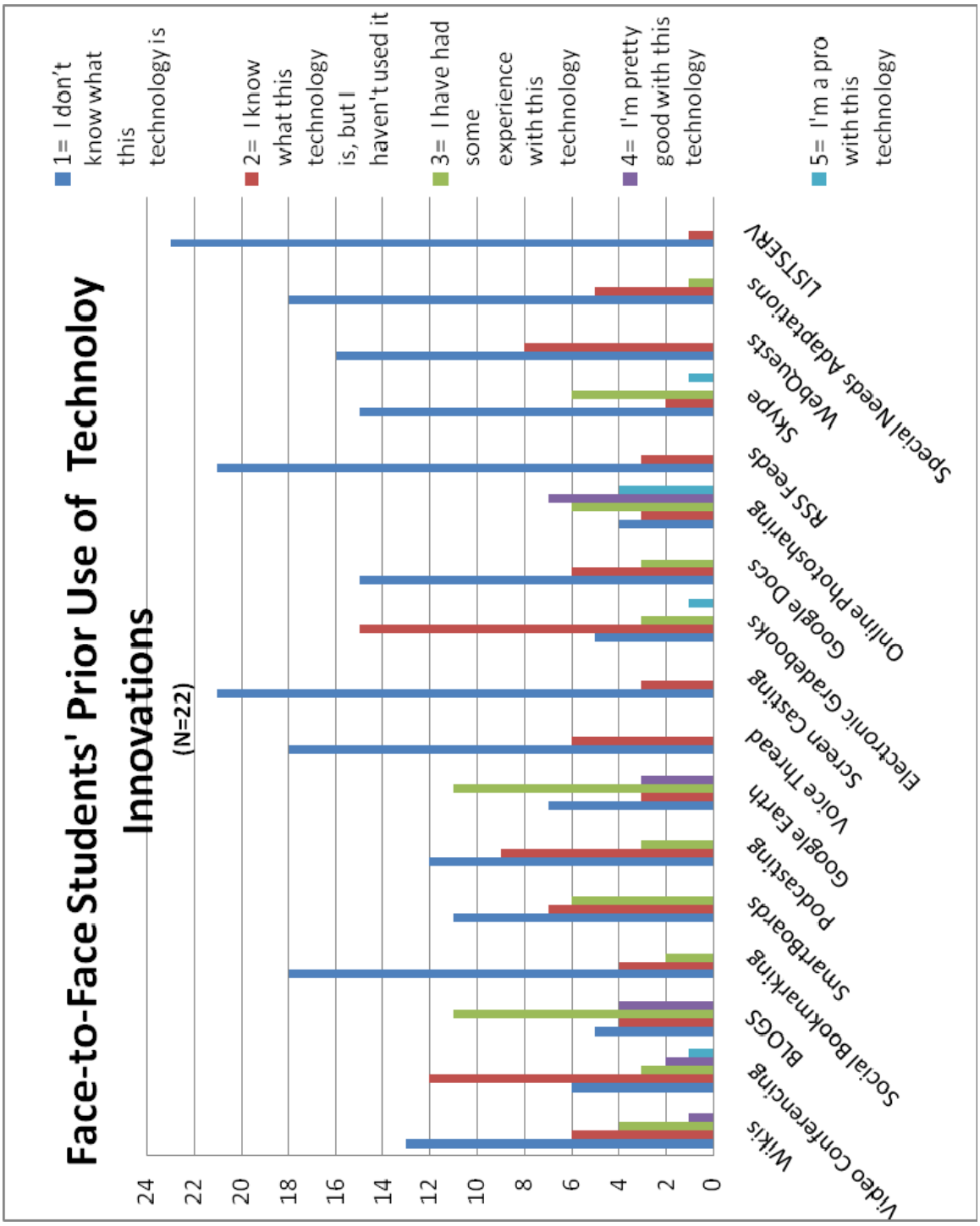
11. What was most difficult?
12. What are you most proud of?
13. Do you think the benefits derived were worth the time and effort that you put into it?

