UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

A CASE STUDY OF THE ADOPTION OF A TECHNOLOGY-BASED INNOVATION IN AN URBAN SCHOOL DISTRICT: AN E-PORTFOLIO INITIATIVE

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

SCOTT WILSON
Norman, Oklahoma
2007

UMI Number: 3263433

UMI Microform 3263433

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

A CASE STUDY OF THE ADOPTION OF A TECHNOLOGY-BASED INNOVATION IN AN URBAN SCHOOL DISTRICT: AN E-PORTFOLIO INITIATIVE

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF INSTRUCTIONAL LEADERSHIP AND
ACADEMIC CURRICULUM

BY

Frank McQuarrie, Co-Chair

Courtney Vaughan, Co-Chair

John Chiodo

Jeffrey Maiden

Linda McKinney

ACKNOWLEDGEMENTS

The African proverb, *it takes the whole village to raise a child* aptly describes my journey as a Doctorate of Philosophy student. In contemplating whether I wanted to even begin the journey, my wife, who is my anchor, encouraged me to follow my dreams, pledged her support through the tough times, and promised to be my loudest cheerleader as I passed the different milestones. Although in retrospect I am sure we were both a bit naive, she far and away exceeded her promises and pledges. I could not have made it with out you! Thank you and I love you.

It always helps to have someone with you on a journey, and I was blessed to have my older brother, Don Jr, to serve as my stalwart companion. In a unique experience we served as each others personal cohort. Where one brother was, the other was sure to follow. Many a classmate just referred to us as the "Wilson Brothers." Don's insights, intellect, and sense of humor made the journey a little less arduous. I note in pride that he completed his dissertation the same semester as I. Congratulations and thank you for your support.

On any journey the guide determines the path of the journey. I have had the opportunity to interact with numerous talented professors, who challenged me to step outside my comfort zone, defend my philosophies, and consider new alternatives. Thank you for sharing your passions! To the ultimate guide, my chair, Dr. Frank McQuarrie, thank you for constant support, guidance, and friendship. It us under your mentorship I have successfully accomplished my

goals! I hope I can gleam a portion of your dedication you provided each of your students with the students I will come to work with in my career! To Dr. Courtney Vaughn, I thank you for your sharing your knowledge, passion, and insight into the qualitative world. I truly count your tutelage a blessing. To Dr. Jeffrey Maiden and Dr. Linda McKinney thank you for your thoughtful insights and unrelenting support during this process. To Dr. John Chiodo, as the instructor of my first Doctorate of Philosophy course, you set a standard that I worked the entirety of my program to meet, thank you.

To my parents, thank you for your faith in my abilities, your unrelenting support, and your willingness to answer all the questions, no matter what time it was. To my fellow classmates, thank you for making the journey a rich experience by sharing slivers of yourself in the class discussions, presentations, and personal conversations.

The only party that did not knowingly sign on for this adventure is my daughter Isabella Grace. You actually entered our family during the summer of 2004. I was knee deep in Chaos. Many a night you looked at me with your blue eyes, not knowing why your Daddy had to go, but smiling and giving me a hug, kiss and a whispered "I love you Daddy." Hearing you sing "Doctor Daddy" to me after my defense will always be in my mind and heart. I love you beyond all words.

Finally, I owe every blessing in my life, my wonderful wife and daughter, brother, parents, professors, classmates, and work colleagues to God. I am truly blessed, thank you! I hope I prove to be a good steward of such blessings.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

What role should technology hold in education has been a hotly contested topic. Advocates suggest that technology will expand students' learning experiences and prepare them for a future where workers will require a skill set not yet developed. Critics point to the massive budgets invested by federal, state, and local educational agencies in the acquisition of educational technology only to have little to no change in education practice or student achievement.

This study utilized an instrumental case study that investigated the adoption of the technology-based innovation of e-portfolios in a southwest urban school district. The three questions used to guide this research included: (a) Does a participant's perceived quality of professional development influence the adoption of e-portfolios? (b) Is there a relationship between the quality of participant's instructional planning and subsequent adoption of e-portfolios? (c) Based on the status of adoption (completer/non-completer), how does each group describe the variables that impacted their adoption/lack of adoption of e-portfolios?

The study used three different indexes—level of adoption, quality of professional development, and quality of instructional lesson planning—generated from participant responses on electronic surveys to explore two different interactions on the issue of adoption. A Pearson's correlation coefficient did not identify a statistically significant influence between perceived quality of professional development and level of adoption (r = -.125 p >.05). However, a

Pearson's correlation did identify a statistically significant relationship between the quality of an instructional lesson plan and the Level of Adoption (r = .495 p = .003) of e-portfolios.

The third research question produced 11 themes from the wide array of participant feedback collected through both an electronic survey and participant interviews. The 11 themes include: Instruction and Pedagogy, Time, Student Engagement, Access to Resources, Professional Development - Ongoing Support, Quality of Professional Development, Mentoring, Collegiality, Administration Influences, The E-Portfolio System, and, Motivation.

This study produced several recommendations for practitioners. Recommendations include the acquisition and deployment of technology to the schools before introducing the innovation; the identification and selection of early adopters to provide a foundation of mentors; include compulsory development sessions for instruction development to insure the focus on quality; and the inclusion of instructional lesson planning to support new innovation.

The study also provides several recommendations for further research. Recommendations include the expansion of several demographic and/or contextual data points in an effort to provide rich narrative of the environment that could influence adoption; limit the impact of technical variables that fall outside the scope of the study; move the focus of the study from if they adopt to when do they adopt; and, explore the impact of an innovation on student achievement.

CHAPTER 1

INTRODUCTION

Most educators would agree with the statement that "technology will play a major role in education." If a common interpretation of 'why do we educate our young?' is to 'prepare the young for a productive life in the society at large' and the fact that technology is beginning to infiltrate almost every aspect of today's society, then it is safe to say we need to prepare today's children to utilize technology. This study will investigate the integration of technology as a central instructional tool of teachers from an urban district.

Chapter 1 includes five sections—Background of the Study, Need for the Study, Research Question, Definitions, and Summary. The Background of the Study will review technology's role in education, the role of professional development in the utilization of technology, and the impact of planning on technology's infusion into instructional practice. The Need for the Study will introduce the debate on technology's impact on student learning, provide a short overview of the research trends of educational technology literature and highlight two professional development models employed in the design of this technology program. Finally, Chapter 1 will include the Research Questions, Definition of Terms, and a Summary.

Background of the Study

Technology's role in education

As federal, state, and local governmental agencies started to provide funds for technological-based programs, a diverse group of researchers and evaluators began to collect data in order to document the true impact of technology. One of the primary threads found in the educational technology literature from its inception focused on two variables, the availability of technology and the impact that technology had on student achievement (Lemke et al., 1998; Office of Technology Assessment, U.S. Congress, 1988; Parsad & Jones, 2005; Smerdon et al., 2000; Solmon, 1998;).

In reviewing the infusion of technology in the schools, the measurement benchmark moved from the number of schools that had computers—from 18% in 1981 to 95% in 1988—to today's benchmark of student-to-computer ratio—from 92.3 students per computer in 1983 to 2.75 students per one instructional computer in 2003 (Office of Technology Assessment, U.S. Congress, 1988; Parsad & Jones, 2005). As the access to technology reached acceptable levels as defined by technology-promoters, most people turned to the second variable—student achievement. The literature as a whole fails to demonstrate that technology had a significant impact on student learning (Becker and Ravitz, 2001; Cuban, 1986; Maddux, 2003; Oppenheimer, 2003; Peck, Kirkpatrick, & Cuban, 1986). This provides the critics of the technological movement with the ammunition to suggest the investment in technology is unjustified (Cuban, 1986;

Oppenheimer, 2003; Peck, Kirkpatrick, & Cuban, 1986). Maddux (2003) agrees with the critics that exposure to "computers is not automatically educationally beneficial," but goes on to point out that it is that the "value of integrating technology lies in *how*, not *whether*, it is used" (p. 45). The ability of traditionally trained teachers to integrate technology directly relates to the quality of pre-service education and professional development.

Professional development

How to prepare in-service teachers to utilize a tool or practice that they did not receive in their formal training is a question that ushered in the age of professional development in the late 1800s. Throughout the history of professional development and its maturation as an educational field, new advances in educational tools required districts to provide their in-service teachers with additional training to use the new tool (Rury, 2005).

In the earliest effort to prepare veteran teachers to use technology most of the educational technology literature reported that the instruction was focused on computer literacy—art of powering up a new device, accessing popular productivity applications, or the digitalization of administrative tasks of the likes of taking attendance and maintaining a grade book (Becker & Ravitz, 2001; Lemke et al, 1998; & Maddux, 2003). With the cost associated with technology, professional development is often an afterthought. Lemke et al. (1998) documented one of the largest educational technology investments by a state. In this report the authors found that the most common form of professional

development was "informal, self-taught, and as time allowed" (p. 36). This haphazard approach disregarded the change literature first introduced in the 1970s. This literature provided districts with an understanding of change and a set of tools to plan, implement, and monitor change with in an educational environment (Hall & Horde, 1987; Loucks-Horsley & Stiegelbauer, 1991).

The presence of technology is not impacting learning. Cuban (2001) found that the "introduction of information technologies into schools over the past two decades has achieved neither the transformation of teaching and learning nor the productivity gains that" the reform coalitions have sought" (p. 195). Peck, Cuban and Kirkpatrick (2002) go on to suggest that despite "the dramatically increased presence of information technologies… the vast majority of students have school experiences remarkably similar to those of student over the previous 50 years" (p. 479).

Planning for effective instruction

Similar to professional development, the act of planning for instruction has been a matter of concern since the turn of the 19th Century. In 1924, Lois Mossman discussed the importance of planning.

> The classroom teacher should make daily preparation for his work. Failure to do so means indifference, or at least an inferior sort of leadership. Because social environment is constantly changing, the subject matter pertinent to the consideration of any problem varies with the occasion. Failure to use pertinent details is conducive to low standards

> of work with the children. No amount of experience in teaching removes the necessity of organizing anew one's thinking relative to a given situation and of selecting data pertinent to carrying out the proposed activity. (p. 61)

Borko and Livingston's (1989) comparison of veteran and student teachers' planning requirements yielded several findings that help explain that in the delivery of an unfamiliar unit of instruction a teacher is often assisted by formalizing the activities through a detailed lesson plan. In order to assist in the development of a formula for effective planning, several researchers developed planning frameworks/models that were designed to formalize the instructional planning techniques (Haigh, 1981; Hunter, 1982; Johnson & Johnson, 1984; Tyler, 1949).

Need for Study

Cuban (2001) uses the term techno-promoters to describe those people who worked to infuse schools with the latest technology. He identified that in the 1990s, two of the strongest techno-promoters in the United States were President Clinton and Vice President Gore. In 1996 President Clinton made the following statement. "We know, purely and simply, that every single child must have access to a computer, must understand it, must have access to good software and good teachers and to the Internet, so that every person will have the opportunity to make the most of his or her life" (Goldfarb, 2002, p. 8). President Clinton's four 'pillars' challenged the nation to strive for: (1) Modern computers accessible to

each student; (2) Network classrooms; (3) Engaging educational software; and, (4) Teachers using technology to teach with invigorating educations wholesale adoption of technology in the mid-to-late 1990s (Cuban, 2001). It is apparent that the political capital obtained from the support and promotion of technology-based initiatives is not isolated to a particular political party. Clinton's administration developed the universal telecommunications service (E-rate) program (Cuban, 2001). E-rate's mission has been realized with 90 percent of low socio-economical schools having modern networks as compared to only 82 percent of the wealthier-non-E-rate schools (Cambre and Hawkes, 2004). Not to be outdone, President Bush's administration not only continued to support E-rate, but actually increased the educational technology budget by over $60 million dollars in 2001 (Cambre & Hawkes, 2004). The investment in technology is directly related to the push for increased accountability and the hope that technology could serve as a reform agent.

Cuban (2001) reported that the United States actually included technology as a central component of a national school reform agenda. This agenda stressed that high-tech hardware and software will: 1) "Make schools more efficient and productive than they currently are;" 2) "Transform teaching and learning into an engaging and active process connected to real life;" and, 3) "Prepare the current generation of young people for the future workplace" (Cuban, 2001, pp. 13-15).

As seen in Parsad and Jones' (2005) report student to computer ratio of 4.4 comes close to the recommendation of Jamie McKenzie (1998), a prominent

educational technologist, of a ratio "of one networked computer for every three or four students" (¶ 15). Simkins (2006) suggested that "conservative estimates" reported that between 2000-2005 the nation's schools invested over $25 billion on "various forms of technology (¶ 7). Market Data Retrieval (MDR) (2006) report that 50 percent (n=6,807) of the schools that participated in their study had technology budgets greater than $190,000 per year (p. 20). Which is interesting as there are only 1,073 school districts that have an enrollment of 10,000 or more students (MDR, 2006, p. 10). However, MDR (2006) went on to report that the "Tech-Related Training" budget for 9,727 (84%) of the districts was only $49,999 or less (p. 20).

When the level of investment is combined with the limited results discussed earlier, one can understand the concerns of researchers who found that that despite "the dramatically increased presence of information technologies… the vast majority of students have school experiences remarkably similar to those of student over the previous 50 years" (Peck, Cuban, & Kirkpatrick, 2002, p. 479). So a study that specifically reviewed the elements that influenced adopters of a technology-based innovation and documented common pitfalls that prevents educators from adopting the same innovation would be a valued study.

Research Questions

This case study investigated the level of implementation of a cohort of 33 teachers from 13 secondary schools in a southwest urban district who volunteered to participate in a year-long Project for Integrating Curriculum-aligned

Eportfolios (Project I.C.E.). Project I.C.E. called for the implementation of three components—design of e-portfolios, develop four units of instruction, and recruitment of two protégés whom they would mentor in the use of the e-portfolio component. The research was guided by three questions: (a) Does a participant's perceived quality of professional development influence the adoption of e-portfolios? (b) Is there a relationship between the quality of participant's instructional planning and subsequent adoption of e-portfolios? (c) Based on the status of adoption (completer/non-completer), how does each group describe the variables that impacted their adoption/lack of adoption of e-portfolios?

As two of the three guiding question incorporate the concept of quality, it is important to clearly define that concept as relates to each question. The first question, does a participant's perceived quality of professional development influence the adoption of e-portfolios, the concept of quality was determined by each participant's own perceptions. This is measured, as will be discussed in the Data Sources section of Chapter 3, through the combination of Likert-type scales, direct answer, and open-ended questions. The second guiding question to rely on the concept of quality was in relation to instructional planning. This measurement of quality utilized the expertise of a subject matter expert assistance to the Project ICE staff in developing a instructional lesson plan scoring rubric.

Definition of Terms

- *Technology*. For the purposes of this study, technology is defined as the use of the equipment associated with e-portfolios. This includes the use of a

personal computer (PC), digital camera, scanner, and the web-based e-portfolio platform.

- *Professional development* in this study will include the phenomenon labeled professional development, staff development, training, and/or in-service. Guskey (2000) defines professional development as "those process and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might in turn improve the learning of students" (p. 16). While the term *training* could be associated with the behavioristic psychology, it is evident from the context of the literature that it is meant to be synonymous with the educative process most often associated with quality profession development.

- *Portfolio.* A consortium of educators from the Northwest Evaluation Association (NWEA) developed and refined the definition of a portfolio as:

> a purposeful collection of student work that tells the story of the student's efforts, progress or achievement in (a) given area(s). This collection must include student participation in selection of portfolio content; the guidelines for selection; the criteria for judging merit; and evidence of student self-reflection. (Arter & Spandel, 2000, ¶ 11)

As defined, portfolios continuously assess student performance in real-world situations and provide stakeholders with a guide for what is expected of students and the level of quality at which students are expected to perform.

- *E-portfolio.* The creation, storage, and presentation of a portfolio through on electronic platform that allows for a student work to be uploaded to a repository.

- *Instructional lesson plan.* John (1994) defines lesson planning as:

> an activity in which all teachers engage and is recognised as a seminal component of the cognitive functioning of teaching. In fact it is within planning that teachers 'translate syllabus guidelines, institutional expectations and their own beliefs and ideologies of education into guidelines for action in the classroom. (¶ 32)

Summary

The unprecedented movement to equip each and every school with the latest technology shows no signs of slowing. At a national technology conference during the summer of 2006, numerous presentations were offered on how to move your technology program to a one-to-one (one computer for every one student) initiative. The move to a ubiquitous technology presence is seemingly around the corner. However the literature shows little evidence that the presence of the technology is improving the experiences of today's students. By shifting the scope of this study from investigating technology's impact on student learning, the researcher hopes to identify the elements that influence the adoption of a new technology-based innovation.

CHAPTER 2

REVIEW OF THE LITERATURE

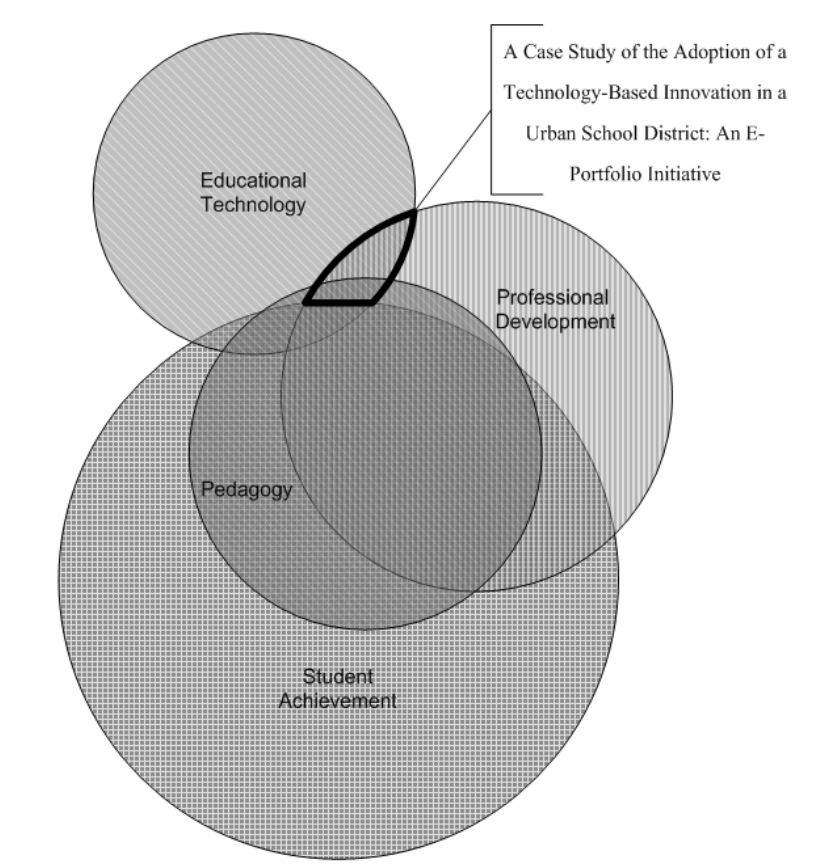
The current study investigates a single trait across several different contexts—technology, professional development, and instructional planning (as a pedagogical practice). By investigating the adoption of a technology-based innovation through these three lenses, consumers of this research should have a rich description from which they can extrapolate information they find relevant for their purposes.

Figure 1, presents educational technology, professional development, and pedagogy as they influence each other and the ultimate goal of student achievement. As the literature review will demonstrate, technology is a growing aspect of education, but until recently it has little impact on student achievement, but as the field continues to mature and research highlights effective practice, the sphere of *Educational Technology* will integrate into the sphere of *Student Achievement*. Conversely, this literature review will demonstrate the field of professional development has been a primary vehicle for the development of pedagogical practice that has a strong impact on student achievement, thus the spheres of *Professional Development* and *Pedagogy* are deeply integrated into the sphere of *Student Achievement*. In the spirit of the case study methodology, this study will investigate the highlighted area of intersection between Educational Technology, Professional Development, and Pedagogy.

In order to truly explore each of these contexts, it is important to introduced the broader description of each of these areas that exist in the professional literature. This effort will start with technology and describe the recent history of the computer in education. Next, this review will move to the area of professional development research. Finally, the review of the literature will turn its focus on the aspect of instructional planning and the ramifications of a well-defined instructional plan on attainment of instructional goals and objectives.

Figure 1

Conceptual Framework for Review of Literature



Technology

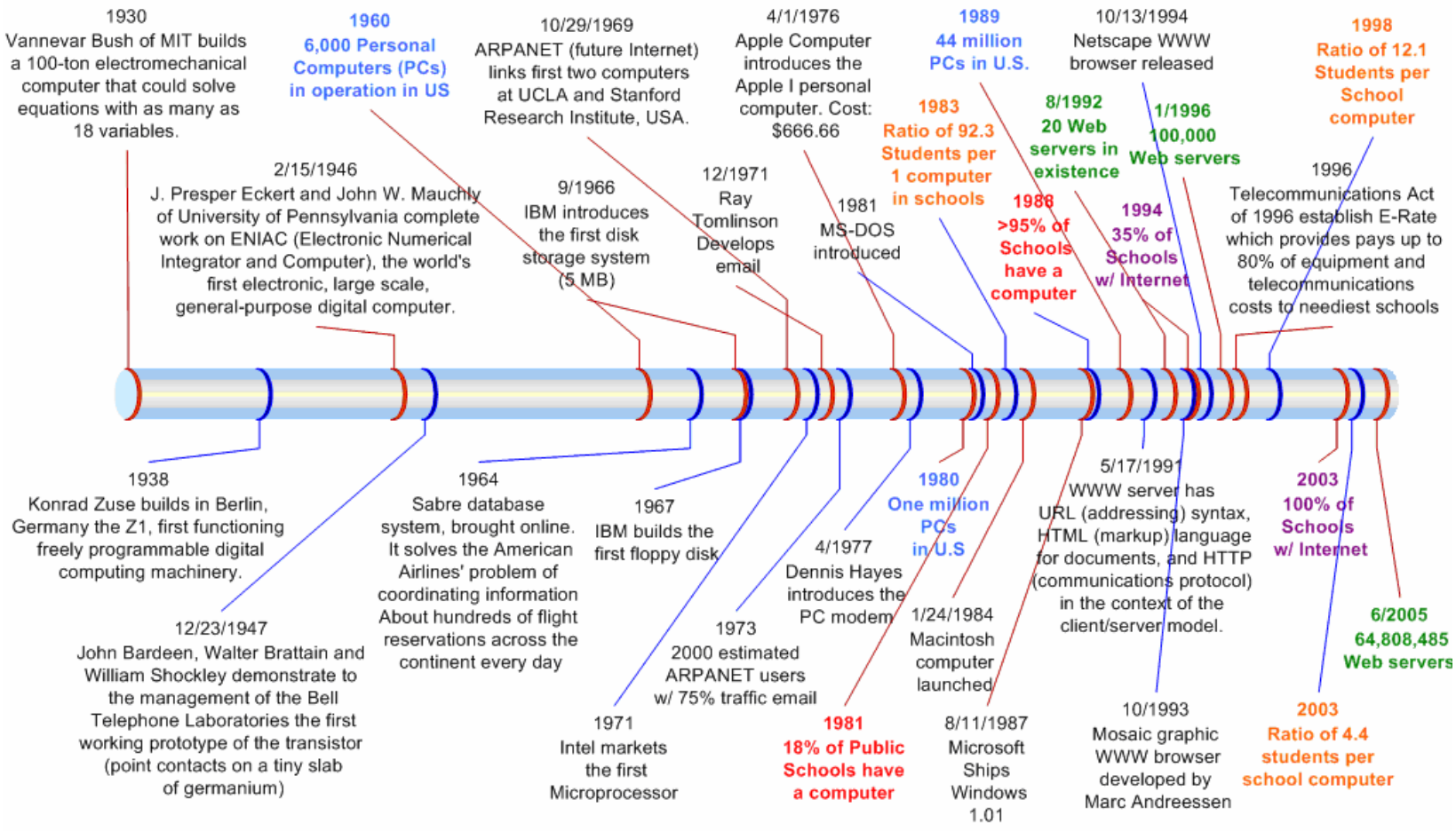
Computers and the Internet.

Historical review of the computer in education. Despite previous technology-based movements (radio, film, television), the term educational technology is often associated with the computer and its role in education. In order to provide a strong understanding of the adoption of technology, this section will examine the literature related to technology from the conception of the first computer to the national movement to provide students access to the technology of today. In order to facilitate this discussion, Figure 2, Emergence of Computers in Education Timeline: 1930-2006 will be used to illustrate the context in which technology was developed.

In 1930 Massachusetts Institute of Technology's (MIT) Bush built a 100-ton electromechanical computer that could solve mathematical equations with as many as 18 variables (Ciolek, 2003). The infamous ENIAC (Electronic Numerical Integrator and Calculator) was the brain child of Eckert and Mauchly of the University of Pennsylvania and was the world's first "electronic, large scale, general-purpose digital computer". The new found computing power of the ENIAC was quickly put to work calculating ballistic missile trajectories (Ciolek, 2005).

As established corporations such as the International Business Machines (IBM) began to market and sale the early computing machines, the evolution and maturation of the computer shifted from the university laboratory, but armed with

Figure 2: *Emergence of Computers in Education*



From Carlson, Burgess, and Miller (1996), Ciolek (2005), Means, Blando, Olson, et al. (1993), Office of Technology Assessment (1988), Parsad & Jones (2005), Saettler (1968), and Saettler (1990).

the necessary resources of corporate America and Bell Telephone Laboratories' transistor the computer grew smaller and more powerful.

One of the earliest computer-based interventions for public schools was computer-assisted instruction (CAI). Means et al. (1993) credited Patrick Suppes of Stanford University for developing a highly structured system that featured learner feedback, lesson branching, and student record keeping as early as the 1960s. However, it was as late as the 1970s that the CAI systems required a mainframe computer and timesharing, thus severely limiting public school children's access to university sponsored programs.

While the largest part of the corporate computer manufacturers budgets were dedicated to the continued evolution of business-based computers, the development of the desk-based 'personal computer' or commonly known as the PC, provided a usable solution for the public schools. During the early to mid 1970s a series fledgling computer companies sprang up in garages. Through their innovative research and marketing, these companies began to move computers from a business-only device to a tool for all sectors of society. One such company, Apple Computers, was one of the first companies to successfully enter the public education market, and due to their early success continue to enjoy a relatively large percentage of that market despite the dominance of the Windows-based systems in today's mainstream society.

Education's state of technology. As late as 1998, "the level of technology access" was not found adequate to meet the education system's learning goals

(Lemke et al., 1998). To illustrate the rapid growth in the acquisition of technology, between 1981 and 1988, the number of schools that had *a computer* increased from 18% in 1981 to over 95% in 1988 (U.S. Congress's Office of Technology Assessment, 1988). Now that the majority of schools had a computer, the question moved to that of student to computer ratios. The student computer ratio fell from 92.3 students per computer in 1983 to ratio of 12.1 students per computer in 1998. Despite the fact that the 1983 figure compared students to any type of computer, including administrative workstations, the ratio was reduced by a factor of 7.6 over a 16 year time span (Office of Technology Assessment, U.S. Congress, 1988; Parsad & Jones, 2005). That ratio would be reduced from 12.1 in 1998 to 4.4 students per one instructional computer in 2003 or reducing the student computer ratio by a factor 2.75 (Parsad & Jones, 2005). So the question of "should schools acquire technology" is not a relevant question as it is evident that technology is now in the schools. The paradoxical nature of technology more computing power for less money did play a role in the almost exponential infusion into schools. However, this nature of technology actually has been well documented.

