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Multiliteracies in the Classroom: An Explanatory Sequential Mixed Methods Approach to Teachers' and Students' Perspectives Toward Integration of Technology

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MULTILITERACIES IN THE CLASSROOM: AN EXPLANATORY SEQUENTIAL MIXED METHODS APPROACH TO TEACHERS' AND STUDENTS' PERSPECTIVES TOWARD INTEGRATION OF TECHNOLOGY

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Curriculum and Instruction

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ABSTRACT

An increased number of students graduating from high school lack college and career readiness skills to earn credit in entry-level college courses or begin a career in an entry-level position. Many schools across America have prepared to address students' college and career readiness with the adoption of Common Core State Standards. Twenty-five teachers and 92 students participated in this dissertation study conducted at a high school (grades 10-12) in the southern United States. The purpose of this study was to describe and explain teachers' and students' perspectives toward the integration of technology that enhances multiliteracies in the classroom. An explanatory sequential mixed methods approach was used to guide this study. Data were collected from surveys to describe teachers' and students' beliefs, perceived barriers, and technology skill levels associated with multiliteracies enhanced by technology in the classroom. Descriptive statistics and independent *t*-tests were used for analysis of the quantitative data. Open thematic coding and axial coding were used for analysis of the qualitative data. Teachers' and students' interviews and classroom observations were used to further explain, clarify, and enhance the data collected from the surveys. Data results indicated that teachers and students strongly support the integration of technology in the classroom. Teachers and students indicated a statistically significant difference in technology skills associated with social literacy and multimedia. Teachers perceived time as the most significant barrier to integrating technology into the classroom; students viewed the school filter as the most significant barrier. Teachers viewed the role of technology as a tool to support students' cognitive development, to obtain and maintain students' attention, to facilitate administrative tasks, and to facilitate and promote students' college and career readiness. Students viewed the role of technology as a tool to gather information from the Internet and to enhance students' cognitive learning processes.

This dissertation is approved for recommendation
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Finally, I would like to thank the teachers and students who participated in this dissertation study. Your contributions were invaluable to the completion of this dissertation and to the future studies of multiliteracies enhanced by technology integration in the classroom.

DEDICATION

I dedicate this dissertation to my husband and my daughter—whose unending sacrifice, support, love, and encouragement allowed this dream to come true for me. Thank you Chuck and Lauren—I love you both.

I dedicate this dissertation to my merciful Lord Jesus Christ who freely gave me eternal life and strength when I felt I could not go on.

"I can do all things through Christ who gives me strength." (Phil. 4:13)

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Introduction

Policy makers indicate a strong commitment to support the expansion and use of technology in the K-12 classrooms (NCLB, 2001; CCSI, 2010; ISTE, 2011; PARCC, 2012). The adoptions of National Educational Technology Standards (NETS) and Common Core State Standards (CCSS), and the assessment system by Partnership for Assessment of Readiness for College and Careers (PARCC) represent evidence of this commitment.

The "new" literacies of the 21st century embrace the expansion of technologies in the K-12 classroom. Being literate in the 21st century classroom requires students to be able to do more than just read and write using a traditional textual format. Literacy has taken on an expanded definition to include digital literacy, information literacy, cultural literacy, critical literacy, visual literacy, social literacy, multimedia/multimodal literacy—the interplay of which is multiliteracies. Various technology tools support many of these literacies. According to the National Educational Technology Standards for Students (NETS-S, 2007), student technology standards focus on 21st century skills, Web 2.0 technologies, and collaboration. Students integrating technology with literacy develop (1) creativity and innovation; (2) communication and collaboration; (3) research and information literacy; (4) critical thinking, problem solving, and decision making; (5) digital citizenship; and (6) technology operations and concepts (ISTE, 2011; Shrum & Levin, 2009, p. 14).

The National Educational Technology Standards for Teachers (NETS-T, 2008) goal is to make teachers aware of, model, and design instruction to move students into the 21st century

digital-age. These standards direct teachers to (1) facilitate and inspire student learning and creativity, (2) design digital-age learning experiences and assessments, (3) model digital-age work and learning, (4) promote digital citizenship and responsibility, and (5) engage in professional growth and leadership (ISTE, 2011; Shrum & Levin, 2009, p. 19).