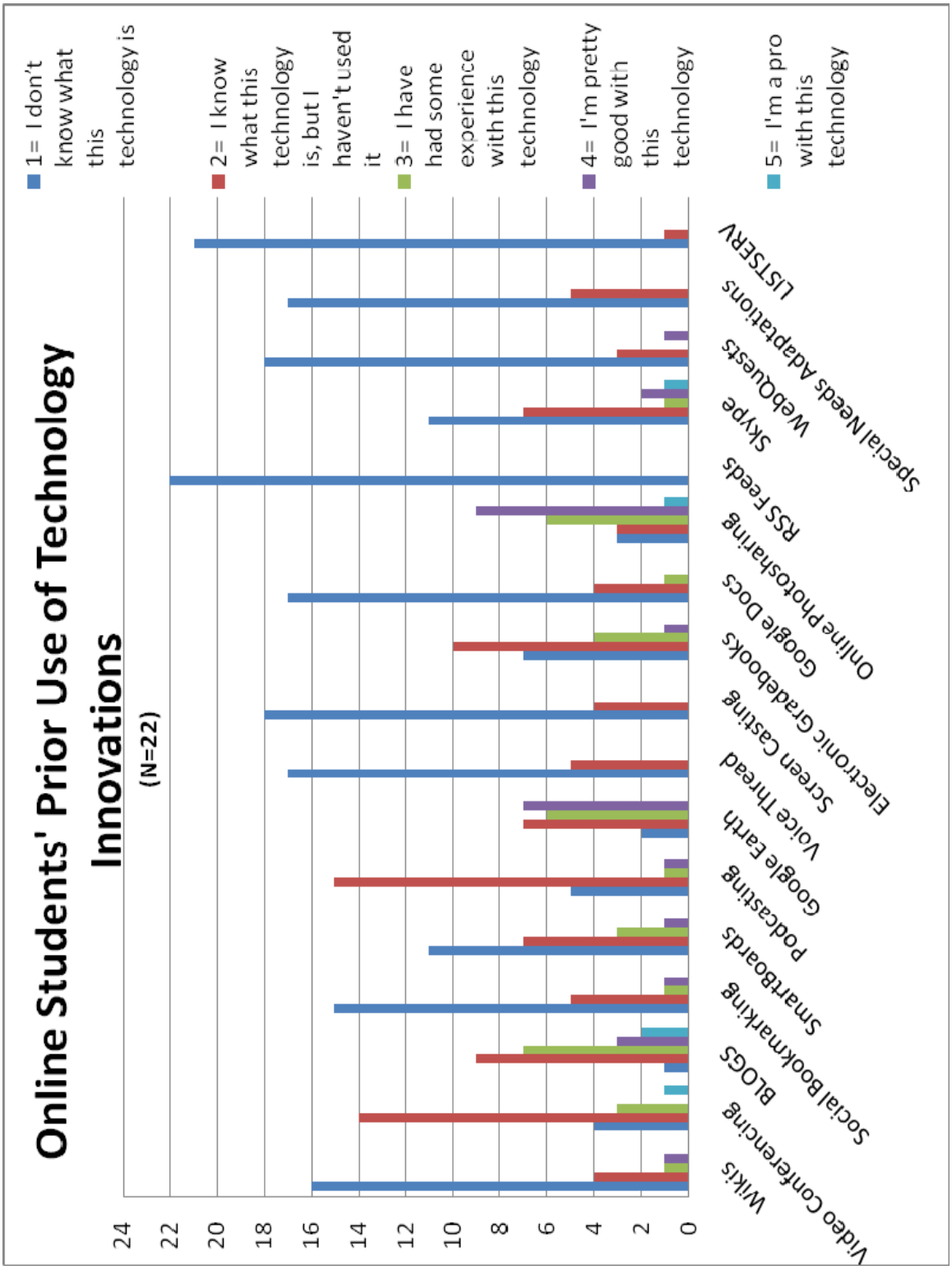
APPENDIX F

PRIOR USE OF TECHNOLOGY INNOVATONS, SPRING 2009

FACE-TO-FACE SECTION

ONLINE SECTION


Face-to-Face Students' Prior Use of Technoloy Innovations
(N=22)
1= I don't know what this technology is
2= I know what this technology is, but I haven't used it
3= I have had some experience with this technology
4= I'm pretty good with this technology
5= I'm a pro with this technology
0
2
4
6
8
10
12
14
16
18
20
22
24
Video Conferencing
Wikis
BLOGS
Social Bookmarking
Smartboards
podcasting
Google Earth
Voice Thread
Screen Casting
Electronic Gradebooks
Google Docs
Online Photosharing
RSS Feeds
Skype
WebQuests
Special Needs Adaptations
LISTSERV


Online Students' Prior Use of Technology Innovations
(N=22)
1= I don't know what this technology is
2= I know what this technology is, but I haven't used it
3= I have had some experience with this technology
4= I'm pretty good with this technology
5= I'm a pro with this technology
0
2
4
6
8
10
12
14
16
18
20
22
24
Video Conferencing
Wikis
BLOGS
Social Bookmarking
Smartboards
podcasting
Google Earth
Voice Thread
Screen Casting
Electronic Gradebooks
Google Docs
Online Photosharing
RSS Feeds
Skype
WebQuests
Special Needs Adaptations
LISTSERV

APPENDIX G

TABLE OF SPECIFICATIONS

RESEARCH QUESTIONS, SPRING 2009

Research Question	Method	Instrument
1. What are the similarities and differences between face-to-face and online versions of the *Innovations Mini-teach* as it was orchestrated in an introduction to educational technology course for teacher candidates?	Qualitative/ Quantitative	Interest Form Technology Journey Two Essay Learning Module/ Instructional Strategies Observation Feedback Surveys Posttest Feedback Questions and Open-ended Responses Focus Groups- F2F and Online Semi-structured Interview- Instructor
2. What is the nature of the learning experience involved in the *Innovations Mini-teach* project implemented in the face-to-face section of the course?	Qualitative	Learning Module/ Instructional Strategies Observation Posttest Feedback Questions and Open-ended Responses Technology Journey Two Essay Focus Groups- F2F and Online Semi-structured Interview- Instructor
2a. Can the project be modified to make it viable in an online environment?	Qualitative	Learning Module/ Instructional Strategies Observation Posttest Feedback Questions and Open-ended Responses Technology Journey Two Essay Focus Groups- F2F and Online Semi-structured Interview- Instructor
2b. What accommodations are necessary to implement the project without synchronous face-to-face interaction? How does this impact the learning experience?	Qualitative	Learning Module/ Instructional Strategies Observation Posttest Feedback Questions and Open-ended Responses Technology Journey Two Essay Focus Groups- F2F and Online Semi-structured Interview- Instructor
2c. Are there differences in learning outcomes resulting from the face-to-face versus the online version of the course?	Qualitative/ Quantitative	Pretest-Posttest Technology Journey Two Essay Observation Posttest Feedback Questions and Open-ended Responses Focus Groups- F2F and Online Semi-structured Interview- Instructor

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