Three years before co-founding the Intel Corporation, Gordon Moore predicted that the power and complexity of integrated circuits would double every 18 months, while the cost would decrease by one half—this prediction is often referred to as Moore's Law (McCain & Jukes, 2001, p. 45). Today, a school could purchase approximately 10 computers for the cost of a single computer in

1986.[1] But the increased value was not the only reason for the schools acquisition of technology, socio-political forces were also at play.

Goldfarb (2002) credits President Clinton with the following 1996 quote concerning technology. "We know, purely and simply, that every single child must have access to a computer, must understand it, must have access to good software and good teachers and to the Internet, so that every person will have the opportunity to make the most of his or her life" (p. 8). Cuban (2001) credits President Clinton's "four 'pillars'" he challenged the nation to strive for: (1) Modern computers accessible to each student; (2) Network classrooms; (3) Engaging educational software; and, (4) Teachers using technology to teach with invigorating educations wholesale adoption of technology in the mid-to-late 1990s (p. 16). President Clinton and Vice President Gore proposed a universal telecommunications service (E-rate), a subsidy to assist schools and libraries to establish telecommunication networks at low socio-economical communities through equipment and installation discounts (Cuban, 2001). E-rate's mission has been realized with 90 percent of low socio-economical schools have modern network as compared to only 82 percent of the wealthier-non-E-rate schools (Cambre & Hawkes, 2004). This push for technology did not stop with the change in administrations. President Bush's administration increased the

[1]A complete computer system (Dell® Dimension B110) could be purchased for $299. (as of April 17, 2006).

educational technology budget by over $60 million dollars in 2001 (Cambre & Hawkes, 2004).

Cuban (2001) highlighted that the United States actually included technology as a central component of a national school reform agenda. This agenda stressed that high-tech hardware and software will: 1) "Make schools more efficient and productive than they currently are;" 2) "Transform teaching and learning into an engaging and active process connected to real life;" and, 3) "Prepare the current generation of young people for the future workplace" (Cuban, 2001, pp. 13-15).

As seen in Parsad and Jones (2005) report student to computer ratio of 4.4 comes close to the recommendation of Jamie McKenzie (1998), a prominent educational technologist, of a ratio "of one networked computer for every three or four students" (¶ 15). If the trend continues, that mark will be passed in the next several months. Now infused with the technology, several studies were conducted to analyze the effectiveness of and/or status of the technology initiatives at the school, state, and even national perspective.

Technology's impact in education. Several studies suggested that presence of technology does not assure student success. Lemke et al. (1998) presented three challenges highlighted through an evaluation of Virginia's state-wide educational technology initiative. The authors suggested that schools encountered: "K-12 students and educators are gaining expertise in basic computer skills but generally are not using technology effectively to improve

student learning" (p. 5); "The Commonwealth lacks many of the essential conditions necessary for the effective use of technology in schools" (p. 7); and, "Technology use in Virginia schools focuses primarily on skill development rather than advancing student learning across the core Standards of Learning" (Lemke et al., 1998, p. 8). Virginia's teachers received basic computer skill and application training, but limited training in curriculum integration. This is not just an isolated case, as we see in a Smerdon et al.'s (1999) study of technology at the national level entitled *Teachers' Tools for the 21st Century : A Report on Teachers' Use of Technology*. Teachers reported the most common training was the basic computer training (96%), followed by software applications (88%), the use of the Internet (87%), and finally, the integration of technology into the curriculum and classroom instruction (79%) (Smerdon et al., 1999). Lemke et al. (1998) investigated the focus of trainings by reviewing the design of the common professional development offerings. He found the most common (95 percent of participating teachers) professional development consisted of "informal, self-taught, and as time allowed" trainings (Lemke et al., 1998, p. 36).

Studies did identify positive trends and relationships between several different technological-based variables and student success. Smerdon et al. (1999) found that half of public school teachers were using computers and the Internet in a mixture of traditional (practicing drills) and innovative (research and solving problems) teaching methods. Mann, Shakeshaft, Becker, and Kottkamp's (1999) study determined that the more of each "of the model components that the

student experienced, the higher the gain score on the Stanford-9. The [West Virginia Basic Skills/Computer Education] BS/CE technology regression model accounts for 11% of the total variance in the basic skills achievement gain scores of the 5th-grader students" (p. 12). The model components included:

> [S]oftware that focuses on the State's basic skills goals in reading, language arts and mathematics; enough computers in the schools so that all students will be able to have easy and regular access to the basic skills software; and professional development for teachers in the use of software and the use of computers in general. (p. 11)

Lewis Solmon's (1998), *Progress of Technology in the Schools: Report on 21 States* specifically looked at six different dimensions that the Milken Exchange has determined to be indicators of effective technology use. These dimensions include learners, learning environments, professional competency, system capacity, community connections, and technology capacity.

In the study, Solmon (1998) found a significant and positive relationship between the percent of classroom time spent *using computers* and both student engagement in learning and their deepening understanding of academic subjects. There was also a weak, but positive correlation between *drill and practice* and deeper understanding of academic subjects (Solmon, 1998). He went on to report that:

> [students are more engaged and have a] deeper understanding of academic subjects where students are reported to be using technology in at least

> some of their regular classrooms, becoming more independent learners, and developing on-line research expertise, and where teachers are reported to be providing inquiry-base learning projects, to be doing more individualize instruction, and to be integrating technology-base software into the teaching and learning process. (Solmon, 1998, p. 57)

It takes a motivated and *trained* teacher to successfully integrate technology into his/her daily classroom activities. Several of the studies cited above also have made the connection to successful implementation and a teacher's preparedness. A student whose teacher had more technology training and skills, and the training offered incentives for participation are more likely to be more engaged in learning and have a deeper understanding of the academic subjects due to technology in the classroom (Solmon, 1998).

Teachers who reported being better prepared to use technology were more likely to use it than teachers who were not prepared (Smerdon et al., 1999). This use extended from creation of instructional materials (88% compared with 50%) to the creation of multimedia presentations (55% compared with 12%) (Smerdon et al., 1999). The same study also found that 66% of teachers who reported feeling well prepared or very well prepared to use technology indicated that they assigned students to use computers or the Internet to solve problems or analyze data, compared with 47% of teacher who reported feeling somewhat prepared and 14% of teachers who reported feeling unprepared (Smerdon et al., 1999). Teachers cited they gained the preparation from independent learning (93%),

professional development activities (88%), colleagues (87%), students (54%), and college/graduate work (51%) (Smerdon et al., 1999). Teachers who reported spending nine hours or more in professional development were more likely to report feeling well prepared or very well prepared to use computers or the Internet than those who reported spending fewer than nine hours in such activities (Smerdon et al., 1999).

While the involvement in professional development has demonstrated an increase in use (adoption) of technology in the classroom, it is important to point out that the training reviewed by several researchers focused on the computer and not the curriculum. Sandholtz and Reilly (2004) document that much "of training emphasizes computer literacy, with a focus on fundamental computer operation and standard applications rather than curriculum based" (p. 488). Lemke et al. (1998) made the following recommendation to the Commonwealth of Virginia in their evaluation of the states technology efforts.

> [There remains] a need for more technology in schools. Yet study results indicate that there are other important unmet needs as well. In terms of professional development, while educators in Virginia are acquiring skills in the use of technology, they have not yet acquired the knowledge and ability to use technology effectively in ways that add significant value to student learning and performance. (Lemke et al., 1998, p. 35)

Sandholtz and Reilly (2004) go one step further and suggest that through evidence of a case study of a district that made the first priority of a technology implementation the integration of that technology into the curriculum versus the introduction of basic technical skills. "To help teachers become more productive in their use of technology, we need to help them focus more on instruction and learning, and less on bits, bytes, and backups" (Sandholtz & Reilly, 2004, p. 510).

Jamie McKenzie (1998) documents the late 1990s technological rush. "In many cases, districts spend millions of dollars only to wake up with the 'screensavers' disease.' …The… rush to network schools pays too little attention to student learning and staff development" that are needed to truly integrate technology into schools daily instructional practices (¶ 14). In study after study, the design of the study made the technology the independent variable with student achievement the dependent variable. All too often the researchers left out the second (to the learner) most crucial element of any learning system—the teacher. Becker's (1999) research found that a teacher's pedagogy did have an impact on classroom use of technology.

> [The] most consistently facilitative of greater levels of use—high levels of classroom connectivity; computer expertise; *constructivist pedagogy* [italics added]; participation in staff development; high frequency of informal contacts with other teachers; involvement in professional leadership activities; being a young teacher; and not being a mathematics teacher. (p. 32)

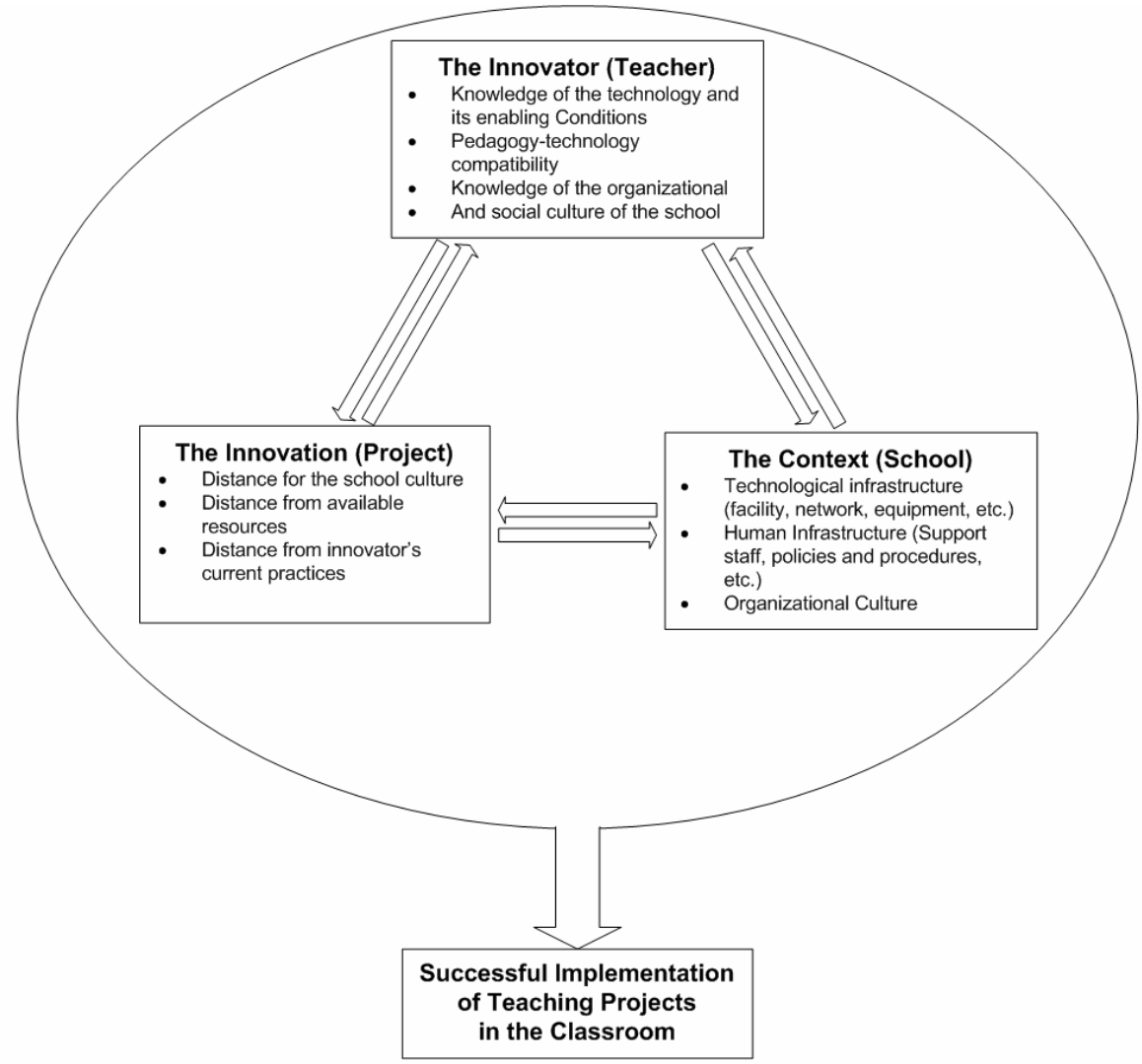
Zhao, Pugh, Sheldon, and Byers (2002) identified 11 "salient factors that significantly impact the degree of success in classroom innovations" (Zhao et al., 2002, p. 482). These factors were placed into one of three domains—teacher, context, and innovation (see *Figure 3*).

When combining the factors and domains, a complex interaction must take place in order for the project to be successful. The insight into the "Pedagogy-technology compatibility," "Distance for the school culture," and "Organizational Culture" are of special interest. If a teacher has a traditional pedagogy, then he/she would be much more comfortable in the drill and practice environment were students are asked to complete exercises very similar to the worksheets. Where as an environment of a week long student-centered activity where groups of students are exploring divergent themes may seem somewhat chaotic. If the school where a teacher is attempting the student-centered activity is a traditional-based school (innovation is a great distance from the school's culture), a teacher would have additional roadblocks as his/her parents, peers, and administrators may be unfamiliar with the employed teaching strategies and might even feel that it isn't teaching if the class is not quietly taking notes. Finally, if there is not a support system (Organizational Culture) in place to assist in successful adoption of technology, then more often than not, the greater the challenge the innovator will have in facilitating a successful implementation. Technology requires network, technician, and administrator support for ongoing success, as equipment will malfunction. If the technician or administrator believe that the secretary's

computer takes priority, then the use of technology for instruction is harder to achieve.

Figure 3

Conditions for Classroom Technology Innovations



From Zhao et al., 2002, p. 490

The value of educational technology. A major critic of technology's role in public education is Larry Cuban, who has authored two books and numerous

journal articles that highlight the limited success and high cost of technology in education. In *Teachers and Machines: The Classroom Use of Technology Since 1920,* Cuban (1986) documented the limited adoption of radio, instructional film, television, and computers. With each medium he presented that the technological buzz created by "technology-promoters" who were quick to forecast how technology would revolutionize how their students would learn in the not-to-distant future. Cuban (2001) expanded his study of technology in schools and found that the "introduction of information technologies into schools over the past two decades has achieved neither the transformation of teaching and learning nor the productivity gains that" the reform coalitions have sought" (p. 195). He goes on to suggest that despite "the dramatically increased presence of information technologies… the vast majority of students have school experiences remarkably similar to those of student over the previous 50 years" (Peck, Cuban, & Kirkpatrick, 2002, p. 479).

Joining in Cuban's dissenting voice is Todd Oppenheimer. Oppenheimer (2003) contends that "the presence of state-of-the-art technology is in general making matters worse" in areas of student achievement (p. 395). In an article reviewing the research of technology in education, Maddux (2003) agrees with Cuban that exposure to "computers is not automatically educationally beneficial," but goes on to point out that it is that the "value of integrating technology lies in *how*, not *whether*, it is used" (p. 45). An explanation of why technology does not have a greater impact in the core-subject areas is often a matter of access. Becker

and Ravitz (2001) point out that the majority of the computers purchased by schools were first used in the business/vocational classrooms (e.g., 80% of usage in computer course). This was a priority so that students were prepared to use the equipment found in the public sector. As business/vocation subject areas have little direct impact on student achievement on standardized test scores, it is understandable that early investments did not yield the academic improvement for which supporters had hoped.

Maddux (2003) contends that "few, if any, important questions in education have simple answers, and few, if any, educational problems have single causes" (p. 37). He goes on to suggest one reason why technology research has failed to produce significant improvements is the "tendency for professionals in the field of information technology in education to be unduly influenced by fad and fashion" (p. 41). All too often educators allow themselves to be influenced by *fantastic, to-good-to-believe*, results as presented by other teachers, popular media, and/or educational salespeople. "Information gained from such sources tends to be biased and potential advantages highly exaggerated" (p. 42). So when they begin to implement and do not see the promised results, they eagerly accept the next solution that will revolutionize learning. "When short-lived fads dominate a field, there is no time for a critical body of early literature to be produced on a specific topic and lead to more complex, creative, and sophisticated questions and designs" (p. 42).

Finally, in the discussion technology's worth, Stallard and Cocker (2001) suggest that the impact of technology on core services is a gradual process. They offer that business, industry, government, and military organizations are in fact successfully using technology in their fundamental operation today. The reason they provide is as oppose to education, those organizations began the integration process more than two decades earlier. "Before real change could take place, pioneering individuals and groups had to make effective use of the primitive IT tools of the time and teach the rest so that they could follow" (p. 21).

Technology's role in the classroom. In Bull, Bell, and Kajder's (2003) *The Role of 'Computers in the Schools' Revisited,* Wentworth and Earle (2003) define three paradigms that attempt to categorize the use of computers in an educational setting. These three paradigms—tutor, tool, and paradigm—are explored in Bull, Bell, and Kajder's (2003) Eras of Computers in Schools (Table 1). For the purposes of this literature review, only the first era will be explored to introduce how some see technology impacting the classroom.

The Tutor paradigm refers to CAI, or a "process-product model of computer use in education in which students use drill-and-practice programs" (Wentworth & Earle, 2003, p. 80). This form of computer use has been well researched and reviewed. The proponents of this paradigm were quick to point out that that a supplemental CAI program had consistently yielded an average gain of one to eight months of instruction in elementary students and provide best results with lowest achieving students (Office of Technology Assessment, U.S.

Congress, 1988). Proponents warn that drill-and-practice limits "independent thinking and creativity" (Wentworth & Earle, 2003, p. 80).

Table 1

Three Eras of Computers in the Schools

Era	*Focus*	*Activities*
Early	Theoretical Exploration	"Tutor, Tool, Tutee" Paradigm Established
Intermediate	Applied Implementation	Networks Developed, Multimedia Created
Universal Access	Transformation	Social and Educational Systems Changed

From Bull, Bell, and Kajder (2003) p. 60.

The second paradigm is using a computer as a Tool, or to "enhance learning in traditional subject areas" (Wentworth & Earle, 2003, p. 81). Uses would include the use a of a database/Internet to research a topic; the use of a word processor to developed a research paper; and/or, utilizing a presentation software, graphics, videos, and/or audio to present information on that topic. This paradigm in most often referred to as *technology integration*, a buzz word and ultimate goal of the 1990s in technology education.

The final paradigm defined in Wentworth and Earle (2003) is Tutee or actual computer programming. They contend that in teaching a student to

program you are providing the student an insight in how a computer works or even thinks. They offer research that reports that programming increased students' problem-solving, planning, logical thinking, and even variable understanding skills.

Each of the three paradigms requires an interaction with the curriculum of the classroom. The degree of that interaction is determined by the environment of the school, classroom, and the philosophical foundation of the teacher leading the instructional process.

Curriculum meets technology. Due to the complex interactions of a learning environment (Gura & Percy, 2005; Marlowe & Page, 2005; Sandholtz & Reilly, 2004; Zhao et al., 2002), it is important that the technology-enthusiast realize that providing a classroom with computers and training teachers on how to use the technology (basic computer skills and applications) does not ensure that the technology will impact that classroom. For true technology integration to occur, the curriculum must be the point of improvement. How else can you improve student achievement (result of instruction), if not to change the instruction? It was Albert Einstein who was quoted as saying: "Insanity: doing the same thing over and over again and expecting different results" (BrainyQuote, 2006, ¶ 1).

To aid in the discussion of curriculum, this literature review will select Dobson, Dobson, and Kessinger's (1980) categorization of three philosophical camps—essentialism, experimentalism, and existentialism—to aid in framing this

discussion. Of the three camps, the third camp is not well represented in the literature. While elements of existentialism or to "live a full life;" to experience the environment; to continue learning personal truth" are beginning to creep in the educational technology literature, the literature base is anemic and would not be well represented (Dobson et al., 1980, p. 56). This section will then focus the discussion on remaining two curriculum camps—Design A (essentialism or behavioralism) and Design B (experimentalism or pragmatism or constructivism) (Dobson et al., 1980).

Marlowe and Page's (2005) *Creating and Sustaining the Constructivist Classroom* (2nd ed) suggests that despite the past four decades of literature calling for reform and the "growing body of supportive research," that the "dominant mode of instruction to be large group, teacher controlled recitation and lecture, based primarily on the textbook" (p. 21). They go on to argue that since the arrival of the information explosion, "information doubled between 2000 to 2003 and will continue to double every three years" that there is "no way teachers and students can manage that amount of information in a traditional 'teacher-telling,' 'student-listening' approach" (Marlowe & Page, 2005, pp. 21-22). Pfundstein (2003) identified two by-products of technology—active learning and student-centered instruction. He goes on to suggest that "through the use of technology, students are literally in control of the primary learning tool" (Pfundstein, 2003, p. 79). Cambre and Hawkes (2004) state that the "constructivist learning approach

has created a shift in instruction design from standardization to customization" (p. 50).

A question might surface in today's educational environment that places such a strong emphasis on specified set of outcomes that are behaviorally tested, how could anyone utilize a constructivist approach. Marlowe and Page's (2005) latest edition provided insights into how a practicing constructivist utilizes a student-centered classroom with the mandates of No Child Left Behind (NCLB) hovering.

> As the implementation of the NCLB and standardized testing movements bore down on Jan's school, her principal required that all teachers post the students' standardized test scores… outside their rooms for all to see. She did not, however, change her constructivist classroom and approaches.
>
> The principal was incensed when she realized that Jan's students' scores were higher than the scores of other teachers—especially since the other teachers were traditional teachers or had reverted to traditional approaches, including teaching to the test to enhance (they thought) test scores. (p. 81)

When contrasted with the traditional behaviorist environment, the technologist that holds to this ideology would see computers and their applications as preparing students for the world of work (Cambre & Hawkes, 2004; Cuban, 2001). Cuban (2001) presented that only four teachers of 35

observed had, in fact, changed their daily pedagogy. He indicated the vast majority of the teachers "used a familiar repertoire of instructional approaches" (Cuban, 2001, p. 95). Gura and Percy (2005) document the technologies that would be welcomed by an Essentialist.

> In a traditional classroom, after wrong answers are discussed briefly, it is time for the class to move on. Time is precious, so no wonder performance levels are low.
>
> Not with instructional software, though. The computer keeps redirecting the student to the same type of question that he is getting wrong. It adjusts the level of the question to meet his level of competency and interjects supplementary bits of information and explanation as the database drills down to specific weakness in understanding. (p. 58)

The above quote is describing an *integrated learning systems* (ILS). Picciano (2002) suggests that the ILS represented the "most intensive use of technology in teaching and learning available today…. They [ILS] are designed not to be an adjunct to teaching but actually to perform the teaching function" (p. 42). This dedication to a core set of information (truth), utilizing a disciplined and structured environment is an Essentialist definition of quality education (Dobson et al., 1980; Joseph et al., 2000; and Schubert, 1986).

An Essentialist is what Feinberg and Soltis (1998) would label a Functionalist or someone who "sees schools as serving to socialize student to adapt to the economic, political, and social institutions of society" (p. 6). They go

on to suggest that compulsory "education facilitates the development of new skills that the continuous expansion of technology requires" (Feinberg & Soltis, 1998, p. 17). This view point is often the first reason provided in advocating technology-infused schools.

Professional Development

Defining Professional Development

Guskey (2000) defines professional development as "those process and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might in turn improve the learning of students" (p. 16). In an article published four years earlier, Guskey and Sparks (1996) linked three major categories: content characteristics (knowledge, skills, and understandings), process variables (type and forms of staff development activities), and context characteristics (organization, system, or culture) to the impact of staff development on student learning. In discussing inservice, Neil (1987) quotes Dewey as saying:

> Now the value of the formulated wealth of knowledge that makes up the course of study is that it may enable the educator to determine the environment of the child, and thus by indirection to direct. Its primary valued, its primary indication, is for the teacher, not the child. (cited in Neil, 1987, p. 13)

Armed with a basic concept of the phenomenon labeled either professional development, staff development, and/or inservice, a historical review will provide

readers an examination of the early call for the improvement of teachers' knowledge and skills set through today's multifaceted staff develop models. However, to provide a meaningful timeline of staff development, it is important that we establish a timeline of American education.

Education's Historical Implications

The inception of American education can be traced back to the religious settlers of the "New World" whose dedication to their beliefs required the pious training of their youth to read to scriptures (Rury, 2005, p. 30). In 1647, "Massachusetts enacted a law requiring towns of 50 families or more to establish a school, to confound the 'Old Deluder Satan'" (Rury, 2005, p. 32). As the Puritan ideology gave way to the "industrialization" of the 1800s, the educational system was prime for change and evolution. Rury (2005) states that the "[e]conomic development contributed to the expansion and improvement of education; as income grew and the economy became more complex, people attached greater value to schooling" (pp. 57 & 58).

By 1850, the majority of the large cities had rudimentary school systems in place (Rury, 2005, p. 67). The three decades between 1830 and 1860 "is considered the first great period of school reform in American History" (Rury, 2005, p. 74). Horace Mann, who might be considered the most famous proponent of common-school reform, advocated the separation of church from the schools so that children of different faiths could learn in the same institution (Rury, 2005).

The efforts and outcomes of Mann and his peers are often recognized as the foundation of today's American educational system (Goldin, 1999).

The Foundation of Professional Development

Mann's efforts also reached into the realm of teacher professionalism. Mann and his fellow reformers began to push for "systematic examinations and minimum training requirements for teachers, to raise the level of instruction and to help establish a professional identity for teachers" (Rury, 2005, p. 76). In 1838 Massachusetts established the first publicly supported teacher-training institution and was known as a normal school (Rury, 2005). The development of additional normal schools and their teacher pre-service programs began to expand throughout the last half of the 1800s until 1920, when they were the norm.

The turn of the century witnessed several of the first inservice efforts that attempted to provide a venue to increase teacher knowledge and skills. Krug (1972) introduced several inservice initiatives (institutes, reading circles, and summer school). For the most part the participation in these inservice events was voluntary, with a select few teachers who were provided a strong recommendation from school/district administration to attend.

The institute was very similar to today's conference. Groups of teachers were gathered to listen to an "educational expert" talk to a specific topic or subject deemed by the organizing agency to be a timely relevant area that teachers needed to be exposed to. The sponsor of the institute (locality, county, or, larger

metropolitan districts) determined the national standing of their speaker(s) (Krug, 1972).

The Early 1900s.

The second intervention of the early 1900s was the reading circle. This development tool was designed to provide teachers the opportunity to read professionally. Often a state teachers' association or state department of education would arrange for teachers to buy books from an approved reading list. Krug (1972) provides the example that in 1920-1921 in Ohio, participating teachers could purchase five books for seven dollars. While participation was semi-voluntary, it was advantageous for teachers to participate as some of the states with certificate renewal exams might include questions covered by these books (Krug, 1972).

Krug (1972) identifies that the favored venue for provide practicing teachers access to further content knowledge was summer school. In 1927, 45 percent of the entire work force of "845,000 teachers, administrators, and supervisors" enrolled in summer school course work (p. 158). Often this occurred on the campuses of higher learning institutions. An interesting by-product reported by Krug (1972) was that "teachers could get better jobs by getting to know people from other school systems" (p. 159). This socialization component was also present in the institutions introduced earlier.

As the normal schools began to provide rigorously trained professional educators, the inservice practices began evolve to address the whole act of

teaching. One such evolution, as described by Monroe (1913), was the use of classroom observation and/or demonstration for inservice purposes (cited by Neil, 1987). This practice encouraged teachers to observe each other's classrooms in action.

Richey (1957) reported that the 1920s inservice opportunities expanded to include summer normal schools, evening extension courses, local teachers' reading circles, classroom supervision and consultation, and correspondence courses. However, the emphasis shifted from the narrow "subject-content review" to a richer offering that included cultural expression, pedagogy, specialist councils in vocation education, art, music, and home education (Harris, 1976, p.180).

The next 20 years (1920 through 1940), the emerging psychological theories encouraged inservice to become "less authoritatively managed, and more akin to guidance" (Richey, 1957, p. 58). As the professionalism of education matured, the effect of studies conducted by normals, teacher's colleges, departments of education, and teacher associations yielded information that was shared with practitioners via new inservice curricula. In Canada, the establishment of government certification was an effective lever in increasing the quantity of inservice activities offered. Despite the new research and inservice curricula, in the late 1930s most inservice activities were still aimed toward remedying teachers' patchy pre-service training (Corey, 1957).

The 1940s to 1970s.

During the next 30 years (1940 through 1970), American education experienced its awkward growth spurt that generated an extreme demand for "credentialed personnel." Joyce (1981) reported that the teacher workforce doubled from roughly one million persons in 1940 to over two million in 1970 (p. 113). The schools of education struggled to meet these demands due to the fact that, of those students graduating, only a third actually would be teaching after three years in the classroom (one third never entered the profession and on third left the profession after the first three years) (Joyce, 1981). With the demands of teaching and supervising such large numbers of candidates, the "professional preparation was brief" (Joyce, 1981, p. 113).

Two of today's most common inservice tools —workshops and action research—became staff development mainstays in the 1950s educational landscape. Richey (1957) offered that the term workshop dated back to 1936 and consisted of a "number of teachers working together, with resource persons and a director, under conditions that [were] designed to provide for individual growth through contact with a stimulating environment" (p. 62). He continued to describe action research as an "instrument for the development in teachers of the ability and desire to apply the methods of science to the solution of their own educational problems" (p. 63). At its core, action research utilizes practicing professionals to formulate solutions to real-world problems; they would implement their solution, and evaluate the outcomes of their project and program.

Dillon-Peterson (1981) identified two major forces that impacted "education's decade of innovation" or the 1960s. First, society came to the realization that schools were not meeting the needs of all of its students, specifically the disadvantaged. Secondly, the professional climate of America's schools encouraged innovation, "often introduced in an ad hoc manner, with little other rationale that it 'felt right'" (p. 1). Dillon-Peterson (1981) described how the innovation usually was abandoned as "reactionary forces demanded an accounting or a return to more traditional ways of learning" (p. 2).

The mid-1960s welcomed a large number of social reforms—integration, multicultural curriculum, and mainstreaming. Contrary to previous decades critical teacher shortages, the teaching workforce had stabilized and began to mature as professional educators. This provided administrators, districts, state and federal agencies with the monumental task of providing staff development on how best to accomplish these new educational reforms (Joyce, 1981). The 1960s also found that the teacher organizations began an active role in advocating for their constituency, which began to stress the teacher/administrator relationships (Joyce, 1981). Neil (1987) suggests that this "degeneration of teacher and administration cooperation" coupled with the "rapid expansion of the curriculum field" limited the growth of the professional development field and one could argue that it actually regressed during this turbulent decade (p. 11).

Joyce (1981) reflected on the mindset of the 1970s. "The schools were being attacked for failing to teach the basic skills. Flesch's book *Why Johnny*

Can't Read was followed by suggestions that Ivan *could*" (p. 115). Neil (1987) offered five reasons why inservice teacher education became a vital concern: first, "[s]trong teacher organizations demand professional development;" secondly, public outcry and concern to the falling test scores of students; next, shift from pre-service preparation of new teachers for the "'on-the-job' focus of inservice;" the expense of the pre-service programs were much higher than "municipal expenditures through inservice;" and finally, "acceleration of new knowledge" in all the educational fields, demanded consideration of ongoing staff development opportunities (p. 11). This concern translated to a strong emphasis on improving the schools and a concerted investment by the federal government to facilitate that improvement.

This decade also yielded some of the foundational staff development models that continue to impact how staff development activities are conducted. Centered on the concepts of innovation and successfully planned implementation of said innovation, these models yielded the research that brought staff development to the foreground in the school improvement movement. Carter (2001) credits this focus on the additional emphasis the federal government, primarily the National Institute of Education (NIE), "became greatly concerned with the question of implementation and began funding projects that specifically investigated these concerns" (p. 2).

As the implementation of an innovation became a common thread in staff development efforts of the early 1980s, the educational environment began to

emphasize the improvement of instruction (Bailey & Little, 1996). Through practical trials, researchers began to utilize a collaborative element in their programs. As the evidence from these programs were disseminated throughout the field, the staff development model once again seemed to evolve to become what some would identify as the "coaching and context" model (Carter, 2001, p. 4). An example of an 'instructional model' that emerged during this decade is the Madeline Hunter's *Total Decision Making Model*. This model provided educators with seven teaching steps that might be utilized (depending on the teaching design and environment) to organize the instruction.

The staff development of the mid-1980s (continuing through the mid-1990s) was recognized as a key tool of school reform. In a 1997 work, Sparks and Hirsh identified that "[s]taff development was intended to train the teachers of today, in the spirit of reform, in order to educate the children of tomorrow" (cited in Carter, 2001, p. 5). With the reform of the whole (school) in mind, staff development began to shift the focus from the individual to the school, from the isolated component to the system. Carter (2001) suggested the four guidelines for staff development as identified by Lieberman and Miller as encapsulating "the work of other scholars in the field of staff development" during the mid 1990s. The guidelines were:

- Staff development was culture building. Effective staff development had to be held within the boundaries of the individual school culture.

- Staff development was putting teaching inquiry into practice. Teaching was a reflective practice. Teachers needed time to reflect on what worked and what did not work in their classrooms.
- Staff development was about human development and learning. Staff development ideally should organize and promote learning for students and teachers.
- Teaching was a craft. Teachers make, remake, shape and reshape the classroom experience. Individual artistry and integrity must be respected and allowed to grow. (p. 6)

As staff development enters the 21st century, and continues to serve as a central tool in the efforts of educating the nation's children, the field "is in a state of flux with future direction not clearly established" (Carter, 2001, p. 7). While the guidelines above have "given way to reform and counter-reform movements" the majority of the concepts in practice continue to evolve into tomorrows favored practice/model (Carter, 2001, p. 7).

Professional Development Strategies that Promote Adoption.

One of the most respected research teams in today's field of educational professional development is Bruce Joyce and Beverly Showers. Joyce and Showers (2002) first expanded on the concept of coaching—a prolonged follow-up and/or support of an expert—in the early 1980s. They "found that continuing technical assistance, whether provided by an outside expert or by peer experts, resulted in much greater classroom implementation than was achieved by teachers

who shared initial training but did not have the long-term support of coaching" (Joyce & Showers, 2002, p. 84). The impact of including a coach is evident in Table 2: In this table the outcomes of the professional development are investigated over the four training components. As seen Peer Coaching provides

Table 2

Training components and attainment of outcomes in terms of percent of participants

	Outcomes		
Components	Knowledge (thorough)	Skill (strong)	Transfer (executive implementation)
Study of Theory	10	5	0
Demonstrations	30	20	0
Practice	60	60	5
Peer Coaching	95	95	95

From Joyce and Showers, 2002, p. 78

95% outcomes on knowledge, skill and transfer. Joyce and Showers (2002) stressed that transfer was "*the place where the interface between staff development and student achievement exists. The learning environment of the students changes, and those changes are of a quality and amount that enable increased learning to take place*" (p. 71, emphasis included in original text).

This section started with Guskey (2000) defining professional development as "those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might in

turn improve the learning of students" (p. 16). The next section will investigate the literature that surrounds one such skill—Instructional Planning.

Instructional Planning

The impact of planning on teachers' instructional practice has been noted as one of the most important aspects of effective teaching for more than 30 years (Berliner & Rosenshine, 1977; Borko & Livingston, 1989; Good & Brophy, 1978; John, 1994). The literature highlights that lesson planning for effective teaching includes the following elements: identification of clear lesson and learning objectives; carefully linked activities to the objectives; planned strategies to teach the objectives; planned linkage of instruction to real life in the lesson; planned usage of advanced organizers, graphic organizers or outlines; planned consideration of student attention spans and learning styles; and, systematic development in the planning process of objectives, questions, and activities that reflect higher-level and lower-level cognitive skills as appropriate for the content and the students (Berliner & Rosenshine, 1977; Borko & Livingston, 1989; Good & Brophy, 1978; John, 1994).

Defining Instructional Planning

The research is clear; instruction and planning are an inseparable connection. The degree and formality of the planning is dependent on numerous factors. However, this high degree of complexity tends to offer a broad and at times general explanation of the process as the definition. Clark and Yinger

(1980) suggest that planning is anything that "a teacher is doing [that] aids in preparing a framework for guiding future action" (p. 6). Calderhead (1984) asserts that when teachers engage in planning, they "translate syllabus guidelines, institutional expectations and their own beliefs and ideologies of education into guidelines for action in the classroom" (quoted in John, 1994, p. 38). Finally, John (1994) defines instructional planning "as an intensely creative act which helps the teacher think up solutions to new and persistent problems" (p. 38).

Comparing Expert to Novice Instructional Planning Practices.

Borko and Livingston (1989) found that "planning by novices focuses primarily on the development of strategies for presenting content to students and is more time consuming and less efficient that that of experts" (p. 492). They also found that due to novices inability to construct "explanations on the spot or by organizing instruction around student questions", they tend to develop much more structured lesson (Borko & Livingston, 1989, p. 492). However, the advantages the experts enjoy often come from experience with the specific instructional content. Borko and Livingston (1989) reported that until a teacher develops the "interconnections" between the "content knowledge, pedagogical content knowledge, and knowledge of learners" they are not equipped to predict misconceptions the student may have, thus will be less prepared to adjust their instruction to reconcile those issues (p. 492). This can be seen in the following quote. "Indeed, as Elaine's experience in teaching analytic geometry for the first time suggests, these interconnections are very limited the first time an expert

teaches a new course; they continue to develop as he or she teachers the course repeatedly over time" (Borko & Livingston, 1989, p. 492).

Summary

This chapter discussed the three main contexts of this study—technology, professional development, and instructional planning. This review of literature provides readers the framework from which Project ICE was conceptualized, developed, and implemented. A common thread throughout the technology section focused on how professional development provides participants with detailed knowledge as to how an innovation can be incorporated into their classroom (Becker & Ravitz, 2001; Lemke et al, 1998; Maddux, 2003). However, as this form of instruction was new to the majority of the participants an instructional planning framework (one supported by the district) would provide them the structure that they could use to gain the interconnections that Borko and Livingston (1989) discussed.

CHAPTER 3

METHODOLOGY

The scope of this study investigates the phenomenon of the adoption of a technology-based innovation in an urban district. In the case of this district's Gaining Early Awareness and Readiness of Undergraduate Programs (GEAR UP) program and impetus behind the Project Integrating Curriculum-aligned Eportfolios (ICE) program, the technology-based innovation was electronic portfolios (e-portfolios). Because the e-portfolios were a major element of the original grant application, the GEAR UP program was eager to improve the adoption rate. With the assistance of two professional development and instructional experts, a supplemental grant was developed and eventually awarded in June 2004. The supplemental grant was targeted to fund summer institutes participant and presenter stipend requirements. The funds to purchase equipment and support follow-up staff development activities came from the annual operating budget of the GEAR UP program.

Methodology

This study was guided by three central questions: (a) Does a participant's perceived quality of professional development influence the adoption of e-portfolios? (b) Is there a relationship between the quality of participant's instructional planning and subsequent adoption of e-portfolios? (c) Based on the status of adoption (completer/non-completer), how does each group describe the

variables that impacted their adoption/lack of adoption of e-portfolios? The three questions will be explored with the case study methodology.

In the field of education, the term case study means different things to the different researchers who are working with this qualitative research methodology (Bassey, 1999; Cohen & Manion, 1989; Creswell, 2003; Lincoln & Guba, 1985; Merriam, 1998; Schwandt, 2001; Stake, 1995; Stenhouse, 1988; Yin, 2003). However, it is the consensus of the same literature base that the tools and techniques of the case study methodology allow researchers to conduct an in-depth exploration of a specific instance in the social context it occurs (Bassey, 1999; Merriam, 1998). After careful review of the literature base of this methodology, the researcher selected the latest works of two primary authors in today's field— Merriam's (1998) *Qualitative Research and Case Study Applications in Education*, and Bassey's (1999) *Case Study Research in Educational Settings.* While each author provides a strong and amazingly similar theoretical foundation on which they base their works, both provide a unique perspective, practical insights, and occasional tools that will provide a comprehensive case study framework for this study. In defining their theoretical framework, both Merriam and Bassey referenced the works of Stake (1995), Yin (2003), and Stenhouse (1988) and while the researcher utilized the primary source to explore the initial context of the works, the connections were initially established by Merriam and Bassey.

While Merriam and Bassey both tend to expand on the qualitative aspects of the case study, both recognize the strength of this methodology lies not in the data collection or analysis techniques that are used, but in the constant focus on that element, the case, that is being studied. Merriam (1998) indicates that a "case study does not claim any particular methods for data collection or data analysis. Any and all methods of gathering data, from testing to interviewing, can be used in a case study" (p. 28). Similarly, Sturman (1994) proposes that with the case study the focus is on the "investigation of an individual, group of phenomenon." The "techniques used in the investigation may be varied, and may include both qualitative and quantitative approaches" (as cited in Bassey, 1999, p. 26).

This theoretical support lends credence to the inclusion of both qualitative and quantitative analysis in this study. The quantitative elements were used to identify relationships between a participant's level of adoption and both the perceived quality of professional development and the quality of instructional lesson plans. Any relationships found will be explored to a greater extent with an in-depth qualitative analysis of participant feedback on both surveys and participant interviews.

Both Bassey and Merriam define the scope of what constitutes a case study. Bassey (1999) cites Cohen and Manion's (1998) work that defines the unit and suggests that findings might be generalized back to a wider population.

> [C]ase study research typically observes the characteristics of an individual unit – a child, a clique, a class, a school or a community. The

> purpose of such observation is to probe deeply and to analyze intensively the multifarious phenomena that constitute the life cycle of the unit with a view to establishing generalizations about the wider population to which that unit belongs. (p. 24)

Merriam (1998) suggests that the *individual unit* is both a *bounded* and an *integrated* system. Her description of what is investigated by a case study is something that is a "thing, a single entity, a unit around which there are boundaries" (p. 27). Both Bassey and Merriam incorporate Stake's definition of case study into their conceptual framework. Stake (1995) defines case study as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi).

With the concept of the bounded system that is to be investigated, both Bassey and Merriam again move to the literature to introduce the different ways a researcher might use the case study methodology to investigate and report on different aspects of that single case. Stake (1995) begins by suggesting that there are two basic aspects of case studies—1) the intrinsic case study and 2) the instrumental case study. In the intrinsic case study the focus in on the case, or what Stake titles theta (Θ) where as the instrumental case study investigates the issue or problem, which Stake labels as iota (ι). Project ICE specifically investigated the issue of the lack of adoption of technology-based innovations. This investigation of the issue or ι would have Stake define this case study as an instrumental case study.

Although Bassey (1999) suggests that Yin's philosophy leans towards the "positivist paradigm" especially when compared to Stake's approach is "firmly within the interpretive paradigm," Yin's three forms of case studies are common currents within the literature (p. 27). To this extent, Bassey and Merriam do reference the work of Robert Yin and incorporate several of elements of his work within their frameworks. In his 2003 edition, Yin presents there are three types—exploratory, descriptive, and explanatory—of case studies that can be viewed from a single instance/case or through an investigation of multiple cases. In an exploratory case study the field work and data collection take place before the "final definition of study questions and hypotheses" (Yin, 2003, p. 6). According to Yin (2003), a descriptive case study is a "complete description of a phenomenon within its context" (p. 5). Finally, the explanatory case study "presents data bearing on cause-effect relationships—explaining how events happened" (p. 5).

Finally, both Bassey and Merriam referenced the work of Stenhouse (1988). Stenhouse identified four "broad styles of case study"—ethnographic, evaluative, educational, and action research (cited in Bassey, 1999, p. 27). Stenhouse (1988) begins with ethnographic and frames it as a style of case study that investigates a single case "in depth by participant observation" (cited in Bassey, 1999, p. 28). He goes on to suggest that ethnographic provides an outside "standpoint explanations that emphasise causal or structural patterns of which participants in the case are unaware" (cited in Bassey, 1999, p. 28). Stenhouse

explains the evaluative case study provides stakeholders with "information that will help them to judge the merit and worth of policies, programmes or institutions" (cited in Bassey, 1999, p. 28). Next, he explains that educational case study is a style of case study that is "concerned to enrich the thinking and discourse of education either by the development of educational theory or be refinement of prudence through the systematic and reflective documentation of evidence" (cited in Bassey, 1999, p. 28). Finally, he defines a case study in action research as "contributing to the development of the case or cases under study by feedback of information which can guide revision and refinement of the action" (cited in Bassey, 1999, p. 28). The educational case study and the ability to develop or refine educational theory is the ultimate goal of this study.

The researcher selected the case study methodology for its in-depth investigation of a specific case—the adoption of technology-based innovation. After a careful review of the case study literature, the thought that this methodology can yield "generalizable" results was very intriguing (Adelman et al., 1980; Bassey, 1999; Merriam, 1998; Stake, 1995; and Yin, 2003). Although most case study literature address "generalization" and authors seem to qualify the term with different labels—Bassey's "fuzzy generalization" to Stake's "naturalistic generalizations," the end concept is remarkably the same. If the details of a specific case are provided to a knowledgeable professional, the consumer of the research will have the ability to see "similarities 'in new and foreign contexts'" (Merriam, 1998, p. 211). However, Guba and Lincoln (1981)

contend that before a researcher can generalize their findings they must first establish the internal validity.

Merriam (1998) provides readers a list of six internal validity strategies. First is *triangulation*, or the use of "multiple investigators, multiple sources of data or multiple methods to confirm the emerging findings" (p. 204). Second is *member checks* where data and interpretations are reviewed with participants and confirming their plausibility. Next is *long-term observation,* a strategy that includes conducting "repeated observations of the same phenomenon" over a period of time (p. 204). The fourth strategy utilizes *peer examination* to provide feedback on findings as they emerge. The *participatory or collaborative mode of research* strategy advocates the "inclusion of participants in all phases of research" (p. 205). Finally, clarifying the *researcher's biases* is the final strategy. By clarifying the researcher's "assumptions, worldview, and theoretical orientation at the outset of the study" that researcher strengthens the internal validity of the study (p. 205).

Population

This study investigated the degree of adoption of a technology-based innovation by a group of secondary educators from a district in the southwestern part of the United States. The district is unique in that it spans both urban and rural portions of the largest urban center in the state. The 2000 census reported a population of over 550,000 for the urban center and 660,000 for the county. During the 2004-2005 school year the district had an average daily attendance of

36,398 students. Of the 2,268 teachers and media specialist, 38% held graduate degrees and averaged over 14 years as an educator.

The technology-based innovation being investigated was a component of $2.9 million dollar United States Department of Education Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) initiative. In this district the GEAR UP program started with a 6th and a 7th grade cohort of students in the 1999-2000 academic year. The grant then followed those students as they moved through the secondary school system until their graduations in 2005 (original 7th grade students) and 2006 (original 6th grade students). The GEAR UP program served all secondary schools that had a socio-economical need as indicated by a federal free or reduced lunch rate of 50% or higher. During this study (2004-2005), the grant served 13 of 14 secondary school centers. Of those 13 schools, six were traditional neighborhood high schools (NHS), three were specialty schools (SS) that students throughout the district applied to attend, one was an alternative school (AS), and three were charter schools. The only district school not served by the GEAR UP program was a specialty school (CSS) that had a free and reduced lunch program that only served 25.6% of its students.

Table 3 disaggregates five selected indicators that describe this study's population. On the average, the neighborhood schools' certified staff members have more experience.

Sample

The prospective participants were recruited by distributing a flyer/application for participation in the Project ICE program star. During the first two weeks of June, 2004 each school served by the GEAR UP program received a flyer for each certified staff announcing the program and registration process. The flyer documented the following five requirements of participation in the year-long program: the participation in an eight-day summer institute, commitment to attend quarterly meetings and refresher trainings, development of four units of instruction, implementation of each unit with a group of students, and coaching of two protégés to implement the technology-based innovation in their own classrooms. The flyer also announced the following four incentives that the GEAR UP program would invest into the project: each participant would receive a stipend to pay for any time they spent in professional development activities; each participant that successfully completed the summer institute would receive a classroom workstation (computer, printer, scanner, and digital camera) customized to support the elements of the technology-based innovation; each

Table 3

Selected Characteristics of Selected Population Teachers by School

Type of school	N	Percent minority	Average years of service	Percent with graduate degree	Class size
Alternative 1	21	38.1	11.3	19.1	11.4
Alternative 2	4	0.0	6.0	50.0	15.0
Charter 1*	24	31.0	9.9	52.0	19.8
Charter 2*	28	48.0	13	78.6	15.1
Charter 3**	-	-	-	-	-
Neighborhood 1	49	30.6	11.5	32.7	17.5
Neighborhood 2	27	70.4	19.0	37.0	16.3
Neighborhood 3	36	33.3	11.3	33.0	15.9
Neighborhood 4	36	33.3	11.3	33.3	15.9
Neighborhood 5	56	23.2	15.2	51.8	20.4
Neighborhood 6	24	62.5	15.1	29.2	17.8
Specialty 1	48	16.7	13.1	43.8	20.3
Specialty 2	40	32.5	13.2	40.0	18.4
Specialty 3	32	43.8	13.0	31.3	18.6

Note. All school data are from the 2003-2004 school year. Charter School 3 did not report the identified data to the district or state agencies.

participant would be paid a work-product stipend for each completed e-lesson plan; and each participant would be paid for successful completion of a mentoring

endeavor. While the participation was limited to the first 40 respondents, there were only 35 applications returned. Of the 35 applications received, all 35 applicants were invited to participate.

Table 4 provides an overview of the educators who were invited to participate in the summer institute professional development events. Two additional demographic traits included were if the teachers were core-teachers

Table 4

Subject Area and School Type of Applicants by Session

		N teacher subject areas		N of teachers from type of schools			
Session	N	core	non-core	AS	CSS	NHS	SS
July 6-9 and 12-15, 2004	20	8	12	1	4	11	4
August 2-5 and 9-12, 2004	15	9	6	2	2	10	1
Totals	35	17	18	3	6	21	5

(English/reading, mathematics, science, or social sciences) or non-core teacher and if the school at which they taught was an alternative (AS), charter (CSS), neighborhood (NHS), or specialty school (SS).

Of the 35 educators invited to attend either summer institute, two participants did not participate. Two participants originally agreed to participate

in a summer institute, but did not attend either session. As participation in the summer institute was a criterion for the project, these two participants were dropped from the study. Seventy-six percent of those who did participated were present for the entirety of their selected session. See Table 5 for some additional attendance details of the participants.

Table 5

Attendance Rates by Session

		Number of hours attended			N of teachers from type of schools			
Session	N	50 to 56	55	>50	AS	CSS	NHS	SS
July 6-9 and 12-15, 2004	20	8	1	1	1	4	11	4
August 2-5 and 9-12, 2004	13	8	3	2	1	2	9	1
Totals	33	16	4	3	2	6	20	5

As seen in Table 5, high percentages (94.3%) of the applicants actually were involved in the required summer institute. This pool of 33 professionals served as the sample for this study. Throughout this project the participants were queried on three central aspects of their experiences. First, they were asked to provide their perception of the quality of professional development and its

influence on their adoption of e-portfolios. Next, the study tracked the quality of participants' instructional planning and determined if that quality had an impact on their adoption of e-portfolios. Finally, the study investigated how completers and non-completers described the variables that impacted their adoption of e-portfolios.

Data Sources

In an effort to provide a rich description of the bounded system of Project ICE, the program asked participants to complete a wide-range of surveys, submit a series of work samples, and possibly participate in an interview. This request was presented in full in the recruitment documents clarified during several instances in the summer institute, quarterly meetings, and email communications. A secondary set of data sources provided subject participation rates as tracked through the GEAR UP office and the e-portfolio platforms statistical reports that provided the number of e-portfolios produced during the project.

The primary data collection tool used with the whole sample was the quarterly surveys. Each survey was conducted on the e-portfolio platform (ALCAweb). Each participant had been introduced to the survey tool and had used that tool to conduct the daily evaluations during the eight-day summer institute. Participants were reminded of the survey by either an email address and/or faxed memorandum. A core set of questions used to track the progression of a teacher's adoption of a technology-based innovation was used throughout the four surveys. The first survey also included questions to collect pertinent

demographic data and timely reflection of the quality of the professional development provided at the summer institute.

The first quarter survey (Appendix A) consisted of a 22-question survey, five of which requested demographic information, 12 free-response questions, and five direct response prompts. Participants were also asked to attach a copy of their first quarter's completed unit of instruction. Eleven questions included in the first quarter survey served as the core data collection points on the second, third, and fourth surveys. This functionality provided the opportunity to track how the participants chose to implement the required elements of the program. Each survey collected information on the status of each participant's lesson plan for that quarter, reflection of the implementation of that lesson plan with his/her students, and identification of where he/she were in the mentoring process with the two protégés.

The second quarter survey (Appendix B) consisted of a 12-question survey, six of which requested participants to complete free-response questions, and six direct response prompts. Again, participants were requested to attach a copy of their second quarter's completed unit of instruction.

The third quarter survey (Appendix C) consisted of 13-question survey, six of which requested participants to complete free-response questions, and seven direct response prompts. Participants were asked to attach a copy of their third quarter's completed unit of instruction.

Finally, the fourth quarter survey (Appendix D) consisted of a 21-question survey, one of which requested demographic information, nine free-response questions, and 11 direct response prompts. Again, participants were asked to attach a copy of their fourth quarters completed unit of instruction.

While each survey had a core set of questions that tracked the elements of the project, the first quarter and fourth quarter survey collected some additional information. The first quarter captured specific demographic data used to identify any extraneous variables (summer institute session, gender, years experience, perceived technical skill, perceived functionally of unit of instruction, and the quality of unit of instruction) that the researcher thought could explain the findings of the study. Both the first and fourth quarter surveys collected some pre and post measures of several aspects of the project such as the perceived impact of instructional lesson plans, impressions of the e-portfolio platform, and the ability of the summer institute to prepare them for the requirements of the project.

As mentioned in the description of each survey instrument, participants were asked to submit a completed unit of instruction. The unit of instruction (Appendix F), also an electronic component (template) of the ALCAweb e-portfolio platform, requested the teacher to identify several instructional strategies (set, instructional delivery, and closure) that aligned with the numerous district instructional initiatives and general philosophy. This work product provided another component of the triangulation requirement discussed in Merriam (1998).

The researcher scored each unit of instruction using a scoring guide (Appendix E).

The final component was interviews with selected participants that had responded to the survey. The intent of the survey was to utilize purposeful selection (Merriam, 1998) to select a cross section of the teachers who successfully adopted the technology-based innovation. However, due to extraneous variable (access to equipment) that had not been controlled for, the number of adopters was limited enough (n=3) that the researcher interviewed each completer. The interview was semi-structured where the researcher had 13 questions designed to prompt the participant to provide a reflection on why they where a successful adopter. The interviews took place in the participants' classroom/office and consisted of 13 open-ended questions (Appendix G).

Data Analysis

As introduced in the *Methodology* section of this chapter, this case study was designed around the goal of maximizing the level of internal validity as described in Merriam's (1998) six basic strategies to enhance internal validity. To that end, this section will work to first to align the data sources with Merriam's strategies and then work to describe the analysis to be utilized with each unique data source.

Case Study's Internal Validity.

The first of Merriam's (1998) six strategies was *triangulation*. Previously defined as "multiple investigators, multiple sources of data or multiple methods to confirm the emerging findings" (p. 204); this study utilized a combination of multiple sources and methods to provide corroborative evidence of the results. Stake (1995) devoted an entire chapter to triangulation and labeled it with his third Greek letter Δ (delta), so one can ascertain the importance he placed on this strategy. While the name triangulation suggests that the 'multiple' would be three, however, both Merriam and Stake describe triangulation as multiple sources. In the case of this study, there are five fundamental data collection strategies—participation records maintained by the GEAR UP office, database results of the number of e-portfolios created (pre/post project), electronic surveys, document analysis of instructional planning, and an interview with successful adopters of a technology-based innovation.

The second strategy, *member checks*, was accomplished with the implementation of two separate strategies. In the case of participation records, each participant was compensated for their time devoted to this project. This compensation was released as the records were confirmed with project staff, the participant, and the district's financial office. Upon the completion of a survey, each participant had the ability to review their submission and the ability to edit their submission if they found they responded to the survey in an inappropriate manner. In the case of the instructional planning document, they also had full edit

features of that online resource. Finally, after conducting each interview the researcher shared the transcript with each subject and asked the subject to confirm the authenticity of that transcript.

A definite strength of this study design was the inclusion of four surveys administered quarterly during the implementation window of the project. Each survey consisted of a core set of questions that provided a point-in-time data set for each participant as they attempted to truly adopt the technology-based innovation of this project. This structure strongly aligns with Merriam's (1989) *long-term observation* strategy.

This project provided the researcher a unique opportunity to vet the proposed data collection and analysis techniques with a group of peers. A central component of spring 2005's *Advanced Qualitative Inquiry* was a presentation and discussion of a qualitative research project. Combined with the opportunity to present, discuss, and modify data analysis techniques as per my committee's constructive feedback of this study's processes, the *peer examination* has been addressed.

While Merriam's fifth strategy, *participatory or collaborative mode of research,* was not overtly addressed to the degree of the first four, its influence could be attributed to operational practices of an experienced professional development team. Throughout the entirety of the project, participant formative feedback was used to adapt the program to the specific needs of the participants. The majority of this feedback was collected during the actual summer institute.

So the participatory or collaborative mode of research strategy was incorporated into the study to some degree. Finally, the accounting for the *researcher's biases*, the sixth strategy, was accomplished through careful review by a committee of professional researchers that ensured proper balance was maintained.

In working to enhance the internal validity of this single case study, the researcher drew data from one of five sources. The sources included electronic surveys, document analysis of instructional planning, subject participation records, the number of e-portfolios created, and an interview with successful adopters of a technology-based innovation. The type of analysis ranged from descriptive statistics to Merriam's (1998) category construction to statistical tests such as the *Pearson product-moment correlation coefficient*.

Electronic surveys. Project ICE project utilized four surveys at the end of each academic quarter to collect specific implementation data. Descriptive statistics (mean and mode) were used to report the participants' responses to direct answer questions. In the case of the free response questions, the participants' responses were analyzed using the same qualitative methods as the interviews and will be described in detail in the *Participant Interview* section.

Instructional lesson plan. The participants of the Project ICE program were asked to develop a detailed instructional lesson plan using the framework of Madeline Hunter's lesson line. The district where the study was conducted stressed the importance of Hunter's work as the state sponsored administrator evaluation trainings were developed with the lesson line as the foundation. The

researcher, working in concert with a subject matter expert who presented the lesson line process in the summer institute, developed a detailed scoring rubric. The scoring rubric provided descriptive statements with the corresponding scores for each criterion. Utilizing this scoring rubric, each submitted instructional lesson plan was evaluated in its ability to provide the requested information in the requested format. Each participant had the opportunity to score up to 152 points. The resulting score would be considered an indicator of quality of the instructional lesson plan.

The quality of the instructional lesson plan score would be compared with level of adoption. The matrix used to calculate the level of adoption of each participant investigated their ability to meet the three basic requirements of the project. The requirements included the development of four instructional lesson plans, the implementation of each those lessons with a class of students (as evidenced by the students creation of an e-portfolio entry), and the mentoring of two protégés (as evidenced by the creation of an e-portfolio entry by each of the protégés classes).

The relationship between the quality of instructional planning and adoption of a technology-base innovation will be explored with Pearson product-moment correlation coefficient. Lomax (2001) introduces the Pearson statistical methodology as a correlation coefficient, or a tool for measuring the relationship between two factors. Lomax indicates that "the Pearson is a standardized version of the covariance. The sign of the Pearson denotes the direction of the

relationship, and the value of the Pearson denotes the strength of the relationship" (p. 179). So with a range from -1.00 to +1.00, Pearson values near the extremes (-/+ 1.00) signifies a strong relationship. Ranges around -/+ .50 indicates a moderate relationship. A weak relationship is identified as the Pearson values approach 0.00.

Lomax (2001) goes on to discuss the inferences of measuring a correlation from two variables derived from a single sample. He stresses that for "inferential tests of correlations that sample size plays a role in determining statistical significance" (p. 181).

Number of e-portfolio. The e-portfolio system is based on a web-based database that allowed the GEAR UP program to identify the number of e-portfolios produced with in specific span of time. Database queries would be conducted to identify the number of e-portfolio entries created during the 2003-2004 school year (prior to Project ICE) and the 2004-2005 (Project ICE effort) school year. The count of each should provide an indicator of student use of the innovation and provide one indicator of the success of the program as a whole.

Participant interview. As mentioned in an earlier section, the limited number of participants that fulfilled the requirements of the project and was labeled as an adopter of a technology based innovation was very limited. Due to this limitation, the researcher moved from purposeful selection to request all adopters to participate in a semi-structured interview. Each interview was recorded and transcribed. The transcript was provided to the participant to ensure

the information was correct and in the spirit of their intended responses. Utilizing the code and theme process presented in *Advanced Qualitative Inquiry* (Spring 2005) and formalized as the step-by-step process of category construction as presented in Merriam (1998), the researcher analyzed the narrative feedback of both the interviews and open-ended answers provided through the electronic surveys.

The text was read through one time to obtain the context, direction, and intent of the information. Next, the transcript was read carefully and the researcher highlighted words or phrases and added a highlight and comment that 'coded' that information. This process was repeated throughout the entirety of the text. Next the 'codes' were collected and similar comments were grouped. The groups of codes were then labeled, which became a theme for the analyzed text. Merriam (1998) recommends that to code/theme each separate iteration of data by itself. This allowed the researcher to see what similar themes emerge from the data.

CHAPTER 4

RESULTS

This study examined the progress of a group of 33 teachers from 13 secondary schools in a southwest urban district that participated in a technology-based e-portfolios professional development program. The organizers of Project ICE (Integrating Curriculum-aligned Eportfolios) hypothesized that the inclusion of lesson planning and mentoring would aid in the adoption of e-portfolios by the participants. An instrumental case study research design (Stake's iota-ι) was employed to study the "particularity and complexity" of this group of teachers' adoption efforts (Stake, 1995, p. xi). The following three questions were used to guide the research: (a) Does a participant's perceived quality of professional development influence the adoption of e-portfolios? (b) Is there a relationship between the quality of participant's instructional planning and subsequent adoption of e-portfolios? (c) Based on the status of adoption (completer/non-completer), how does each group describe the variables that impacted their adoption/lack of adoption of e-portfolios? The data sets for this study included quarterly surveys, work samples, and participant interviews.

This chapter will be organized by the three guiding research questions. Each section will present the findings associated with that question.

Perceived Quality of Professional Development and Adoption

The first research question investigated the relationship of participants' perception of the quality professional development and the level of adoption of e-

portfolios. This section will review the data that informed this analysis and then present the findings.

The Data and the Analysis Tool

Each participant was asked on the 4th quarter survey to rate how the professional development delivered during the summer institute prepared them to implement the three components of Project ICE. The three components included lesson study, mentoring, and e-portfolios. There were three data points that used 5-point Likert-type questions. The perception of the quality of professional development was a scale created by combining each of the three components. The means of each of the subcomponents and the final professional development score are presented in Table 6. This information suggests the participants as a whole were most satisfied with the professional development presented on the development of instructional lessons. Conversely, they were least satisfied with the e-portfolio instruction.

Table 6

Perceived Quality of Professional Development

	Lesson	Mentoring	ePortfolios	Quality of PD
Mean	3.58	3.50	3.25	10.33
Std. Deviation	1.084	1.446	1.288	3.525

For the purposes of this study, the concept of adoption was transformed into a quantifiable scale. The GEAR UP program had identified participants as

either completers (people who implemented all of the components of the Project ICE program) or non-completers (people who did not implement one or more of the different components of the Project ICE program). To utilize the Pearson's correlation coefficient to investigate the relationship, the researcher converted this measure from a nominal to an interval data set. The researcher used the administrative records to identify which participants completed which of the program requirements. Each requirement formed a single data point of the data set that would become a matrix that reported a participant's level of adoption.

The Level of Adoption (LoA) matrix consisted of 24 discrete data-points that addressed the three different components of Project ICE. Each point was aligned with a predefined programmatic expectation that the participants were asked to complete. The data points include: attendance, implementation of instructional units, and mentoring protégés. For the attendance data point, the criteria were attendance at the summer institute and the four learning cluster meetings held during the year (five items). For the implementation of instructional units the documentation was the implementation of the four units with their classes and submission of the units for review (eight items). The mentoring of protégés included the identification of protégés, preparation of an e-portfolio system for the protégés, presentation and modeling of e-portfolios to the protégés, and documentation of the number of protégés whose classes had documented e-portfolios (11 items). Table 7 presents the mean and standard

deviation for the participants for each of the three subcomponents and the overall adoption.

Table 7

Sub-Components and Level of Adoption

	% PD	% Lesson	% Mentoring	% Level of Adoption
Mean	80.3	28.6	24.2	39.0
Std. Deviation	11.6	28.7	30.8	22.8

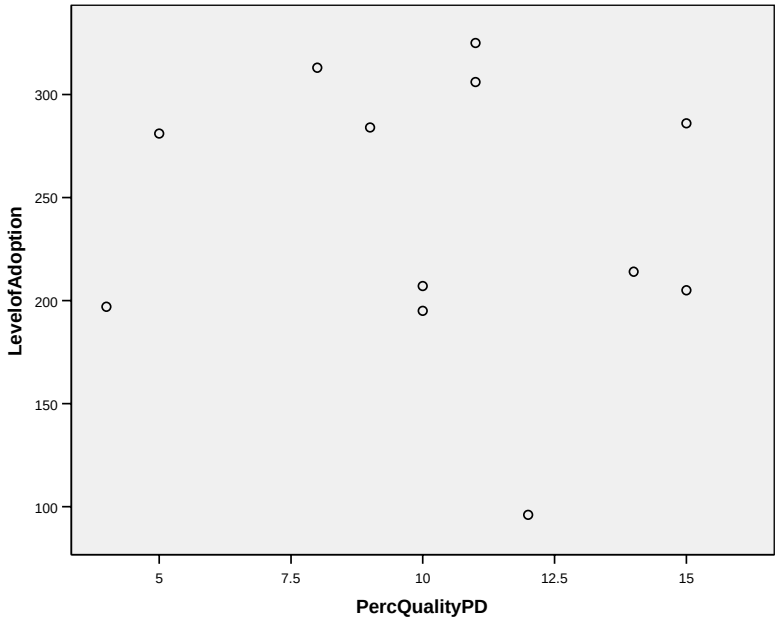
As presented in the Methodology section, the influence of perceived quality of professional development and level of adoption was investigated using the Pearson's correlation coefficient. This analysis was performed within the SPSS software package.

The Findings

The results of the Pearson's Correlation indicated that there is no statistically significant influence between perceive quality of professional development and level of adoption (r = -.125 p >.05). This is easily seen in Figure 4.

Figure 4

Correlation of Perceived Quality of Professional Development and Level of Adoption



r = -.125 p>.05

Quality of Instructional Planning and Adoption of E-Portfolios

The second research question examined the interaction between the quality of participant's instructional planning and subsequent adoption of e-portfolios. Again, the discussion will be organized in two sections—the data and analysis tools and presentation of the findings.

The Data and the Analysis Tool

The second research question utilized two different data sets. The concept of 'quality of instructional lesson planning' was measured with a scoring rubric.

The variable of adoption was once again measured by the Level of Adoption matrix described in the previous section.

The quality of instructional lesson planning was a scoring rubric based on 14 elements of expanded lesson plan (based on Madeline Hunter's lesson line literature). The expanded-lesson plan was presented by the subject matter specialist during the summer institute. The lesson planning rubric consisted of 14 criteria which included: status of lesson; name of lesson; description of lesson; teacher objectives; student objectives; required resources; associated discipline/subject; grade level; prerequisites; set; instructional delivery; engaging questions; closure; assessment; and, standards. Each lesson was submitted via the e-portfolio system. The researcher scored each individual lesson, recording each of the 14 criteria on an Excel worksheet. While the researcher did review the individual means and standard deviations for each quarter's scores, the scale used to investigate possible correlations between the quality of instruction lesson planning and level of adoption was the mean of all submitted lessons.

Table 8

Quality of Instructional Lesson Plan by Quarter Submitted and Scores Used

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	QoILP
N	61	39	29	8	137
Mean	120.3	109.0	112.5	124.3	115.7
Std. Deviation	40.0	47.1	33.9	24.8	40.3

A comparison of the means by quarter and final quality of instructional lesson plan can be found in Table 8.

The relationship between the quality of an instructional lesson plan and the level of adoption was also investigated using the Pearson's correlation coefficient. Once again, this analysis was performed within the SPSS software package.

The Findings

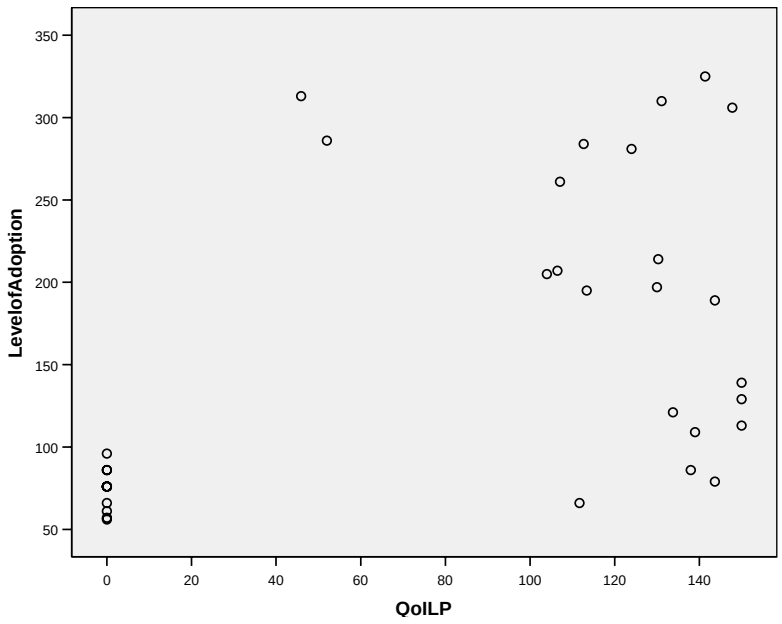
The results of the Pearson's Correlation indicated that there is a statistically significant relationship between the quality of an instructional lesson plan and the Level of Adoption (r = .495 p = .003) of e-portfolios. As discussed in the previous section, a portion of the Level of Adoption matrix did measure the participants' ability to submit the lesson plans. The Level of Adoption matrix did not examine the quality of the lessons. A participant who submitted a high-quality lesson plan would receive the same credit in the matrix as would a low-quality lesson plan, as long as both were received in a timely manner. In Figure 5 the correlation between these two variables is presented in the form of a scatter plot.

Upon closer inspection of the data, the lower right-hand quadrant of the scatter plot can be explained by filtering for those participants who submitted a lesson developed within the summer institute. Each summer institute session was

designed so that the participants had significant time to develop their first instructional lesson plans. This effect can be studied by disaggregating the data to

Figure 5

Correlation of Quality of an Instructional Lesson Plan and the Level of Adoption



r = .495 p<.05; Quality of Instructional Lesson Plan (QoILP)

the sub-groups of the quality of the instructional lesson plan developed during the summer institute (lessons submitted during the 1st quarter—QoILPwPD) and the quality of the instructional lesson plan developed on the participants own (lessons submitted during the 2nd, 3rd, and 4th quarters—QoILPonOwn). In reviewing Table 9, the level of significance of QoILPwPD is lower (*r* = .428 p = .013) than that of QoILP (*r* = .495 p = .003) and QoILPonOwn (*r* = .619 p = .000).

Table 9

Comparison of Pearson's Correlation Coefficients

		LevelofAdoption	QoILP	QoILPwPD	QoILPonOwn
LevelofAdoption	Pearson Correlation	1	.495**	.428*	.619**
	Sig. (2-tailed)		.003	.013	.000
	N	33	33	33	33
QoILP	Pearson Correlation	.495**	1	.848**	.495**
	Sig. (2-tailed)	.003		.000	.003
	N	33	33	33	33
QoILPwPD	Pearson Correlation	.428*	.848**	1	.265
	Sig. (2-tailed)	.013	.000		.135
	N	33	33	33	33
QoILPonOwn	Pearson Correlation	.619**	.495**	.265	1
	Sig. (2-tailed)	.000	.003	.135	
	N	33	33	33	33

**Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Factors that Influence the Level of Adoption: Completers and Non-Completers

The third and final research question of this study used case study qualitative data collection methods and analysis to investigate and document the elements of Project ICE. This question examined and documented what influenced completers in their adoption of e-portfolios as well as those factors that limited the non-completers' adoption of e-portfolios. This section is divided into 12 sub-sections. The next section will introduce the different sources of the data and discuss the qualitative analysis methodologies used to examine the data for meaningful themes. The remaining sections will explore each of the 11 identified themes.

Themes

In identifying the themes associated with either the adoption of or lack of adoption of e-portfolios the researcher adopted the administrative label assigned by the Project ICE staff. This label was based on each participants' ability to complete the program's requirements introduced in chapter 3—the participation in an eight-day summer institute, commitment to attend quarterly meetings and refresher trainings, development of four units of instruction, implementation of each unit with a group of students, and coaching of two protégés to implement the technology-based innovation in their own classrooms. The official completers, as supplied from the GEAR UP Project ICE staff, consisted of three (1st, 2nd, and 4th quarters) of the top four participants in the Level of Adoption Matrix. The participant with the third highest score did not complete the final survey so she was not labeled a completer.

The breadth of the Project ICE program provided a large scope of data sources that participants used to describe both their challenges and successes in their attempt to implement e-portfolios. The data sources for Question Three are: quarterly surveys—implementation challenges (1st through 4th quarters), strength of instructional unit (1st through 4th quarters), changes to be made to the instructional units (1st through 4th quarters), requests for professional development (1st through 3rd quarters), best experience from summer institute (1st quarter), and the impact of mentoring (4th quarter)—and interviews with the completers.

As a result of Merriam's (1998) category construction process 11 themes were identified. Table 9 introduces each of the 11 themes. Merriam goes on to identify an important guideline for developing the category (labeled theme is this research) is "the number of people who mention something or the frequency with which something arises in the data is an important dimension" (p. 185). Merriam's second guideline—"the audience may determine what is important"—suggests that the different subgroups—completers and non-completers—will identify different elements that impacted their adoption (p. 185). Stake (1995) associates the category construction process to the search for meaning.

> The search for meaning often is a search for patterns, for consistency, for consistency within certain conditions, which we call 'correspondence….' We can look for patterns immediately while we are reviewing documents, observing, or interviewing—or we can code the records, aggregate frequencies, and find the patterns that way. Or both. (p. 78)

In discussing each of the themes, this research will report the frequency and percentage for each theme for completers, non-completers, and the total cohort of participants (see Table 9). This will be used as a tool to give a voice to each group and explore the differences between their comments and concerns.

The inclusion of the percentage is to provide readers with the tool to identify the frequency of the theme by each sub-group, as well as the cohort as a whole. The themes will be explored, and thus sequenced, from the cohort's most

prevalent theme—Instruction and Pedagogy—to the study's most unique theme—Motivation.

Table 10

Frequency of Codes Associated by Identified Theme

Theme	Non-Completers N=29		Completers N=3		Cohort N=32	
	N	%	N	%	N	%
Instruction and Pedagogy	36	17%	19	16%	55	17%
Time	34	17%	8	7%	42	13%
Student Engagement	25	12%	13	11%	38	12%
Access to Resources	29	14%	8	7%	37	11%
Professional Development - Ongoing Support	28	14%	7	6%	35	11%
Quality of Professional Development	12	6%	18	15%	30	9%
Mentoring	11	5%	11	9%	22	7%
Collegiality	11	5%	11	9%	22	7%
Administration Influences	13	6%	4	3%	17	5%
The E-Portfolio System	7	3%	10	9%	17	5%
Motivation	0	0%	8	7%	8	2%
Total	206	100%	117	100%	323	100%

Each theme will consist of three sub-sections. First the theme will be introduced. Next, the researcher will describe the different data sources used in

the development of the theme. The final section will compare and contrast the different responses used in reflecting on their successful or non-successful adoption of e-portfolios.

Instruction and Pedagogy

The first theme to be explored is Instruction and Pedagogy. As Project ICE focused on e-portfolios, which are a non-traditional form of evaluation in which the student takes an active role in selecting those work products that best demonstrate his/her mastery of a set of standards. Therefore, the teachers needed to provide students with meaningful lessons that produced meaningful work products. The implications of this requirement were based on participants' pedagogical practices before the program. For some teachers, the inclusion of e-portfolios was a logical next-step. For others, the inclusion of meaningful student work products was a considerable leap in philosophy and practice.

Data sources. The theme of Instruction and Pedagogy emerged from four different prompts. The first two prompts occurred in each of the four surveys and were used to have the participants reflect on the implementation of their instructional unit with their classes. Twenty-seven codes related to this theme came when participants described changes they made to their units. Twenty-one for Instruction and Pedagogy codes were identified from the participants' highlight of the strengths of the unit. The interview with the completers yielded six codes associated with the theme. Finally, a single code relating to instruction was linked with a challenge to implementation in the 3rd quarter survey. As

reported in Table 9, 55 codes were grouped within this theme and seemed to be of the same importance to both completer (17%) and non-completer (16%). The codes related to instructional design issues (timing, sequence, student activities, authentic assessments, etc.) and student outcomes (observed student work products, student mastery of targeted objectives, life skills, etc.).

Instructional and Pedagogical factors influencing adoption. While the theme of instruction and pedagogy is an important factor to both completers and non-completers, each group had a different level of concern when it came to the issue of student outcomes and instructional design issues. As seen in Table 10, the non-completers were highly focused on the aspects of instructional design. In contrast the completers were balanced in their comments reflecting on the design of the lesson, the actual instructional act, and the resulting student outcomes.

For instance, a completer (female with 11 to 20 Years of professional experience) discussed her first unit that was dealing with a series of internet databases used for online research. "The unit was too long. I would only have concentrated on one database only. [It was too] much information for the students to absorb."

A non-completing teacher (female with 6 to 10 years of professional experience) had a similar instructional design of the amount of time students had to work within the lesson. "I would have given the students more time to work on their myths. Also, next year, I will have specific examples from past works for the students to see." Several non-completers reported the sequence of the

instruction, another instructional design issue, needed to be reconsidered. This non-completer (male with 2 to 5 years of experience) who was working with a photography class, discussed how he would re-sequence his different lessons.

> Students had a difficult time taking the necessary photos for their project outside the classroom. In the future I would not introduce this unit until later in the school year when the students were more comfortable and experienced with the equipment. I would also scale down the project and allow the students to plan for and take as few as one photo for their essay. The remaining photos for the essay could come from books or magazines.

In the move to utilize e-portfolios as an assessment tool, completers and non-completers alike discussed the further exploration of scoring rubrics as a way to measure those student work products. A 20+ year veteran teacher-non-completer reported that in a PowerPoint unit that students were to research business travel to a foreign country and present their findings to the class via an oral presentation. "I would change the oral presentations. I am going to prepare a rubric for the oral presentations." In the interview of completer with 11 to 20 years of teaching experience, when she began to reflect on her implementation of Project ICE the year before she moved from the master of the lesson format into advancing her learning in the area of rubrics.

> I guess doing the lesson plans was pretty easy and I enjoyed that I thought… I try to learn all I can, I'm a little slow but I try to learn all, but this was fun. So mainly do lesson plans and [I] enjoyed it. So this is

different ya know. I want to try and master the … ahhh… rubrics. I want to do that. I haven't had time set out and figure out how to do that, but I want to try to put that in my lesson plans.

The second sub-theme, student outcomes, explores those elements of the lesson, unit, or even class that represent the participants' results of student learning. A similar theme that will be explored later—Student Engagement—focused on the students' reactions to the instruction.

A 20+ year veteran teacher and completer reported that her unit on dating and emotions would "help students determine realistic expectations regarding the process of dating." A second completer (11-20 year educator) identified that if students were able to master the use of online article/literature databases, that the students would be able to apply those research skills beyond high school. "The information the students receive that they can use in high school and college." The third completer, a 11-20 teacher, discussed how she felt that the instruction that students received on Microsoft Word would prepare them for future endeavors.

Office XP Word strengths help to make each student familiar with office skills on the computer. Each student can take the Office XP Word skills and use that knowledge to acquire a job working in an office setting or use the knowledge for future educational advantages.

Although non-completers did not offer these comments as frequently when compared with completers, their comments were very similar in nature. A

20+ year educator reported the strength of her career unit was that the "unit allowed students to research and gain valuable information about the career that interests them." A 20+ year offered as the strength of her unit as the "student wrote his own story using the [short story] elements." In identifying the strengths of a unit on types of violence in the family, a 20+ veteran teacher simply listed "[s]tudents describing their experiences of family violence."

While the sub-theme of student outcomes demonstrated that the participants were considering the total teaching act, including the impact on the student, it was still evident from their quotes that they are still focused on the task of developing the lesson/unit. This additional requirement when placed in their day to day professional lives created a need for time which is the second theme to be explored.

Time

Project ICE was a program that recruited a group of volunteer teachers who would participate in a summer institute and then return their rooms to implement the three elements of the project. Similar to most educational programs, the daily expectations to plan and deliver content, maintain classroom discipline, collect and grade student work, along with the numerous other programs/clubs/extra-curricular groups they were working with were still in place. Despite the built-in compensation for the additional time requirements for planning, infusion of technology, and promotion of e-portfolio assessment, the lack of time became a common pattern of the participants.

Data sources. The second most common theme for the entire cohort was Time with a total of 42 codes. Unlike the previous theme, there is a marked difference between the two groups. As seen in Table 9, non-completers identified 34 codes (17%) that were associated with this theme of Time, as compared to only eight codes (7%) for completers. When compared with the other codes, Time was tied for most important factor for non-completers, while it was a three-way tie for seventh most important factor for the completers.

The data points responsible for the Time codes include: implementation challenge (1st through 4th quarter surveys); Professional development requests (1st through 3rd quarter surveys); best experience of summer institute (1st quarter survey); and the interview with the completers.

Time's influence on adoption.

In an effort to compare completers and non-completers, two individuals' comments will be presented. The first comment is from the 1st quarter survey's implementation challenge. The completer was an 11 to 20 year teacher, while the non-completer was 20+ year. The non-completer offered the following as her greatest challenge to implementation: "Time. I'm not sure it is a solvable at this time." In a similar response, the completer offered this statement as her first quarter's implementation challenge; "Finding time to teach the ICE PROGRAM is my greatest challenge. I'm not having any difficulty implementing the program, but finding the time is a challenge."

On the 4th quarter survey the non-completer reported: "Not enough time. I didn't overcome it." Conversely the completer reported "There was not a challenge this quarter to implement the ICE Project. I found it to be very easy and less of a challenge."

Student Engagement

A by-product of Project ICE was the type of instruction that provided students with a work product that was worthy for a student's e-portfolio was not the type of work (lecture notes and exams) students would produce in a traditional classroom. In addition, since the e-portfolios required students to access and use technology to add work products to their portfolio, teachers worked to have students create digital work products. At times the work products were replacement in nature (electronic worksheet versus a paper worksheet), but at times students' use of technology was transparent; it had become just another tool to master a specific skill set. Students became *engaged* in their learning.

Data sources. While Student Engagement was the third most common code for both the cohort (N = 38, 12%) and completers (N = 13, 11%), it was ranked fifth for non-completers (N = 25, 12%). The sources that prompted the participants' feedback includes: strength of the unit (1st through 4th quarter surveys); the interviews with the completers; and, changes to unit (1st and 3rd quarter surveys).

In the first and second coding pass, the researcher identified the participants' focus on students and their learning. While some of the codes were

grouped in other themes due to the overall focus of the comment and resulting code, several codes actually compose the foundation of Student Engagement theme. A sampling of the initial codes is as follows: personalized learning, student success, student empowerment, student focus on lesson, student success, independent learning, and student engagement.

Student Engagement influence on adoption. The differences between completers and non-completers are mere quantity of comments versus the quality of the comments. The non-completers were more likely to speak to the implementation impediments (time, access to resources, etc.) than of the impact on student response to the instruction. In fact at times, the non-completers seemed to embrace the infusion of technology into an instructional unit, while moving to student-centered, project-based learning methodology.

Although this 20+ year veteran teacher was a non-completer, you can see the focus is on the students' reactions to the elements of project-based learning and infusion of technology in her instruction. "Students enjoyed working together with a partner. They also like creating their own company and using the skills they learned this year designing all the documents and the web site."

Conversely, an 11 to 20 year teacher who was a completer reflected on students' reaction to the use of technology. "The kids love the technology and I think it reinforced… because I did some worksheets and they had to type it all in and do the worksheet on the computer and I think it reinforced it and I… they enjoyed it… it made it… they liked it better." Unlike the project described in the

non-completers comments, this instruction seems to be teacher-centered. She provides the information (either by lecture or pointing them to a chapter in a book) and wants the student to prove they have received the information by successfully completing a worksheet.

Access to Resources

Before discussing either the data sources or the findings, this theme requires some additional background information which will provide the necessary background of resources dedicated to Project ICE. As mentioned in chapter 3, each participant was to receive an e-portfolio workstation which consisted of a computer, printer, scanner, and digital camera. In a separate technology initiative, the GEAR UP program had committed to purchase each school a mobile laptop lab.

It was the intention of the Project ICE designers to have all the equipment available in August. This would ensure the participants would have access to the equipment from the first day of school. However, due to an administrative decision, the equipment order was postponed until the GEAR UP grants new fiscal year (after September 1st). This delay meant the equipment didn't start arriving at the schools until early to mid-October.

A second factor that impacted the available of equipment is the district's Information Technology (IT) department. The configuration of the district IT department was that one technician was responsible for a group of nine to 15 schools' equipment. This responsibility included the maintenance of existing

equipment and the installation and configuration of new equipment. If the equipment had arrived in August, the technicians would have been better equipped to respond to the installation requirements and they would not have the high demand of the day-to-day maintenance of administrative and instruction workstations. However, the purchasing delay pushed the arrival of the equipment to October. Some technicians were not able to devote the time to setup and configure the different systems until the December – January timeframe.

Armed with the background of Project ICE's effort to provide adequate technology, it is appropriate to begin to explore the cohort's fourth (N=37, 11%) most reported theme of Access to Resources.

Data sources. The source of the codes that form this theme is telling in itself. Of the 37 unique codes, 26 codes (70%) were associated with the quarterly survey's question on a participant's challenge to implementation. The remaining data sources include changes participants would make to an instructional unit (N=6, 16%) and interviews with completers (N=5, 14%).

For non-completers the issue of Access to Resources was the third most reported code (N=29, 14%) behind Instruction and Pedagogy and Time. Conversely, for completers the issue of Access to Resources was tied with Time for the seventh most reported code (N=8, 7%).

The influence of Access to Resources on adoption. Access to Resources, specifically technology was an element of the data set that seemed to produce several of the strongest comments from the participants. For instance, an educator

with six to 10 years of experience concisely shared why she hadn't started implementing e-portfolios during the first quarter survey. "Technology: we have not been fully equipped to implement the program." This frustration was shared with the completers and non-completers alike.

A 20+ year career technical education teacher explained her implementation challenge during the first quarter's survey.

> Getting computers hooked up, my gear up computer still not working. Finding the time to work with other teachers. The teachers I will mentor have only one computer in classroom. We will need to use my computers and my classroom. This will be a challenge.

So despite the fact that she had technology provided by the district Career Technical Program, she still found the management of technology with her protégé classes to be challenging.

One of the most interesting examples of the lack of Access to Resources as the major factor a non-completer presented for non adoption is that of a 6 to 10 year language arts instructor. In the first quarter's survey she explains her implementation challenge.

> We still don't have all of the equipment. It is difficult to do initial training on the Alcaweb [the e-portfolio system] with just two computers. If we had had all the equipment in place when the school year began, it would have been much easier to build into the students' classroom routine. Now, I'm having to disrupt the flow of things to teach them to use it. After one

quarter, they question anything new you add where they would have just accepted it in the beginning.

This survey entry was the last communication from this teacher. She effectively withdrew from the project.

The lack of equipment during the first quarter is clearly evident. Moving to the fourth and final survey entry, a non-completer who responded to survey anonymously explained his/her inability to implement e-portfolios. "I DIDNT GET A CHANCE TO IMPLEMENTING MY PROJECTS BECASUE WE NEVER GOT WIRELESS HOOKED UP ONCE THE CARTS GOT HERE." [The all capitol letter entry is considered shouting in electronic communications.] A 20+ year non-completer shared her frustration with the Information Technology department in this second quarter's implementation challenge.

> And then, there's the problem with getting IT out to actually get the equipment up and running. I am beginning to think that IT is only a figment of someone's imagination. They only seem to appear often enough to make me question my sanity!

As late as the third quarter participants were still having issues with access to equipment as seen in this teacher's (male with 2 to 5 years of teaching experience) comments.

> Once again, it was the lack of equipment. The mobile labs and presentation stations were never set up for us to use, so we only had the two classroom computers to work with. I just kept students rotating and

limited their allotted time on the computers. Also because they were working on setting up a wireless system - we would be "kicked off" the system and lose work as a result. The way we overcame this was to just keep going.

In an interview conducted after the Project ICE program was complete, one completer (11 to 20 years of experience) offered access to equipment as the greatest impediment to adoption.

Interviewer: Describe your greatest challenge in implementing the components of Project ICE?

Completer: Uh we didn't have any materials [equipment] to begin with, that was very hard for you to be able to go forward when you didn't have the materials and they arrived really late and by the time, and then we had problems with IT [Information Technology], not that it was IT's fault because they were also, you know they were very short… under [manned] minded and it was very difficult for them to come in and set up for us. So by the time we really got started and we had everything set to where we could use the materials it was like in March and it was really hard.

Interviewer: What was, how did you overcome that challenge?

Completer: Well, one of the things I did was, we began, we went ahead and started in the library, I just had the kids come into the library and start working on some of that stuff. And that was how we, you know we used the library computers. But once they were, you know once the stuff was

in place then I let the teacher take some of stuff to his room and start working with it.

Professional Development - Ongoing Support

Project ICE was designed to provide participants a measure of on-going support in their implementation efforts. This support was available into two different forms. First, each participant was asked to attend a quarterly cluster meeting. Prior to each cluster meeting the participants were asked to complete their quarterly survey, where one question was dedicated to ensuring the participants' needs and/or questions were addressed with just-in-time training. The second form of support was the ability to schedule with a GEAR UP staff member to come to a teacher's classroom and to assist in development, model a lesson with students, or to serve as technical support in a teacher's implementation efforts.

Data sources. The participants' feelings and concerns on the on-going support of the project's initiatives (instructional unit, mentoring, and e-portfolios) were captured in three prompts from the quarterly surveys (no codes were generated in this area from the completers interviews). The prompts included the best experience of the summer institute (1st quarter), challenge impeding implementation (1st through 4th quarters), and learning cluster professional development request (1st through 3rd quarters). While the cluster meeting request prompt did provide the majority of the codes (N=19, 54%) of this theme, exploring the types of requests provide important details that can inform this

research question. As seen in Table 9, this theme is the fifth most prevalent theme for the cohort (N=35, 11%). But for non-completers (N=28, 14%) it is the third most important theme, while for completers (N=7, 6%) it did not seem to be a point of focus as it was the ranked 10th out of the 11 themes.

The influence of ongoing support through professional development on adoption. In the first quarter faced with implementing the Project ICE initiatives, completers and non-completers alike felt the need for additional professional development and support. This 20+ year teacher, who was a completer, provided this statement in response to the learning cluster request during the first quarter's survey. "Working on computers and doing the portfolios. I need refresher lessons. I haven't done this in 11 weeks or more and it's easy to forget all the steps. I need to work with it regularly to remember everything I'm supposed to do. [GEAR UP Staff Member's Name] promised to come to my classroom to help and get me started."

A non-completer (2 to 5 year language arts teacher) asked to review those components that she would be asked to teach her protégés. "I would want to review the required components that the mentorees [protégés] must know." Another non-completer, a male career technical education teacher with 11 to 20 years of experience, addressed the time lapse between his summer institute experience and preparing to implement e-portfolios. "I feel that I need a refresher on portfolios in AlcaWeb [e-portfolio system]. It has been 5 months since I've used AlcaWeb. The old saying is true 'if you don't use it you lose it.'"

An 11 to 20 year completer explained the importance of the standing Project ICE lab time established by the GEAR UP staff developed after the second quarters learning cluster meeting illuminated the need. "I don't have any concerns, I'm just THANKFUL [GEAR UP staff member's name] will work with us on Fridays."

The Quality of Professional Development

Two contextual factors influenced the GEAR UP program's attempt to develop a program with the highest quality of professional development and on-going support. First, a national foundation was holding a professional development grant competition, which could serve as a supplemental funding source. The second factor was the limited success the grant was having in implementing one of its core objectives—e-portfolios. So in the design and development stages of this project, the GEAR UP staff recruited the assistance of two nationally-recognized professional development experts. The proposal was vetted within the national foundation's grant review process and was found worthy of funding.

The professional development presented to participants during their summer institute focused on three different areas—development of an instructional unit using Madeline Hunter's Lesson Line (a district adopted lesson design); strategies to assist in the recruitment and mentoring of a two protégés; and, the use of the e-portfolio platform with students. The cohort's sixth theme,

Quality of Professional Development, surfaced as an important factor for completers' adoption of e-portfolios.

Data sources. The issue of the quality of professional development seemed to spring from a diverse set of data points, from both the quarterly surveys and completer interviews, which informed this theme. The quarterly survey prompts included: the impact of mentoring on adoption (1st and 4th quarters), best experience from the summer institute (1st quarter), elements that participants would change about the instructional unit (2nd through 4th quarter), learning cluster (professional development) requests (2nd quarter), and, implementation challenges (3rd and 4th quarters).

While the Quality of Professional Development was the sixth most mentioned code for the cohort (N=30, 9%) and non-completers (N=12, 6%), it was the second most mentioned code for completers (N=18, 15%).

The influence of the Quality of Professional Development on adoption. In reviewing participants' comments associated with the Quality of Professional Development, a personal reaction to the professional development yields a diverse spectrum of appreciation. For instance, a non-completer (teacher with 11 to 20 years of experience) described her summer institute experience as "fun and up-lifting and I looked forward to attending each day's session." Two surveys later (3rd quarter survey), the same teacher suggests that "[t]here was not enough hands-on training during the summer training session." In her interview, a completer (20+ year teacher) actually identified the hands-on activities as a

highlight of the summer institute. "I enjoyed the classes, the hands-on work and I just enjoyed all of it. I thought it was all very nice. You kept us entertained and informed. All Day! You did great!"

There seemed to be agreement between both completers and non-completers on the level of professionalism exhibited by the summer institute facilitators. "My best experience from Project I.C.E. Summer Institute was the motivation and excitement from our instructors" (non-completer, teacher with 2 to 5 years of experience). When asked about the instructional unit component of the summer institute in her interview, the 20+ year completer stressed the importance of the training.

> Oh that [instructional unit training] was perfect! If I hadn't done that, I couldn't of done that at all! When we had to go online, if I hadn't had the hands-on I would of never got it done. The hands-on gave me enough knowledge to then work on it and figure it out.

The same completer provided an almost poetic summary of her experience at the summer institute during her first quarter survey (best experience of summer institute prompt) response.

> Learning about EPortfolios, meeting and sharing with other teachers. The institute was fun, informative and very helpful. The learning environment was fast paced and comfortable. Teachers need this type of experience to promote self motivation to try new things in their classrooms.

Mentoring

Joyce and Showers (2002) research on peer coaching demonstrates the power of mentoring on implementation (see Table 2). The concept of arming the GEAR UP program with 30 trained mentors who would go unto the masses and each train two protégés so that an end product was 90 educators implementing e-portfolios was an attractive outcome for Project ICE. The Mentoring theme explores the impact of this component on the participants' adoption of e-portfolios.

Data sources. The Mentoring theme appeared to garner more attention with the completers (N= 11, 9%) in the frequency of codes than with non-completers (N=11, 5%). The cohort's (N=22, 7%) codes associated with Mentoring yielded the 7th (tied with Collegiality) most mention theme. Both the quarterly surveys and completer participant interviews produced the data points to attract these specific codes. In quarterly surveys the prompts included: implementation challenge (1st, 3rd and 4th quarters), impact of mentoring (1st and 4th quarter), and, the best experience from summer institutes (1st quarter).

The influence of Mentoring on adoption. Three threads seemed to connect the individual codes that eventually formed the Mentoring theme—preparation, accountability, and protégé characteristics. A completer with 11 to 20 years of experience listed the instruction that focused on mentoring at the summer institute to be her best experience of that professional development opportunity. "The best experience was learning the importance of Mentoring other teachers. Working in

Ice Program helps to make one feel more confident and knowledgeable about Mentoring." A non-completer (educator with 6 to 10 years experience) simply listed "Mentoring!" as her best experience of the summer institute.

The thought of mentoring their peers in e-portfolios produced an ongoing pressure to become familiar with the e-portfolio system. This accountability can be seen in the 20+ year completer's 1st quarters reflections.

> I need to do this with my students first then I can work with their students. Having access to enough computers for my students and their students will be a challenge. Preparing my own written lesson plan using step by step instructions is necessary for me as well as mentoree's to be successful in implementing the portfolios.

Several months after completing her Project ICE commitment, the same participant reflected on her impression of the mentoring in the program as a whole.

> *Interviewer:* Did the expectation that you must successfully mentor two peers in utilizing the system impact your use and implementation of e-portfolios?
>
> *Completer:* Yes! Because I knew I had to teach them, so I worked a little harder and since sometimes they would come ask me some questions, so I would think "hmmm." So I would have to go back on and see what I did,
>
> *Interviewer:* Ok.

Completer: And I wrote it all out for them and gave it to them on paper. I still got that somewhere.

A 20+ year non-completer describes a similar impact of the mentoring expectation on her efforts. "Yes. I wanted to do a better job on my portfolios in my classroom so I could show my mentee [protégé] what they looked like." Another non-completer (female teacher with 11 to 20 years of experience) stressed the importance of knowing those elements a mentor needed to prepare her protégés to present. "Sit down with them [protégés] and walk them through the process. I need to be very comfortable and familiar with the process first."

The final thread of Mentoring is the protégé as a person. Some of the non-completers reported challenges in gaining access to two willing protégés. This non-completer (teacher with 20+ years of experience) presents the challenge of coordinating schedules. "Not enough time to meet with my mentees and still do everything else I am supposed to be doing. I have attempted to meet with my mentees on planning periods or a few minutes before or after school." Another non-completer explained her issues in convincing others to participate in a program plagued by delays in equipment and technical glitches. "I didn't provide names before. I don't know how they will implement portfolios due to technology limitations. Even if we have the equipment, many times the internet is down, causing frustration for students and teachers."

Collegiality

In most educational settings, the instructor is asked to direct the learning experiences of a number of students. The day-to-day routine finds each professional isolated from his/her peers with the exception of staff meetings, informal conversations in the hall or teachers lounge, and occasional professional development events.

In designing the Project ICE summer institute, the program designers had hoped to forge some relationships amongst the participants so that they might develop an information support network. With this network, a participant would have one more layer of support available to them during their efforts to implement the project initiatives.

Data sources. The quarterly survey and completer interviews were the sources for the data that formed the theme of Collegiality. Besides a single code that emerged from the impact of mentoring (1st quarter), the primary source of data for this theme found in the quarterly survey was from the prompt that participants used to describe their best experience of the summer institute (1st quarter). In a strange coincidence, the theme of Collegiality was identical in frequency and relative position for completers (N=11, 9%), non-completers (N=11, 5%) and the cohort (N=22, 7%) as the groups had in the Mentoring theme.

Collegiality's influence on adoption. Completers and non-completers both voiced their appreciation for the structure of the summer institute that fostered interactions with their peers. "Working together with other teachers, sharing ideas

and viewpoints. We usually don't have an extended period of time to work on one unit and get input from other teachers. We work in isolation most of the time." This preceding statement from a 20+ year educator who was a non-completer aptly introduces this theme.

This sentiment is seen repeatedly throughout the data. A non-completer with 6 to 10 years of experience stressed the opportunity to work with other professionals was an important element of the summer institute. "What I enjoyed most was being able to work with people that I never see or would have never had the chance to get to know." This was repeated by a 20+ year teacher. "My best experience was being able to collaborate with my peers."

Completers offer extraordinarily similar statements in their reflection of the summer institute. "Learning about EPortfolio's, meeting and sharing with other teachers. The institute was fun, informative and very helpful"—20+ year teacher. The completer (11 to 20 years of experience) described how her interactions with other professionals informed her Project ICE efforts. "One of the best experiences I think was working with the other teachers it just opened my eyes as to what is going on in other schools and ideas just ideas that I could use with project ICE."

Administrative Influences

The next theme, Administrative Influences, inspects those school-based issues that the participants introduced as having bearing on their adoption, but fell outside the scope of instruction and pedagogy. Issues ranged from the schools'

leadership to the format of the schedule to working with the GEAR UP staff to get their protégé's classes loaded into the e-portfolio system.

Data sources. The theme of Administrative Influences was found in both the quarterly surveys and completer interviews. Participants' challenge to implementation (1st through 4th quarter surveys) and learning cluster professional development requests (1st and 3rd quarter surveys) were the specific prompts that informed the theme. This theme produced a greater percentage of codes for non-completers (N=13, 6%) when compared with completers (N=4, 3%). Thus this theme was the 7th most reported theme for non-completers; while for completers it was the least (11th) mention theme.

The Administrative Influences' impact on adoption. A non-completer (2 to 5 years of experience as a teacher) who happened to teach at an alternative school, identified in her first quarter's implementation challenge that the nature of her school was in fact the hurdle.

> My greatest challenge in implementation was first the dynamics of my school. [School's name] is not set up in traditional format so it screws up group efforts. I have had to work with my kids individually which is somewhat time consuming.

During her third quarter's implementation challenge, she once again highlighted a school trait as her impediment. "Time! Also my student enrollment changed everyday ([school's name]) and so it would seem that right when I was about to get somewhere with a student, they would be gone." In the final survey, she

offers a quote that speaks to her frustration in her adoption efforts. "The challenge was somewhat impossible. Daily class enrollment changes created a lot of difficulties for myself to implement this program."

Several of our participants' roles changed between the summer institute and the start of school. One example is a 20+ year non-completer.

> Circumstances seem to be my largest challenge. Two days before pre-school week my teaching assignment changed to all 9th grade. Just after Thanksgiving, I became the Title One Reading Specialist and was pulled out of the classroom and was given the task of raising reading test scores. I do have more access to jrs and seniors than I had before. My current problem is finding a place to hide so the adults will leave me alone long enough to accomplish something!

The following comment submitted on the fourth quarter's survey by a 11 to 20 year teacher (non-completer) actually address several themes—Time or Mentoring—but the competing priorities highlights the management or administrative nature of attempting to implement a new innovation.

> Not enough classroom time or time with protégée. Because I am so unfamiliar with alcaweb [e-portfolio system], teaching it to someone else is very stressful. With all the other obligations I have, choosing a stressful task is at the bottom of the list. Creating units of study took too much time because of difficulty navigating the system.

System

The e-portfolio system used by the GEAR UP program for e-portfolios was developed by a US Department of Education's Technology Challenge Grant recipient known as the Aurora Learning Community Association (ALCA). ALCA created a single Internet-based system that provided a robust learning management system (LMS) that provided a knowledgeable user a powerful instructional tool. However, the same robust LMS in the hands of a novice or to someone who was not ready to utilize the system, the system had a tendency to seem complex.

Data sources. This was a theme that the completers (N=10, 9%) were more likely to speak to than non-completers (N=7, 3%). The following quarterly survey prompts produced codes: implementation challenge (1st through 4th quarters), suggestions for changing the e-portfolio system (1st and 4th quarters), and best experience of the summer institute (1st quarter). It was also an item of discussion from the three completers' interviews. For the purpose of providing the reader with an additional contextual description of the participants, this section will include the self-reported technology skills. This Likert-like scale offered participants the following five options in describing their current technology skill set: 1-Beginner; 2-Novice; 3-Average; 4-Above Average; and, 5-Expert.

System's influence on adoption. The way participants responded to the e-portfolio system was very intriguing. There did not seem to be any continuity by

group (completer versus non-completer). For instance, two completers had opposite impressions of the system. The 20+ year completer (average technology skill set) described the system as unduly complex.

> *Completer*: Well, as I was working on it, many times I would think "why is this… this is too hard, this should be easier." The one thing we kept making mistakes on, and this has been two years, we kept hitting work samples… We heard work samples, work samples… and one Saturday morning I worked with that long enough. When we hit it at a certain stage it would loose everything. I finally figured out what we were doing, and it seems like some of the things like that could have been changed.
>
> *Interviewer*: So, a little to complex?
>
> *Completer*: Maybe so. Maybe so…And I finally… that was simple but I had no one to tell me. I told kids work sample, you told me work sample. So we hit work sample, any how. [Laughing] Sooo… umm, well I finally learned you don't hit that… at this point I don't remember now exactly were at this point we don't hit work sample. So there were some things that I think were a little complex.

Conversely, the 11 to 20 year teacher (above average technology skill set) reported her appreciation of the system in her fourth quarter survey. "I wouldn't change anything [about the e-portfolio system]. I enjoyed working on ALCAweb and I think my students enjoy it also."

This trend continued with the non-completers. The non-completer (11 to 20 years of experience and average technology skills) found the system easy to use. "Needs spell check. Otherwise it [e-portfolio system] is easy to use." Whereas, a six to 10 year non-completer (above average technology skills) suggests the system has several opportunities for improvement when asked what she would change. "soooo many things. It often seems inefficient to use. There are many steps to do a simple thing."

Motivation

Why would a teacher, counselor, or media specialist choose to participate in a project that required the teachers' attention in three time-consuming initiatives? While the question of Motivation was not addressed with a prompt on the quarterly surveys, the completers in their interviews touched on the discussion as they reflected on their involvement and their recruitment and support of their protégés. This section will explore the different motivations that brought people into Project ICE.

Data sources. The final theme, Motivation only source of data was the completers' interviews. Understandably, the theme of Motivation was not an issue, thus ranked last, for non-completers (N=0, 0%). However, for completers (N=8, 7%), the issue of motivation was the 9th most frequently discussed theme.

A participants' Motivation and its influence on adoption. There are three different threads associated with the theme of Motivation. They include

association with professional goals, fulfilling a desire to learn something new, and monetary reward.

In her interview, a completer (11 to 20 years) described how she associated the project outcomes with a teacher's attempt at national board certification.

> I just talked to them, I said would you be interested in, one of them she was working on her nationals and I said [Teacher's Name]. I have something that will help you look good on your nationals. Would you be interested and she said you bet, because she had to do a lot of that kinda of stuff, it was some of the things they were looking in the nationals. So me working with her in that way she had cooperation you know with a teacher and she was also able to implement a lot of the computer stuff that she was needing to do.

Another completer, an 11 to 20 year teacher, spoke to her nature of learning for curiosity sake. This can be seen in the following conversation. The completer had been discussing one of here four units of instruction she implemented.

> *Completer*: But uhmm I guess doing the lesson plans was pretty easy and I enjoyed that I thought, I try to learn all I can, I'm a little slow but I try to learn all, but this was fun. So mainly do lesson plans and enjoyed it. So this is different ya know. I want to try and master the ah cubits
>
> *Interviewer*: Rubrics?

Completer:…ok I want to do that. I haven't had time set out and figure out how to do that but I want to try put that in my lesson plans….

Interviewer: What would you, I know that you are kind of moving forward with Project ICE this year [2005-2006] have you changed anything from this year from last year or ?

Completer: Well not really… I mentioned I want to try and do the rubrics, we've been informed I think at our conference our BPA [state career technical education organization] meeting that we are going to be using the alca web next year, and I told my boss oh we know a little about it. Well we will be going more and more in depth next year. So what we're learning now we got to try and master because it's going to be a little bit more complicated next year. So ah, that would be a strength that I have got to fall back on as far as getting everything mastered this year and that's why I figured I would try to learn all that I could through the ICE program, so when they do bring in the other information and when it's maybe career tech it's mandatory. And it took like I think in two years we have our evaluation so we have got to have all this mastered. So I kinda got to get on the ball… so I need to learn all I can now.

The final thread of the Motivation theme is that of monetary compensation. As described in chapter 3, the GEAR UP program provided an incentive program where teachers were compensated for work performed in the development of their instructional units, mentoring their protégés, and attendance

of all Project ICE professional development events. Protégés were also paid for successful implementation of e-portfolios with a class. Interesting enough the only comment on that compensation was made in passing by the 20+ teacher who was describing how she recruited her protégés. "I asked them if they would be interested. I told them they would get paid and that I needed two people and they agreed and I would go down to help them."

Summary

This chapter presented the data associated with the three research questions. There was no relationship identified between the participants' perception of professional development and their Level of Adoption. There was a relationship (r = .495 p = .003) found to exist between the quality of an instructional lesson plan and the Level of Adoption. Finally, in the exploration of the factors that influenced completers in their adoption of e-portfolios and those factors that limited the non-completers' adoption of e-portfolios. This was accomplished by the presentation of 11 themes. Chapter 5 will present the researcher's findings, conclusions and recommendations for future implementation of technology-based innovations projects.

CHAPTER 5

FINDINGS AND RECOMMENDATIONS

This focus of this study was to identify those elements that impact the adoption of a technology-based innovation, which in this case was an e-portfolio initiative. This chapter will summarize the findings, identify the major connections between this study's results and the literature, and offer recommendations for both practitioners and future research.

Summary of Findings

Using an instrumental case study design (Stake, 1995), this study focused on investigating the adoption of the technology-based innovation of e-portfolios. Three research questions guided this investigation by inspecting the impact of the quality of professional development and the level of adoption, the relationship between the quality of instructional lesson plans and the level of adoption, and finally exploring what factors influenced participants that either adopted or failed to adopt e-portfolios.

Question one: The impact of professional development on adoption.

Question one used two integral scales to explore how a participant's professional development would influence his/her eventual adoption of the required elements of the project. The first scale was the participants' professional development. This scale was constructed from three Likert scale questions that asked participants to rate their perceived value of the summer training in preparing them for their year long implementation effort. The second scale was a

Level of Adoption matrix. This matrix examined each participant's success in completing the program requirements. The results of the Pearson's correlation indicated that there is no statistically significant influence between perceive quality of professional development and Level of Adoption (r = -.125 p >05).

Question two: The relationship between the quality of instruction plan and a participant's adoption.

The second question also used two integral scales in determining a possible relationship between the quality of an instructional lesson plan and the Level of Adoption. The quality of instructional lesson plan scale was the mean of all the instructional lesson plans submitted throughout the project year, as scored by a rubric. As in question one, the researcher relied on Pearson's correlation coefficient to identify the possibility of a relationship between quality of instructional lessons and a participants' Level of Adoption. However, in this instance a statistically significant relationship was found to exist between the quality of an instructional lesson plan and the Level of Adoption (r = .495 p = .003) of e-portfolios.

Question three: Completers' adoption and the non-completers' lack of adoption of an e-portfolio.

The final research question explored participant comments to identify the themes that would describe those elements that influenced the successful or unsuccessful attempts of completers in their attempts to implement the elements of Project ICE (Integrating Curriculum-aligned Eportfolios). The three

completers were identified by the GEAR UP staff as satisfactorily completing all the elements of the program; the remaining 29 participants were non-completers. In this exploration, 11 themes were identified: Instruction and Pedagogy, Time, Student Engagement, Access to Resources, Professional Development - Ongoing Support, Quality of Professional Development, Mentoring, Collegiality, Administration Influences, The E-Portfolio System, and, Motivation. In this comparison, a "search for patterns, for consistency, for consistency within certain conditions" (Stake, 1995, p. 78) was completed. In this search, "the number of people who mention something" and "the frequency with which something arises in the data" were examined (Merriam, 1998, p. 185). Patterns of evidence were compared between completers and non-completers.

Connecting the Findings to the Literature

The research findings did highlight several of the elements addressed in the literature associated with technology, professional development and lesson planning that was introduced within the review of the literature. Five of these connections bear further discussion. They include the use of technology to engage students in an instructional activity, the level of teacher-based professional development and its role in a participants' adoption of an innovation, the elements of the school culture that impacted teacher adoption, the influence of peer mentoring on adoption, and finally, the effect of instructional lesson planning on implementing a new curriculum-based innovation.

Student Engagement

The allure of technology to students is seen in the first finding—student engagement. In the presentation of the Student Engagement theme, this study reported students' reaction to both a student-centered and teacher-centered instructional activity. According to the reporting teachers, the level of student interest increased with the use of technology. This supports Solmon's (1998) findings when he identified a significant and positive relationship between the percent of classroom time spent *using computers* and both student engagement in learning.

Professional Development

The findings of the first research question—Does a participant's perceived quality of professional development influence the adoption of e-portfolios—did not support Smerdon et al.'s (1999) research, which indicated that level of preparation influences ones use of technology. This could be explained by further desegregation of the reported quality of profession data. When groups (completer, non-completer, and cohort) are compared (see Table 10), an interesting anomaly appears. While completers identified the quality of professional development higher on two of the three strands of instruction (lesson plan and mentoring), they reported a decidedly lower score for e-portfolios than the non completers. This suggests two things. First, the completers found the implementation of e-portfolios to be the most challenging element of Project ICE. Second, the non-completers did not recognize or choose to voice this challenge.

Here are two possible explanations of the higher scores. Since the non-completers did not fully implement e-portfolios in the classroom, they did not have the first-hand experience of exactly how challenging it is to have their students create e-portfolios. Secondly, they connect the quality of professional development as an evaluative reflection of the Project ICE staff. They could hold some feelings of guilt and wanted to spare the staff the poor marks in their professional development, especially since they failed to meet the requirements of the project.

Table 11

Comparison of Perceived Quality of Professional Development by Group

Quality of Professional Development by Type	Mean		
	Completers	Non-Completers	Cohort
Lesson	3.67	3.50	3.55
Mentoring	3.67	3.38	3.45
E-Portfolio	2.67	3.38	3.18
Institute	10.00	10.25	10.18

Note: The Institute was a sum of lesson, mentoring, and e-portfolio quality.

Innovation, Innovator and Context

A strong connection to the literature came in the alignment of this research finding to the work of Zhao's, et al. (2002). This section will highlight several of the stronger connections between their 2002 technology use model and the findings of this study.

In Figure 3, Zhao et al. (2002) provides 11 factors that influence the use of technology in instruction. They grouped these 11 factors under three groupings—innovation, innovator, and context. As this research is an instrumental case study (Stake, 1995), which is focused on the issue or problem (Stake's iota—ι), the stronger connections appeared in the grouping of innovation, although several of those bleed over to the remaining two groups of innovator and context.

Zhao et al. (2002) present three factors related to the innovation that influence adoption. They include: distance from the school culture, distance from available resources, and distance from innovator's current practices. Each of the three factors was found throughout the participants' comments.

The distance from the school culture can be seen in the continued comments of the young (2 to 5 years of experience) non-completer who worked in the alternative school. The comment "[my] greatest challenge in implementation was first the dynamics of my school" clearly identifies the gap between innovation and school culture.

Zhao et al.'s (2002) second factor associated with the innovation is the distance from resources. This factor can be found in the theme of Access to Resources, where teacher after teacher identified the primary barrier to adoption as the lack of access to the resources.

While the third factor, distance from an innovator's current practices, was not a element of that formal data was collected during the actual project year, a closer look at the three completers presents some ancillary evidence of a

correlation. The completers consisted of a two career technical teachers and a library media specialist. This southwest state boasts a nationally recognized career technical program that advocates a student-centered classroom; with multiple opportunities for students participate in their own learning. In the same vein, any library media specialist should be an advocate for student exploration through engaging literature or through employing literacy skills for research. In short, each of the completers work in non-traditional instructional settings, which made the adoption of e-portfolios, a non-traditional, evaluation tool easier to implement.

Mentoring

The inclusion of the mentoring component within Project ICE resulted in some interesting connections with Joyce and Showers' (2002) research. Participant comments and reflections from the mentoring theme resulted in one of the interesting threads, which was that of the accountability of being a peer mentor. One non-completer stressed that she needed to become an expert with the system and e-portfolios. "I need to be very comfortable and familiar with the process first."

However, the impact of mentoring did not yield the degree of implementation found in Joyce and Showers' (2002) research. Joyce and Showers' research demonstrated 95% implementation rate with peer coaching versus 9% found in this study. However, when one accounts for the implementation challenges of Project ICE, as touched on in the discussion Zhao's

et al.'s (2002) work, such as access to technology, one could argue that the adoption window was compressed. With the adoption window compressed, those participants without alternative access to technology were not able to complete to project. In closer inspection of the completers, each had access to technology in their instructional areas. So without the additional barriers associated with the program, the completers had an opportunity to access the coaching offered by the Project ICE staff as seen in this comment by a completer. "I don't have any concerns, I'm just THANKFUL [GEAR UP staff member's name] will work with us on Fridays."

Planning for New Instructional Activities

The final connection to be discussed is the role of instructional planning plays in the adoption of a new innovation. Borko and Livingston (1998) highlighted the different ways novice and expert teachers use lesson planning. In their research, they found that when an expert attempts to present anything outside their normal repertoire, they also tend to move to the formal lesson planning. In the interview with the 20+ year career technical education teacher she found the instructional lesson plan element of Project ICE to be an invaluable component that led to her adoption. "Oh that [instructional lesson plan] was perfect! If I hadn't done that [lesson plan], I couldn't of done that [implement e-portfolios] at all!"

As discussed in this section, the majority of the findings of this study are aligned to the literature regarding, professional development, instructional

planning, and the role of technology in education. The main contribution of this study is that those elements that impacted the adoption of a technology-based innovation—in this case e-portfolios—were identified. The findings of this study demonstrated that the adoption process was similar to those found within the literature from the past 10 years. So, administrators, professional development specialist and technology specialist can use this information in developing an implementation plan that attempts to control for impediments and maximizes those elements that ensure success. E-Portfolios are an alterative approach to assessing student learning in today's educational climate, were the primary focus is on testing, districts can focus on the impact of the innovation as an alternative to test to examine student learning; and on the tool (technology) that delivers that innovation.

Recommendations

This section reviews the recommendations for both the practitioner and the researcher. While the recommendations for practice focus on the implementation of a technology-based innovation, the recommendations for research range from the simple—including some additional demographic prompts—to the ambitious—conducting multi-year longitudinal study.

Recommendation for Practice

The findings of this study could be used by several different segments of the educational community in the planning of any technology-based innovation. These segments include administrators advocating a new innovation, professional

development specialist responsible for introduction of the innovation to the targeted staff, information technology staff responsible to the acquisition, configuration, and support of the technology, and the educator whom is expected to implement the new innovation.

District administrators, school administrators, and information technology staff who are planning a technology-based project would be served by consider two recommendations. The recommendations include acquisition of equipment and selection of early adopters.

First, design the project plan so the technology arrives in the targeted classrooms the semester before the innovation-based professional development is scheduled or the innovation is to be implemented. The only professional development to be scheduled is how to use and care for the equipment being placed into the classroom. This would remove one of the largest impediments found in this study—access to technology. The semester would allow the information technology staff to identify and resolve all technology-based problems before the fate of the project rests on the stability of the technology being used.

Secondly, if the project calls for a phased implementation, choose those educators who embrace technology and whose pedagogy is similar to that of the innovation being introduced. If the implementation calls for the educators to implement a project based learning unit, do not select a teacher known for straight

lecture in his/her classroom. A successful implementer will actually provide an onsite mentor to assist the next phase of teachers in their adoption efforts.

In the area of professional development, the recommendations emerge from two marked differences in the quality of the lesson plans developed during the professional development and those lesson plans developed without that support. The difference between these two units, as seen in Table 9, demonstrate a need for additional supports built into the professional development plan of the project. If it was a project similar to Project ICE, additional compulsorily development sessions would ensure the participants have access to the subject matter experts as they are development the subsequent units.

For the teacher, if the new innovation requires a shift in pedagogy or the addition of a technological activity that is outside their expertise, that teacher should consider carefully and formally planning out the activity. This formal lesson plan provides the framework for the teacher to take the unknown out of the implementing the innovation.

Recommendations for Further Study

Project ICE was an initiative to promote the use of e-portfolios. The project had run its course by the time the researcher had elected to use it for this study. The existing data sources were rich with detail that promised to highlight those elements that either enhanced or impeded an educator's adoption of technology-based innovation. However, the thought of designing around the guiding research question was intriguing to the researcher. So, if several of the

recommendations to the researcher seem to be minor in scope and something that could be addressed with a thoughtful experimental design, the reader will understand their presence in this section.

If a similar research project was in the design stage, the first recommendation would be to collect additional demographic and/or contextual data points to assist the researcher in including a rich narrative of the environment in which the participants struggled to achieve the adoption. Specific examples of demographic data that would have been useful in exploring the Project ICE sample of educators would be: the identification of all the extra-curricular activities the participant is involved in (often the early adopters are spread very thin with other activities like senior sponsor, athletic sponsor/coach, club sponsor, etc.); the identification of the number of classes that a participant is responsible for preparing for state assessment that impacts a school's Academic Performance Index (API—a No Child Left Behind evaluation of school performance); and, include a series of questions to identify a teacher's pedagogical philosophy.

Examples of the contextual data points that might be integrate into the study to clarify the findings include: several prompts for a teacher to provide his/her perception of the school's leadership, culture, and practice. This data hook would specifically allow the researcher to further explore the Zhao et al. (2002) model and the interaction between the innovation, innovator, and the context (of the school).

In any research project, a major goal of any researcher is to control the extraneous variables that fall outside the scope of the study, so researchers can report with a higher level of confidence his/her research findings. So, a recommendation for future research projects that work with a technology-based innovation is to limit the impact of access to technology. In the case of Project ICE, the acquisition, delivery, and configuration of the technology were outside the scope of this research initiative. However, the participants access to working technology was a major impediment to the implementation this project. A strong recommendation for researchers would be to coordinate the delivery of equipment well before the research window. This would allow the both the participants and the supporting information technology staff to be familiar with the equipment and ensure the coordination of effort for its use within the framework of the study.

The next recommendation would be to further explore the adoption cycle as participants ability manage change. This aspect of education has been a point of focus of the professional development literature for the past three decades. A prominent model introduce in the 1970s was the Concerns Based Adoption Model (Hall & Hord, 1987). If a research project would shift the focus from if a participant did or did not adopt to identify to the stages a participant moved through as they attempted to adopt, that researcher would be able to further correlate the technology-based innovations adoption to existing research on change management.

The fourth recommendation would be to shift the focus from the issue of adoption—Stake's (1995) iota—to a series of cases contained in a bounded-system—Stake's theta. This focus on selected cases would allow additional data collection procedures to be employed, such as classroom observations of both the lesson and the creation of student e-portfolio entries.

The final and most ambitious recommendation is for a longitudinal study investigating the impact of a technology-based innovation on student achievement. The design of the study could track both the degree of adoption and the amount of time required for the staff to truly integrate the innovation into their practice. Through a carefully-designed tracking system to measure the frequency of student interaction with the treatment/innovation could be compared with gain in achievement scores to identify a possible relationship.

Summary

This study explored a southwest urban school district's implementation of the technology-based innovation of e-portfolios with a group of 32 educators during the 2004-2005 academic school year. The research was designed to identify any relationships between the quality of professional development and instructional planning on participant adoption and to analyze participants' feedback to identify those elements that impacted their level of adoption.

A Pearson's correlation coefficient did not identify a statistically significant influence between perceived quality of professional development and level of adoption (r = -.125 p >.05). However, a Pearson's correlation did

identify a statistically significant relationship between the quality of an instructional lesson plan and the Level of Adoption (r = .495 p = .003) of e-portfolios. The participant feedback produced 11 themes that identify those factors that influenced both the completers' adoption and the non-completers' lack of adoption of e-portfolios. In closer inspection of the themes, several important trends became apparent and warrant closer consideration by both practitioners and researchers.

The theme of access to technology was a theme that impacted both the completer and non-completers. While the non-completers associated many of their troubles with this barrier, often using passionate descriptions of the negative impact of missing or non-functioning equipment, many of them lacked the access to alternative technology resources. However, confronted by the same barriers, each of the completers had access to preexisting equipment. So a recommendation of this research is to purchase, deploy, and configure the technology prior to the implementation efforts of a new innovation.

Time was also an important theme and one that aligns with the findings of two different professional development and/or change models—RPTIM (Wood, Killian, McQuarrie, & Thompson, 1993) and Concerns Based Adoption Model (Hall & Hord, 1987). Both models suggest that it is common for participants to struggle to gain a level of comfort and familiarity with a new innovation. Additional connections could be found with the change literature if the focus of the study could be shifted from investigating completer/non-completer to

investigating how a professional moves along the different stages of professional development.

This study builds upon the research presented in the literature review and highlights the connection between three different literature-bases: professional development, instructional planning, and educational technology. Further exploration of similar initiatives could confirm a fourth connection to the educational change literature.

REFERENCES

Arter, J. & Spandel, V. (2000). *Using portfolios of student work in instruction and assessment*. Northwest Regional Educational Library [On-line]. Available: http://www.literacynet.org/icans/chapter02/portfolios.html

Bailey, S. & Little, J. (1996). Histogram depicting the evolution of professional development and evaluation: Bailey Alliance.

Bassey, M. (1999). *Case study research in educational settings.* Maidenhead, Berkshire England: Open University Press McGraw-Hill House.

Becker, H. (1999). *Teaching, learning, and computing:1998 national survey*. Irvine, CA: Center for Research on Information Technology and Organizations.

Becker, H. J. & Ravitz, J. L. (2001). *Computer use by teachers: Are Cuban's predictions correct?* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Berliner, D. C. & Rosenshine, B. V. (1977). The acquisition of knowledge in the classroom. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds), *Schooling and the acquisition of knowledge* (pp. 375-396). Mahwah, NJ: Lawrence Erlbaum Associates.

Borko, H. & Livingston, C. (1989). Cognition and improvisation: Differences in mathematics instruction by expert and novice teachers. *American Educational Research Journal, 26*(4), 473-498.

BrainyQuote (2006) *Albert Einstien.* Retrieved April 19, 2006 from http://www.brainyquote.com/quotes/quotes/a/alberteins133991.html

Bull, G., Bell, R. & Kajder, S. (2003). The role of "computers in the schools" revisited. In D. LaMont Johnson and Cleborne D. Maddux (Eds.) *Technology in Education: A Twenty-Year Retrospective* (pp. 59-76). New York, NY: The Haworth Press.

Carlson, B., Burgess, A., & Miller, C. (1996). Timeline of computing history. *Computer Magazine - IEEE Computer Society*. Retrieved December 29, 2005, from http://www.computer.org/portal/cms_docs_computer/computer/timeline/timeline.pdf

Cambre, M. & Hawkes, M. (2004). *Toys, tools & teachers: The challenges of technology.* Lanham, MD: Scarecrow Education.

Carter, B. A. (2001). *Trends in k-12 staff development, 1978-1998: A twenty-year history*. ProQuest Dissertations and Theses, 63 (04), 1196. (UMI No. 30509920)

Ciolek, T. M. (2005). *Global networking: A timeline*. Retrieved November 4, 2001, from http://www.ciolek.com/PAPERS/milestones.html

Clark, C. M. & Yinger, R. J. (1980). *The hidden world of teaching: Implications of research on teacher planning.* Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA.

Cohen, L. & Manion, L. (1989). *Research methods in education* (3rd ed.). London: Routledge.

Corey, S. (1957). Introduction. In N. Henry's (Ed.) *The Fifty-sixth Yearbook of the National Society for the Study of Education, part I* (vol 56) (pp. 1-12). Chicago, IL: The University of Chicago Press.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Cuban, L. (1986). *Teachers and Machines: The Classroom Use of Technology* Since 1920. New York: Teachers College Press.

Cuban, L. (2001). *Oversold and Underused: Reforming Schools Through Technology, 1980-2000.* Cambridge MA: Harvard University Press.

Dillon-Peterson, B. (1991). Staff development/organizational development— Perspective 1981. In B. Dillon-Peterson's (Ed.) *Staff Development/Organizational Development* (pp. 1-10). Alexandria, VA: Association for Supervision and Curriculum Development.

Dobson, R., Dobson, J., & Kessinger, J. (1980). Staff development: A humanistic approach. Washington D.C.: University Press of America.

Feinberg, W. & Soltis, J. F. (1998) *School and society.* New York, NY: Teachers College Press.

Goldfarb, B. (2002). *Visual pedagogy: Media cultures in and beyond the classroom.* Durham, NC: Duke University Press.

Goldin, C. (1999). *A brief history of education in the United States* (Historical Paper 119). Cambridge, MA: National Bureau of Economic Research.

Good, T. & Brophy, J. (1978). *Looking in classrooms* (2nd edition). New York: Harper & Row.

Green, S. & Salkind, N. (2003). K Independent-Samples Test: The Kruskal-Wallis and the Median tests. In L. Jewell and J. Heffler (Eds.), *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (3rd edition) (pp. 367-378). Upper Saddle River, NJ: Pearson Education, Inc.

Gura, M. & Percy, B. (2005). *Recapturing technology for education: Keeping tomorrow in today's classroom.* Lanham, MD: Scarecrow Education.

Guskey, T. R. (2000). *Evaluating professional development.* Thousand Oaks, CA: Corwin Press.

Guskey, T. R. & Sparks, D. (1996). Exploring the relationship between staff development and improvements in student learning. *Journal of Staff Development*, 17(4), Retrieved October 18, 2005, from http://www.nsdc.org/library/publications/jsd/f_gusky.cfm on.

Haigh, N. (1981, December). *Research on teacher thinking.* Paper presented at the National Conference of the New Zeland Association for Research in Education, University of Waikato, New Zealand.

Hall, G. E. & Hord, S. M. (1987). *Change in schools: Facilitating the process*. Albany, NY: State University of New York.

Harris, R. (1976). *A history of higher education in Canada 1663-1960*. Toronto, Canada: University of Toronto Press.

Hord, S. M., Rutherford, W. L, Huling-Austin, L., & Hall, G. E. (1987). *Taking charge of change*. Austin, TX: Southwest Educational Development Laboratory.

Hunter, M. (1982). *Mastery teaching.* El Segundo, CA: TIP Publications.

John, P. (1994). The integration of research validated knowledge with practice: Lesson planning and the student. *Cambridge Journal of Education, 24*(1), pp. 33-49. Retrieved November 18, 2006, from Academic Search Premier EBSCO database.

Johnson, D. W. & Johnson, R. T. (1994). *Learning together and alone: Cooperative, competitive, and individualistic learning.* Boston: Allyn and Bacon.

Joseph, P. B., Bravmann, S. L., Widschitl, M. A., Mikel, E. R., & Green, N. S. (2000). *Cultures of curriculum.* Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Joyce, B. (1981). A memorandum for the future. In B. Dillon-Peterson's (Ed.) *Staff Development/Organizational Development* (pp. 113-127). Alexandria, VA: Association for Supervision and Curriculum Development.

Joyce, B. & Showers, B. (2002). Student achievement through staff development. Alexandria, VA: Association for Supervision and Curriculum Development.

Krug, M. M. (1972). *What will be taught: The next decade.* Itasca, IL: Peacock Publishers, Inc.

Lemke, C., Quinn, B., Zucker, A., & Cahill, S. (1998). An analysis of the status of education technology availability and usage in the public schools of Virginia. Santa Monica, CA: Milken Exchange on Educational Technology.

Lincoln, Y. S. & Guba, E. G. (1985). *Qualitative inquiry.* Thousand Oaks, CA: Sage Publications, Inc.

Lomax, R. G. (2001). *An introduction to statistical concepts for education and behavioral sciences*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Loucks-Horsley, S. & Stiegelbauer, S. (1991). Using knowledge of change to guide staff development. In A. Lieberman & L. Miller (Ed.). *Staff development for education in the '90s: New demands, new realities, new perspectives* (2nd ed.) (pp. 15-36). New York, NY: Teachers College Press.

Maddux, C. D. (2003). Twenty years of research in information technology in education: Assessing our progress. In D. LaMont Johnson & Cleborne D. Maddux (Eds.) *Technology in Education: A Twenty-Year Retrospective* (pp. 35-48). New York, NY: The Haworth Press.

Mann, D., Shakeshaft, C., Becker, J., & Kottkamp, R. (1999). *West Virginia story: Achievement gains from a statewide comprehensive instructional*

technology program. Santa Monica, CA: Milken Exchange on Educational Technology.

Market Data Retrieval. (2006). *Education*. Shelton, CT: Market Data Retrieval.

Marlowe, B. A. & Page, M. L. (2005). *Creating and sustaining the constructivist classroom* (2nd ed.). Thousand Oaks, CA: Corwin Press.

McCain, T., & Jukes, I., (2001). *Windows on the future: Education in the age of technology.* Thousand Oaks, CA: Corwin Press.

Means, B., Blando, J., Olson, K., & Middleton, T., (1993). Using technology to support education reform. *U.S. Department of Education,* U.S. Governement Printing Office, Washington, D.C. Retrieved September 9, 2005, from http://www.ed.gov/pubs/EdReformStudies/TechReforms/title.html

McKenzie, J. (1998). Creating technology enhanced student-centered learning environments. *From Now On: The Educational Technology Journal* 7(6). Retrieved April 17, 2006, from http://www.fno.org/mar98/flotilla.html

Merriam, S. B. (1998). *Qualitative research and case study applications in education: Revised and expanded from case study research in education.* San Francisco, CA: Jossey-Bass Publishers.

Mossman, L. C. (1924). *Changing conceptions relative to the planning of lessons.* New York: Teachers' College, Columbia University.

Neil, R. (1987). *The integration of curriculum and teacher development (1890—1990) – Roots and rationale.* Ontario, Canada: An address to the Canadian Society for Studies in Education. (ERIC Reproduction Services No. ED287841)

Office of Technology Assessment, U.S. Congress. (1988). *Power on! New tools for teaching and learning: A new course for education.* Washington DC: U.S. Government Printing Office. Retrieved January 14, 2006, from http://www.wws.princeton.edu/ota/disk2/1988/8831/8831.PDF

Oppenheimer, T. (2003). *The flickering mind: The false promise of technology in the classroom and how learning can be saved*. New York, NY: Random House.

Parsad, B., & Jones, J. (2005). *Internet access in U.S. public schools and classrooms: 1994-2003* (NCES 2005-015). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Peck, C., Cuban, L., & Kirkpatrick, H. (2002). Technopromoter dreams, student realities. *Phi Delta Kappan*,83(6), 472–480.

Pfundstein, T. E. (2003). The use of technology that affect how teachers teach and students learn. In Arthur D. Sheekey (Ed.), *How to ensure ed/tech is not oversold and underused* (pp. 73-94). Landham, MD: Scarecrow Press.

Picciano, A. (2002). Educational leadership and planning for technology (3rd ed.). Upper Saddle River, NJ: Pearson Education Inc.

Publication manual of the American Psychology Association (5th ed.). (2001). Washington D.C.: American Psychological Association.

Richey, H. G. (1957). Growth of the modern conception of in-service education. In N. Henry's (ed.) *The Fifty-sixth Yearbook of the National Society for the Study of Education, part I 56* (pp. 35-66). Chicago, IL: The University of Chicago Press.

Rury, J. L. (2005). *Education and social change: Themes in the history of American schooling*. Mahwah, NJ: Lawrence Erlbaum Associates.

Saettler, L. P. (1968). *The evolution of American educational technology*. New York, NY: McGraw-Hill.

Saettler, L. P. (1990). *The evolution of American educational technology*. Englewood, CO: Libraries Unlimted.

Sandholtz, J. H. & Reilly, B. (2004). Teachers, not technicians: Rethinking technical expectations for teachers. *Teachers College Record* 106(3), pp. 487-512.

Schubert, W. H. (1986). Curriculum: Perspective, paradigm, and possibility. NY: Macmillan.

Schwandt, T. A. (2001). *Dictionary of qualitative inqury* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Simkins, M. (2006). Does technology pay? Investing wisely takes discipline. *Technology and Learning, 26*(4) p. 26. Retrieved September 20, 2006 from LexisNexis™ Academic Universe.

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N., & Angeles, J. (2000). *Teachers' tools fro the 21st century: A report on teachers' use of technology* (NCES 2000-102). Washington, D.C.: National Center for Educational Statistics.

Solmon, L. (1998). *Progress of technology in the schools: Report on 21 states.* Santa Monica, CA: Milken Exchange on Educational Technology.

Stake, R. E. (1995). *The art of case study research.* Thousand Oaks, CA: Sage Publications, Inc.

Stallard, C. K. & Cocker, J. S. (2001). *The promise of technology in schools: The next 20 years*. Lanham, MD: Scarecrow Press.

Stenhouse, L. (1988). Case study methods. In J. P. Keeves (ed.), *Educational research, methodology, and measurement: An international handbook.* Sydney: Pergamon Press.

Tyler, R. W. (1949). *Basic principals of curriculum and instruction.* Chicago: The University of Chicago Press.

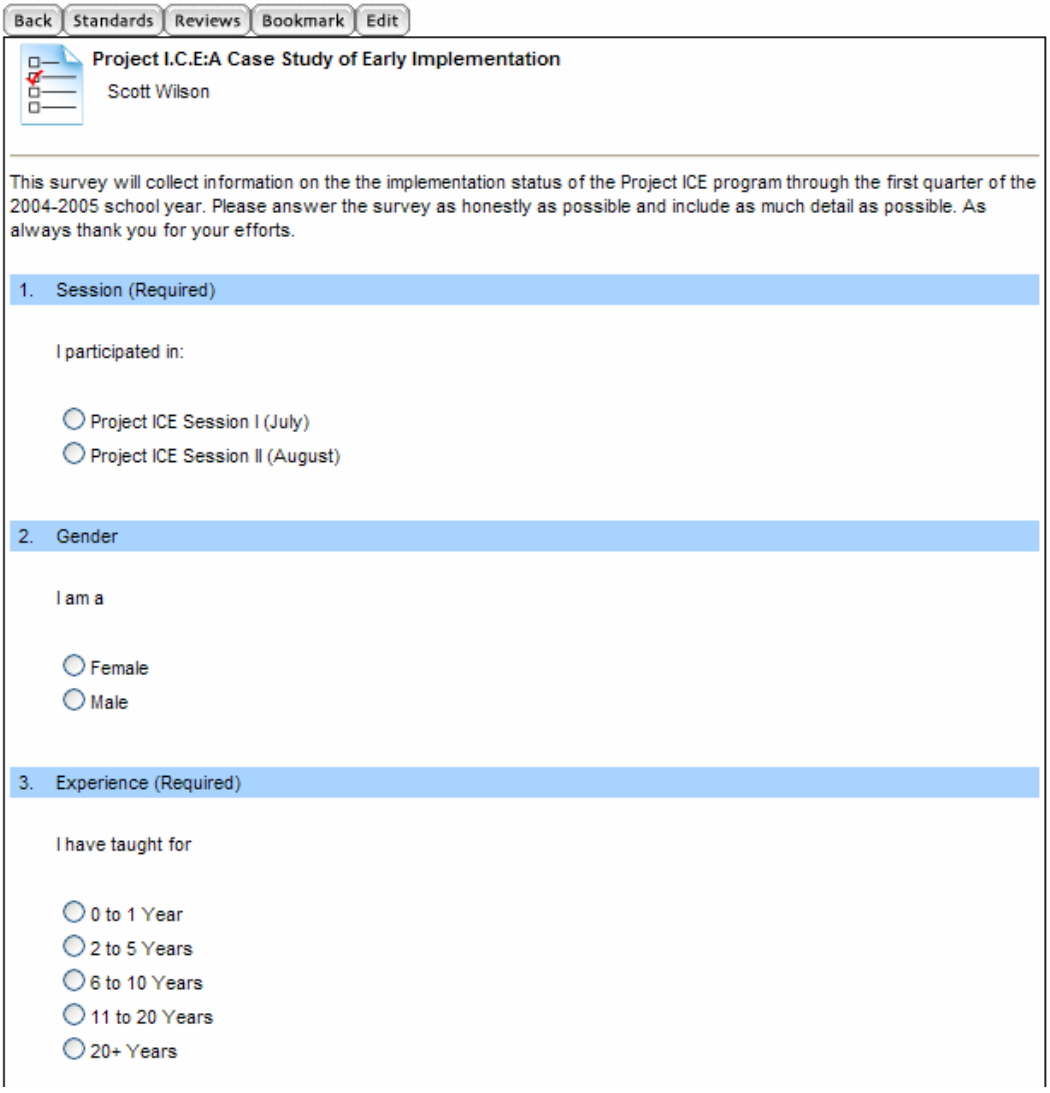
Wentworth, N. & Earle, R. (2003). Trends in computers uses as reported in *Computers in the Schools*. In D. LaMont Johnson and Cleborne D. Maddux (Eds.) *Technology in Education: A Twenty-Year Retrospective* (pp. 77-90). New York, NY: The Haworth Press.

Wood, F., Killian, J., McQuarrie, F., and Thompson, S. (1993). *How to organize a school-based staff development program.* Alexandria, VA: Association for Supervision and Curriculum Development.

Yin, R. K. (2003). Applications of case study research. In L. Bickman & D. J. Rog's (Series Eds.), *Applied social research methods series: Vol 34* (2nd ed., pp. 1-171). Thousand Oaks, CA: Sage Publications, Inc.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. L. (2002). Conditions for classrooms technology innovations. *Teachers College Record,* 104(3), pp. 482-515.

APPENDIX A
Project ICE 1st Quarter Survey



Back | Standards | Reviews | Bookmark | Edit

Project I.C.E:A Case Study of Early Implementation

Scott Wilson

This survey will collect information on the the implementation status of the Project ICE program through the first quarter of the 2004-2005 school year. Please answer the survey as honestly as possible and include as much detail as possible. As always thank you for your efforts.

1. Session (Required)

I participated in:

- ○ Project ICE Session I (July)
- ○ Project ICE Session II (August)

2. Gender

I am a

- ○ Female
- ○ Male

3. Experience (Required)

I have taught for

- ○ 0 to 1 Year
- ○ 2 to 5 Years
- ○ 6 to 10 Years
- ○ 11 to 20 Years
- ○ 20+ Years

4. Certification (Required)

Please select ALL the certifications you currently hold:

- ☐ Advanced Mathematics
- ☐ Agricultural Education
- ☐ Art
- ☐ Biological Sciences
- ☐ Blind/Visual Impairment
- ☐ Business Education
- ☐ Chemistry
- ☐ Deaf/Hard of Hearing
- ☐ Driver/Safety Education
- ☐ Early Childhood Education
- ☐ Earth Science
- ☐ Elementary Education
- ☐ English
- ☐ Family and Consumer Sciences
- ☐ French
- ☐ German
- ☐ Instrument/General Music
- ☐ Journalism
- ☐ Latin
- ☐ Library-Media Specialist
- ☐ Marketing Education
- ☐ Middle Level English
- ☐ Middle Level Science
- ☐ Middle Level Social Studies
- ☐ Middle Level/Intermediate Mathematics
- ☐ Mild-Moderate Disabilities
- ☐ Physical Education/Health/Safety
- ☐ Physical Science
- ☐ Physics
- ☐ Psychology/Sociology
- ☐ Psychometrist
- ☐ Reading Specialist
- ☐ Russian
- ☐ School Counselor
- ☐ School Psychologist
- ☐ Severe-Profound/Multiple Disabilities
- ☐ Spanish
- ☐ Speech/Drama/Debate
- ☐ Speech-Language Pathologist
- ☐ Technology Education
- ☐ U.S. History/Oklahoma History/Government/Economics
- ☐ Vocal/General Music
- ☐ World History/Geography

9. Unit of Instruction (Required)

Please attach the **Unit** resource:

- How to Attach a Unit/Lesson Plan

None Selected

10. Unit Reflection I

Have you implemented your first unit of instruction with a class?

- ○ Yes
- ○ No

11. Unit Reflection II

What were the strengths of the unit?

◉ Returns ○ Returns & HTML ○ HTML ○ None

12. Unit Reflection III

What would you change about the unit/delivery?

◉ Returns ○ Returns & HTML ○ HTML ○ None

13. Unit Reflection IV

To what extent did the Expanded Lesson Plan effect your implementation of the EPortfolios?

- ○ 1-No impact in implementation
- ○ 2-Little impact on implementation
- ○ 3-Some impact on implementation
- ○ 4-Extenive impact on implementation
- ○ 5-Vital for implementation

14. Mentorees I

Have you found two people to mentor?

- ◯ Yes
- ◯ No

15. Mentorees II (Required)

Who are they?

16. Mentorees III (Required)

When do you plan to start introducing them to the EPortfolios?

17. Mentorees IV (Required)

Has the expectation that you must successfully mentor two peers in utilizing the system impacted your use/implementation of the EPortfolio system in your classroom(s)? Explain.

◉ Returns ◯ Returns & HTML ◯ HTML ◯ None

18. Mentorees V (Required)

How are you planning to begin the mentoring process? (Please Provide a Detailed Explanation)

◉ Returns ◯ Returns & HTML ◯ HTML ◯ None

19. System I (Required)

What is the best feature of the EPortfolio system, ALCAweb?

(◉) Returns ( ) Returns & HTML ( ) HTML ( ) None

20. System II (Required)

If you could change one thing about ALCAweb, what would it be?

(◉) Returns ( ) Returns & HTML ( ) HTML ( ) None

21. System III (Required)

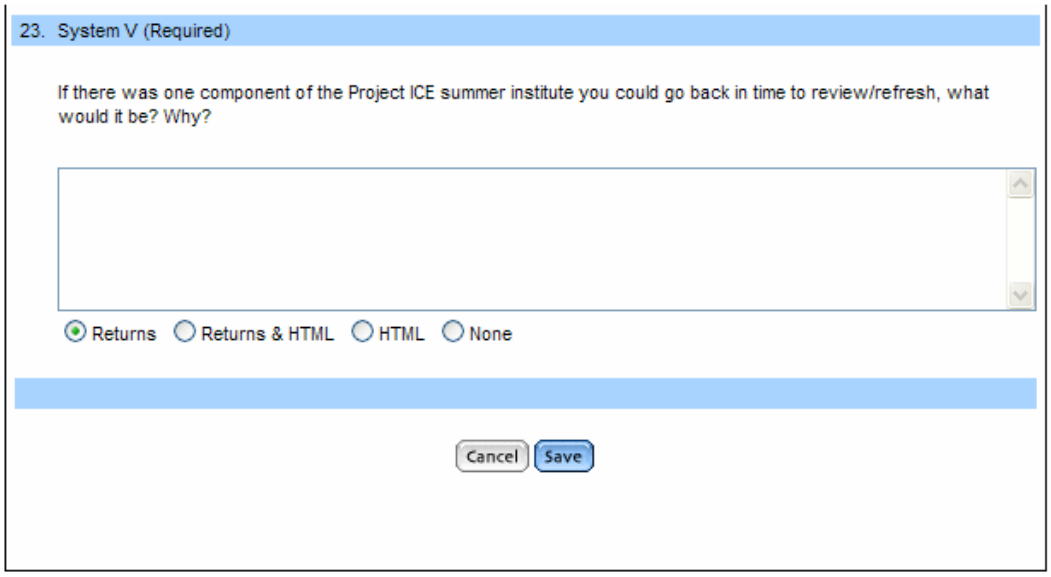
How have your students responded to the ALCAweb system?

(◉) Returns ( ) Returns & HTML ( ) HTML ( ) None

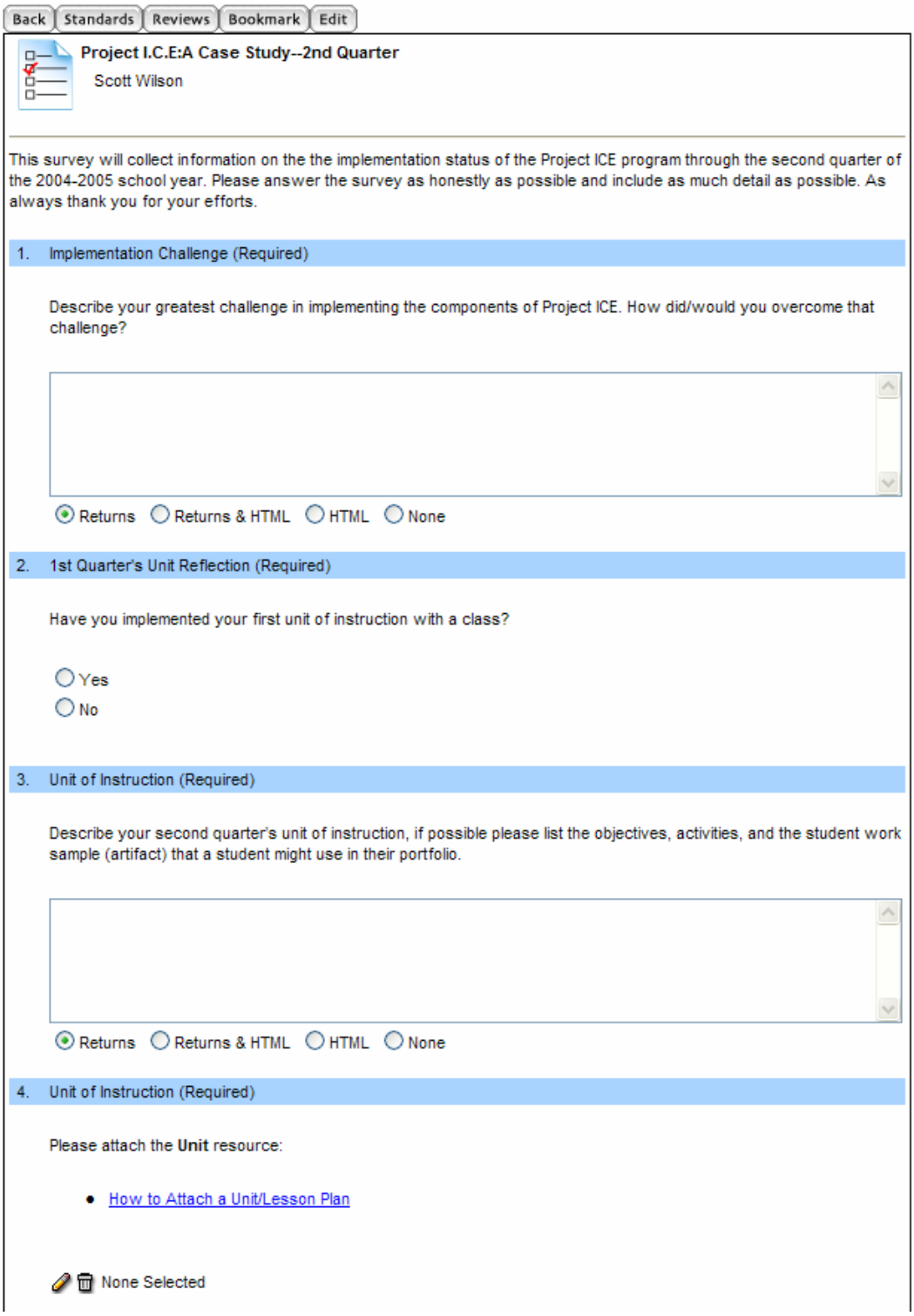
22. System IV

How do you plan to introduce your "mentorees" to the ALCAweb system?

(◉) Returns ( ) Returns & HTML ( ) HTML ( ) None


23. System V (Required)
If there was one component of the Project ICE summer institute you could go back in time to review/refresh, what would it be? Why?
Returns
Returns & HTML
HTML
None
Cancel
Save

APPENDIX B
Project ICE 2nd Quarter Survey



Back | Standards | Reviews | Bookmark | Edit

Project I.C.E:A Case Study--2nd Quarter

Scott Wilson

This survey will collect information on the the implementation status of the Project ICE program through the second quarter of the 2004-2005 school year. Please answer the survey as honestly as possible and include as much detail as possible. As always thank you for your efforts.

1. Implementation Challenge (Required)

Describe your greatest challenge in implementing the components of Project ICE. How did/would you overcome that challenge?

(●) Returns ( ) Returns & HTML ( ) HTML ( ) None

2. 1st Quarter's Unit Reflection (Required)

Have you implemented your first unit of instruction with a class?

( ) Yes
( ) No

3. Unit of Instruction (Required)

Describe your second quarter's unit of instruction, if possible please list the objectives, activities, and the student work sample (artifact) that a student might use in their portfolio.

(●) Returns ( ) Returns & HTML ( ) HTML ( ) None

4. Unit of Instruction (Required)

Please attach the **Unit** resource:

- How to Attach a Unit/Lesson Plan

None Selected

APPENDIX B
Project ICE 2nd Quarter Survey

5. Unit Reflection I (Required)

Have you implemented your second unit of instruction with a class?

- ○ Yes
- ○ No

6. Unit Reflection II (Required)

What were the strengths of the unit?

- ◉ Returns ○ Returns & HTML ○ HTML ○ None

7. Unit Reflection III (Required)

What would you change about the unit/delivery?

- ◉ Returns ○ Returns & HTML ○ HTML ○ None

8. Unit Reflection IV (Required)

To what extent did the Expanded Lesson Plan effect your implementation of the ePortfolios?

- ○ 1-No impact in implementation
- ○ 2-Little impact on implementation
- ○ 3-Some impact on implementation
- ○ 4-Extenive impact on implementation
- ○ 5-Vital for implementation

9. Protege I (Required)

Have you found two people to mentor?

- ○ Yes
- ○ No

10. Protege II

If they have changed since the 1st Quarter's survey, please provide us their names:

Returns Returns & HTML HTML None

11. Protege III (Required)

Have you provided your protege instruction on how to use the ALCAweb?

Yes
No

12. Protege IV (Required)

Has your protege observed you using the ALCAweb system with a class of students?

Yes
No

13. Protege V (Required)

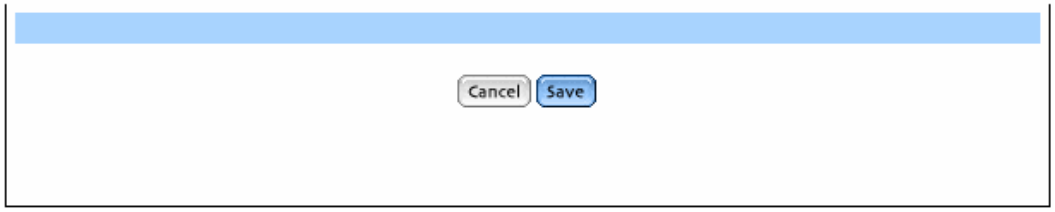
Have you provided the GEAR UP staff the protege's name and the class(es) they plan to introduce to ePortfolios (so the class can be uploaded to the ALCAweb system)?

Yes
No

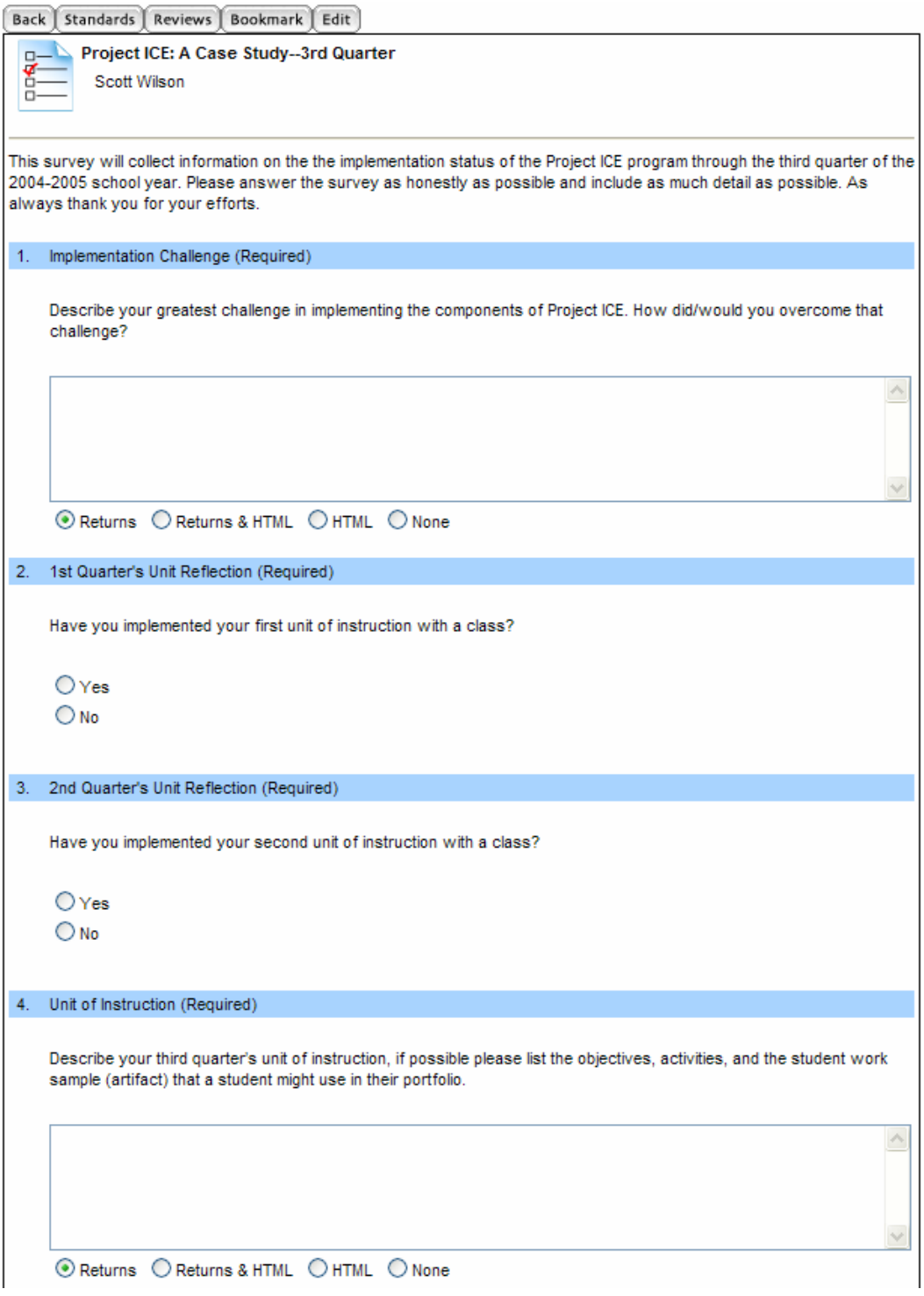
14. Learning Cluster (Required)

Please provide any questions, request for training, and/or concerns you would like to cover at the next Project ICE's Learning Cluster Meeting.

Returns Returns & HTML HTML None


Cancel
Save

APPENDIX C
PROJECT ICE 3RD QUARTER SURVEY



Back | Standards | Reviews | Bookmark | Edit

Project ICE: A Case Study--3rd Quarter

Scott Wilson

This survey will collect information on the the implementation status of the Project ICE program through the third quarter of the 2004-2005 school year. Please answer the survey as honestly as possible and include as much detail as possible. As always thank you for your efforts.

1. Implementation Challenge (Required)

Describe your greatest challenge in implementing the components of Project ICE. How did/would you overcome that challenge?

(●) Returns ( ) Returns & HTML ( ) HTML ( ) None

2. 1st Quarter's Unit Reflection (Required)

Have you implemented your first unit of instruction with a class?

( ) Yes
( ) No

3. 2nd Quarter's Unit Reflection (Required)

Have you implemented your second unit of instruction with a class?

( ) Yes
( ) No

4. Unit of Instruction (Required)

Describe your third quarter's unit of instruction, if possible please list the objectives, activities, and the student work sample (artifact) that a student might use in their portfolio.

(●) Returns ( ) Returns & HTML ( ) HTML ( ) None

5. Unit of Instruction (Required)

Please attach the **Unit** resource:

- How to Attach a Unit/Lesson Plan

None Selected

6. Unit Reflection I (Required)

Have you implemented your third unit of instruction with a class?

- ○ Yes
- ○ No

7. Unit Reflection II (Required)

What were the strengths of the unit?

◉ Returns ○ Returns & HTML ○ HTML ○ None

8. Unit Reflection III (Required)

What would you change about the unit/delivery?

◉ Returns ○ Returns & HTML ○ HTML ○ None

9. Unit Reflection IV (Required)

To what extent did the Expanded Lesson Plan effect your implementation of the ePortfolios?

- ○ 1-No impact in implementation
- ○ 2-Little impact on implementation
- ○ 3-Some impact on implementation
- ○ 4-Extenive impact on implementation
- ○ 5-Vital for implementation

10. Protege I (Required)

Have you found two people to mentor?

- ◯ Yes
- ◯ No

11. Protege II

If they have changed since the 2nd Quarter's survey, please provide us their names:

◉ Returns ◯ Returns & HTML ◯ HTML ◯ None

12. Protege III (Required)

Have you provided your protege instruction on how to use the ALCAweb?

- ◯ Yes
- ◯ No

13. Protege IV (Required)

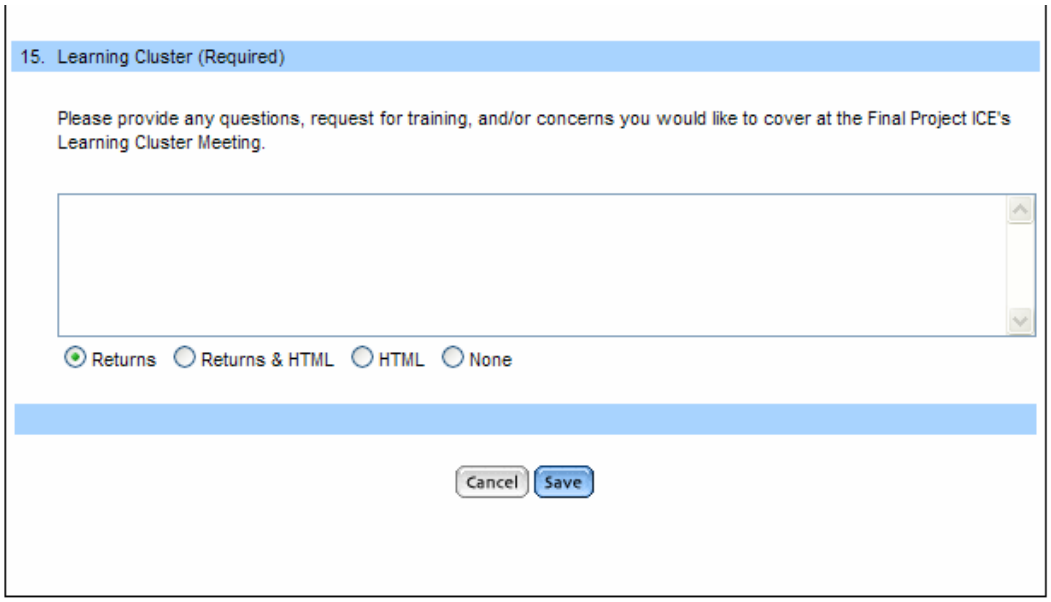
Has your protege observed you using the ALCAweb system with a class of students?

- ◯ Yes
- ◯ No

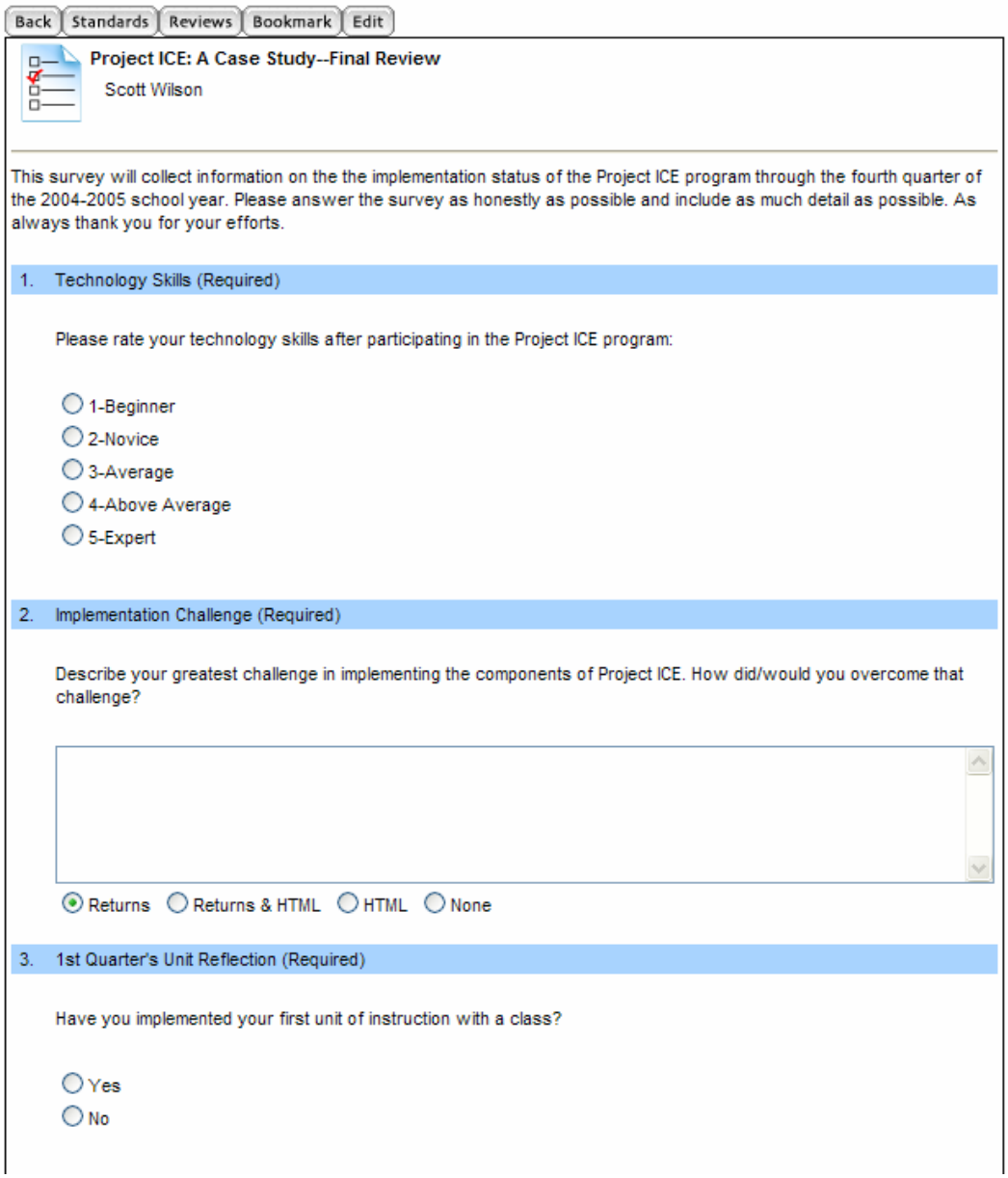
14. Protege V (Required)

Have you provided the GEAR UP staff the protege's name and the class(es) they plan to introduce to ePortfolios (so the class can be uploaded to the ALCAweb system)?

- ◯ Yes
- ◯ No


15. Learning Cluster (Required)
Please provide any questions, request for training, and/or concerns you would like to cover at the Final Project ICE's Learning Cluster Meeting.
Returns
Returns & HTML
HTML
None
Cancel
Save

APPENDIX D
PROJECT ICE 4TH QUARTER SURVEY



Back | Standards | Reviews | Bookmark | Edit

Project ICE: A Case Study--Final Review

Scott Wilson

This survey will collect information on the the implementation status of the Project ICE program through the fourth quarter of the 2004-2005 school year. Please answer the survey as honestly as possible and include as much detail as possible. As always thank you for your efforts.

1. Technology Skills (Required)

Please rate your technology skills after participating in the Project ICE program:

- ○ 1-Beginner
- ○ 2-Novice
- ○ 3-Average
- ○ 4-Above Average
- ○ 5-Expert

2. Implementation Challenge (Required)

Describe your greatest challenge in implementing the components of Project ICE. How did/would you overcome that challenge?

◉ Returns ○ Returns & HTML ○ HTML ○ None

3. 1st Quarter's Unit Reflection (Required)

Have you implemented your first unit of instruction with a class?

- ○ Yes
- ○ No

4. 2nd Quarter's Unit Reflection (Required)

Have you implemented your second unit of instruction with a class?

- ○ Yes
- ○ No

5. 3rd Quarter's Unit Reflection (Required)

Have you implemented your third unit of instruction with a class?

- ○ Yes
- ○ No

6. Unit of Instruction (Required)

Describe your fourth quarter's unit of instruction, if possible please list the objectives, activities, and the student work sample (artifact) that a student might use in their portfolio.

◉ Returns ○ Returns & HTML ○ HTML ○ None

7. Unit of Instruction (Required)

Please attach the **Unit** resource:

- How to Attach a Unit/Lesson Plan

None Selected

8. Unit Reflection I (Required)

Have you implemented your fourth unit of instruction with a class?

- ○ Yes
- ○ No

9. Unit Reflection II (Required)

What were the strengths of the unit?

◉ Returns ○ Returns & HTML ○ HTML ○ None

10. Unit Reflection III (Required)

What would you change about the unit/delivery?

◉ Returns ○ Returns & HTML ○ HTML ○ None

11. Unit Reflection IV (Required)

To what extent did the Expanded Lesson Plan effect your implementation of the ePortfolios?

○ 1-No impact in implementation
○ 2-Little impact on implementation
○ 3-Some impact on implementation
○ 4-Extenive impact on implementation
○ 5-Vital for implementation

12. Protege I (Required)

Did you mentor two people?

○ Yes
○ No

13. Protege II

If they have changed since the 3rd Quarter's survey, please provide us their names:

◉ Returns ○ Returns & HTML ○ HTML ○ None

14. Protege III (Required)

Did you provide your protege instruction on how to use the ALCAweb?

- ○ Yes
- ○ No

15. Protege IV (Required)

Has your protege observed you using the ALCAweb system with a class of students?

- ○ Yes
- ○ No

16. Protege V (Required)

Has the expectation that you must successfully mentor two peers in utilizing the system impacted your use/implementation of the EPortfolio system in your classroom(s)? Explain.

◉ Returns ○ Returns & HTML ○ HTML ○ None

17. System I (Required)

What is the best feature of the EPortfolio system, ALCAweb?

◉ Returns ○ Returns & HTML ○ HTML ○ None

18. System II (Required)

If you could change one thing about ALCAweb, what would it be?

◉ Returns ○ Returns & HTML ○ HTML ○ None

19. System III (Required)

How have your students responded to the ALCAweb system?

Returns Returns & HTML HTML None

20. General Program (Required)

On a scale of 10, 1 being a waste of time and 10 being a treasured experience, rate your total expirece as a Project ICE participant.

- 10 - Treasured Experience
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1 - Waste of Time

21. General Program I (Required)

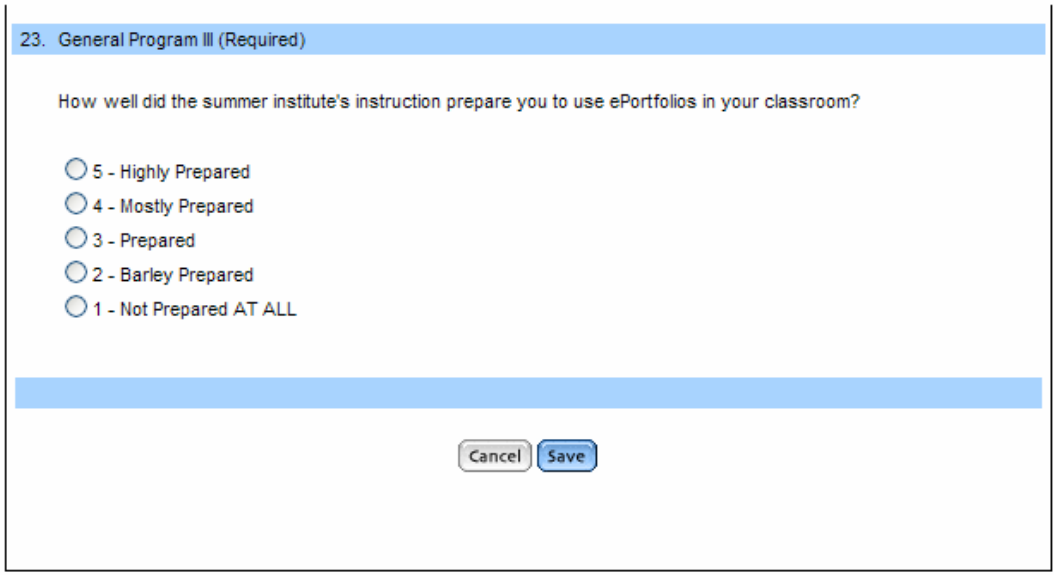
How well did the summer institute's instruction prepare you for the development of an instructional unit?

- 5 - Highly Prepared
- 4 - Mostly Prepared
- 3 - Prepared
- 2 - Barley Prepared
- 1 - Not Prepared AT ALL

22. General Program II (Required)

How well did the summer institute's instruction prepare you to mentor a fellow teacher?

- 5 - Highly Prepared
- 4 - Mostly Prepared
- 3 - Prepared
- 2 - Barley Prepared
- 1 - Not Prepared AT ALL


23. General Program III (Required)

How well did the summer institute's instruction prepare you to use ePortfolios in your classroom?

- 5 - Highly Prepared
- 4 - Mostly Prepared
- 3 - Prepared
- 2 - Barley Prepared
- 1 - Not Prepared AT ALL

Cancel Save

APPENDIX E
INSTRUCTIONAL LESSON SCORING GUIDE

Back | Standards | Reviews | Bookmark | Edit

Project ICE Lessons Scoring Guide

Scott Wilson

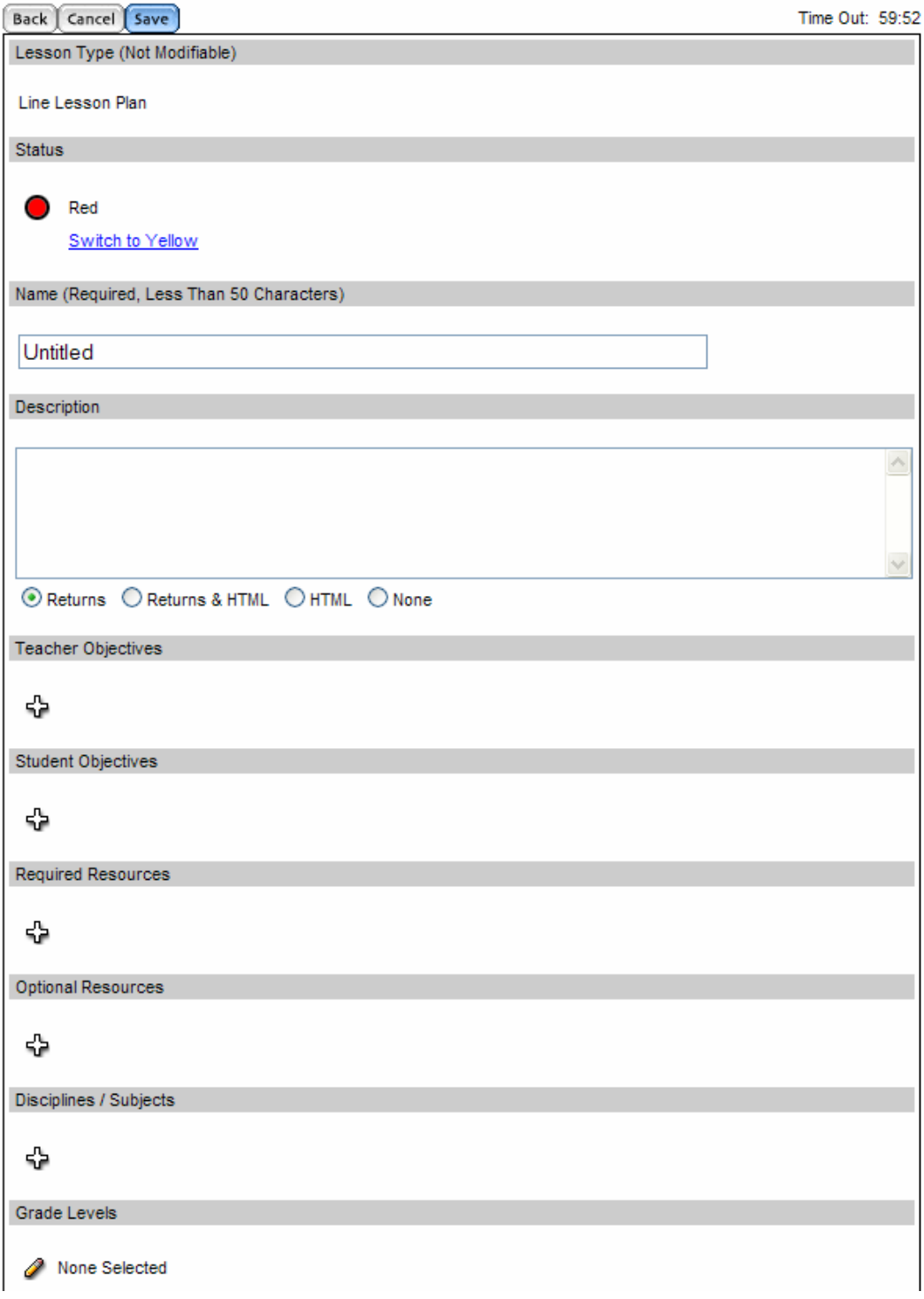
This scoring guide will be used to evaluate the Lessons developed by Project ICE Participants.

Criteria	Points	Standards
Status	3	
Status: Blue: lesson ready for publication to community 3 pt; Yellow: Lesson in pilot status 2 pt; Red: Lesson still in development 1 pt	3	
Name (Lesson Title):	2	
Name (Lesson Title): Descriptive Lesson Name - 2pts; Generic Lesson Name (ie. Chapter 12) - 1 pts;	2	
Description:	3	
Description: The description accurately describes the overall objective of the lesson and the specific content to be taught during the lesson - 3pts; The description either describes the overall objective of the lesson OR the specific content to be taught during the lesson - 2pts; There is some text - 1pt; No text - 0pt	3	
Teacher Objective:	20	
Teacher Objective: Behavior, learning, conditions, and performance level are clearly and concisely written (no unnecessary word)-20pts; Behavior, learning, conditions, and/or performance level are a bit ambiguous and/or too "wordy"- 10 pts; Behavior, learning, conditions, and/or performance level are unclear or poorly written - 2pts.	20	
Student Objecitve:	5	
Student Objecitve: Behavior, learning, and performance level are clearly and concisely written in a simple statement(no unnecessary word or teacher language) 5pts; Behavior, learning, and/or performance level are a bit ambiguous, too "wordy," and/or include teacher language 3pts; Behavior, learning, and/or performance level are unclear or poorly written - 1pt.	5	
Required Resources:	10	
Required Resources: The Resources/Materials needed for the lesson are provided and are clearly and concisely explained- 10pts;The Resources/Materials needed for the lesson are provided and a bit ambiguous, too "wordy," and/or not included- 5pts; The Resources/Materials needed for the lesson are unclear or poorly written- 1pt	10	

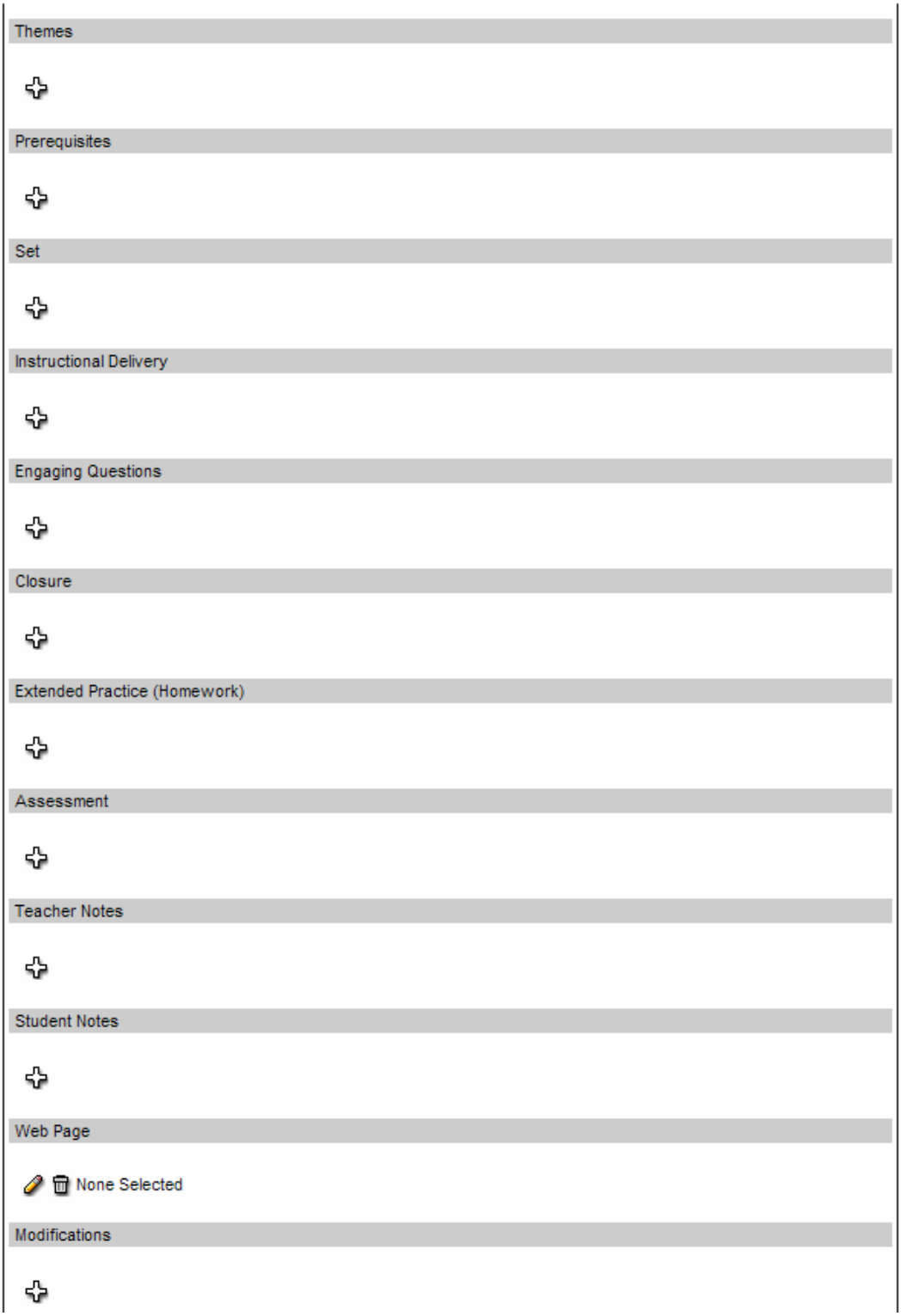
Discipline/Subject:	3	
Discipline/Subject: The discipline(s) and the subject(s) are clearly identified-3pts; The discipline(s) but not the subject(s) are clearly identified-1pt; The discipline(s) and the subject(s) are are not identified-0 pt.	3	
Grade Level:	3	
Grade Level:The grade level is clearly identified-3pts; The grade level is not identified-0 pt.	3	
Prerequisites:	10	
Prerequisites: The Prerequisites needed for the the learner to succeed are identified and are clearly and concisely explained- 10pts;The Prerequisites needed for the the learner to succeed are identified and are a bit ambiguous, too "wordy," and/or not included- 5pts; The Prerequisites needed for the the learner to succeed are not identified, are unclear or poorly written-1pt	10	
Set:	20	
Set: The set is written clearly, includes a short activity or prompt that focuses the students' attention before the actual lesson begins and relates the behavior described in the objective and description of the lesson- 20 pt; The set is written somewhat ambiguous but still includes a short activity or prompt that focuses the students' attention before the actual lesson begins and/or relates the behavior described in the objective and description of the lesson - 10 pts; A set was not included - 0 pts.	20	
Instructional Delivery:	20	
Instructional Delivery: The Instructional Delivery steps are clearly and concisely written (no unnecessary words) and relate to the behavior described in the objective-20pts; The Instructional Delivery steps are a bit ambiguous, too "wordy," and/or relate to the behavior described in the objective-10pts; The Instructional Delivery steps are not identified, are unclear or poorly written and/or do not relate to the behavior described in the objective- 1pt.	20	
Engaging Questions:	10	
The Engaging Question matches the behavior described in the objective and the appropriate Bloom's taxonmy of the question has been identified - 10 pts; The Engaging Question does not match the behavior described in the objective or the appropriate Bloom's taxonmy of the question has not been identified - 5 pts There are no Engaging Questions listed. - 0 pts.	10	

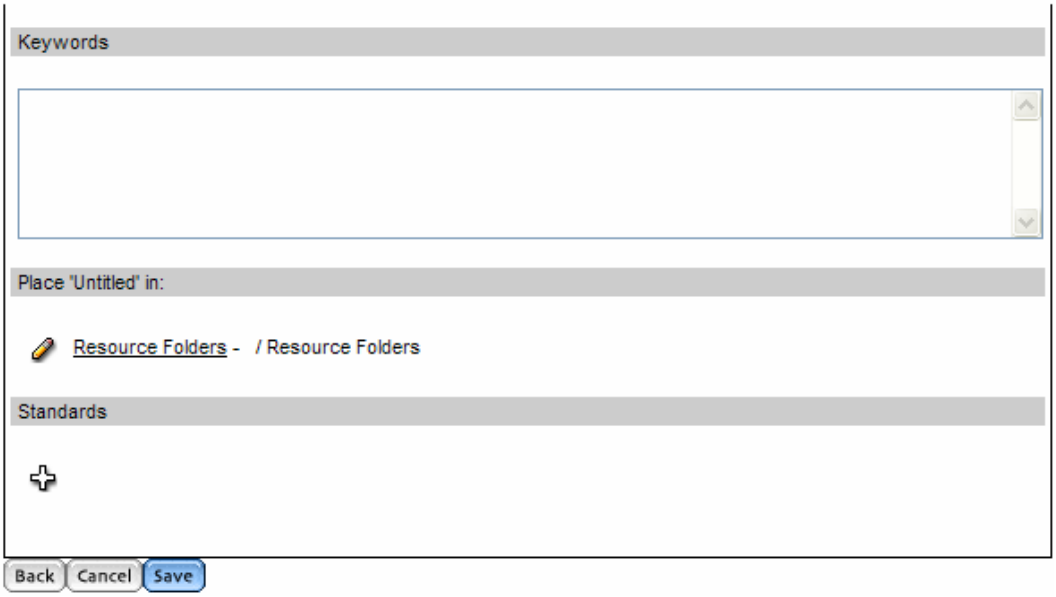
Closure:	20	
Closure: The Closure statement(s) is written clearly, includes a short activity or prompt that reviews the students' learning after the actual lesson ends and relates the behavior described in the objective and description of the lesson- 20 pt; The Closure statement(s) is written somewhat ambiguous but still includes a short activity or prompt that reviews the students' learning after the actual lesson ends and/or relates the behavior described in the objective and description of the lesson - 10 pts; A Closure statement was not included - 0 pts.	20	
Assessment:	20	
Assessment: The behavior assessed exactly matches the behavior described in the objective and description of the lesson - 20 pts; The behavior assessed closely resembles the behavior described in the objective and description of the lesson- 10 pts. The behavior assessed is inconsistent with the behavior described in the objective and description of the lesson - 2 pts.	20	
Standards:	3	
Standards: The apprORpriate standard(s) are clearly identified-3pts; The apprORpriate standard(s) are not identified-0 pt.	3	
Total Points:	**152**	

APPENDIX F
INSTRUCTIONAL LESSON TEMPLATE



APPENDIX F
INSTRUCTIONAL LESSON TEMPLATE




Keywords
Place 'Untitled' in:
Resource Folders - / Resource Folders
Standards
Back
Cancel
Save

APPENDIX G
PARTICIPANT INTERVIEW PROTOCOL

- Open interview by reading the Informed Consent Form aloud and ask the participant to verbally agree to participate in the interview process.
- Provide date, location, and subject's name, job title, and current teaching assignments.
- Explain that the tape will be used to create a transcript of the interview. They will be provided a copy of that transcript and upon completion of the study the tape will be destroyed.
- Stress that this interview's main focus is to pilot a set of interview questions to determine their validity and ability to collect information on the success and/or failures of Project I.C.E.

QUESTIONS

- What was your best experience from the Project I.C.E. Summer Institute? Why?
- Describe your greatest challenge in implementing the components of Project ICE. How did/would you overcome that challenge?
- Describe a unit of instruction, if possible please list the objectives, activities, and the student work sample (artifact) that a student might use in their portfolio.
- Have you had a chance to implement the this unit of instruction? What were the strengths of the unit? What would you change about the unit/delivery?
- Did the Expanded Lesson Plan effect your implementation of the e-portfolios?

APPENDIX G
PARTICIPANT INTERVIEW PROTOCOL

- Has the expectation that you must successfully mentor two peers in utilizing the system impacted your use/implementation of the e-portfolio system in your classroom(s)? Explain.
- How did you start the mentoring process?
- What is the best feature of the e-portfolio system, ALCAweb?
- If you could change one thing about ALCAweb, what would it be?
- How did your students respond to the ALCAweb system?
- How did you introduce your "protégés" to the ALCAweb system?
- If there was one component of the Project ICE summer institute you could go back in time to review/refresh, what would it be? Why?
- Thank you for participating in this interview. I will try to get a transcript to you in the next two weeks. Do you have any questions or concerns? END