Technology in the classroom takes on increased importance in the success of 21st century students with the widely adopted Common Core State Standards of 2010. New technologies have "accelerated the speed at which connections between speaking, listening, reading and writing can be made, requiring that students be ready to use these modalities nearly simultaneously" (CCSI, 2010, p. 48). Adoption of and compliance with the Common Core State Standards (CCSS) presents challenging curriculum changes for teachers and students, as well as technology driven assessment changes. The CCSS further supports literacy and mathematic standards for college and career readiness by setting the educational standards for students K-12. The College and Career Readiness (CCR) initiative as defined in the blueprint for the Reauthorization of the Elementary and Secondary Education Act (ESEA; 2010) requires that all students upon graduation be college and career ready with the knowledge and skills necessary in literacy and mathematics to gain entrance into an entry-level, credit-bearing college course or entry-level position in the student's chosen career field.

On the classroom level, multiliteracies in the 21st century classroom address the needs and interests of all students in 2D and 3D (print and virtual) dimensions. A 21st century classroom involves students in "problem-solving, analysis and practices using print and visual, electronic, face-to-face media in combinations that are occurring in new, civic, media and workplace contexts" (Pahl & Rowsell, 2005, p. 114).

According to Pahl and Rowsell (2005), the 21st century classroom engages students in opportunities to practice critical literacies, collaborative work, and intercultural communications. Students engaged in critical literacy skills learn to second-guess, criticize and argue with a range of texts (p. 114). Students involved in learning communities develop collaborative working skills through collaborative reading, writing and decision-making activities (p. 115). Students of the 21st century are global students and learn to negotiate a global world outside the classroom, negotiating and solving problems across cultures and languages (p. 115). Problem solving, collaborative work, intercultural communication, and multiliteracies are skills that prepare students for 21st century colleges and careers.

Statement of Problem

Standardized exams, such as ACT or SAT, assess traditional literacy and do not take into consideration the multiliteracies students master. According to ACT, an increasing number of students across the nation are graduating high school unprepared to enter college or start careers. The ACT College and Career Readiness 2011 stated that only 25% of graduating seniors met the college readiness benchmarks in all four subjects: English, reading, mathematics, and science (ACT, 2011). Standards in colleges and careers are becoming increasingly rigorous; however, the students are not showing increased preparedness to meet those standards. The Programme for International Student Assessment (PISA) reported that in 2009 the United States ranked 14th in reading literacy, 25th in mathematics literacy, and 17th in science literacy when compared to other Organization for Economic Cooperation and Development (OECD) countries (NCES, 2010). Comparison of literacy skills of 2000 to 2009, and 2003 to 2009 indicated no measurable change in student achievement (NCES, 2010). According to National Assessment of Educational Progress (NAEP) scores, literacy performance for seventeen-year-olds has flattened

since 2004 after the decline in the 1990s (NAEP, 2012). Approximately thirty-six percent of first-year undergraduate students in 2007-08 reported having taken remedial courses in college or trade schools (NCES, 2011). Students enrolling in remedial English, reading, or writing courses are less likely to eventually earn a degree or certificate (Alliance, 2011). Wagner (2008) and Schrum and Levin (2009) discuss the challenges facing 21st century schools: (a) to prepare students for jobs that do not yet exist, (b) to use technology that has not yet been invented, and (c) to solve problems that have not yet been identified. The Common Core State Standards proposes to address these challenges with the rigorous literacy expectations outlined for English language arts, social studies, science, math, and technical subjects.

In 2013, secondary schools adopting the Common Core State Standards will be challenged further to align curriculum to meet college and career readiness standards of CCSS for all students. Meeting the literacy expectations in English language arts, social studies, science, math, and other technical courses as outlined in the Common Core State Standards is strongly dependent upon the integration of technology in the classroom. This technology integration is driven in 23 states by the assessment system being developed by PARCC: Alabama, Arizona, Arkansas, Colorado, District of Columbia, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, and Tennessee (PARCC, 2012). The remaining states are part of the Smarter Balanced Assessment Consortium that is also a state-led consortium working to develop assessments that accurately measure student progress toward college and career readiness (Smarter Balanced, 2012). Teachers who are looking for a coherent and practical framework that consolidates fundamental aspects of traditional literacy pedagogy with the multiliteracy competencies that students will need to

negotiate in the 21st century may be the teachers at highest risk of not meeting the CCSS standards, thus, failing to make ready graduating students for college and careers. The focus of this dissertation study was on teachers' and students' perspectives of the integration of technology to enhance multiliteracies in the classroom that will develop college and career ready students and meet the rigorous literacy expectations of the Common Core State Standards. This dissertation study delved into the teachers' and students' perspectives about the integration of technology that enhances multiliteracies in all content area classrooms in order to address the issue of an increasing number of students graduating from high school who are unprepared to start college or enter careers because of poor literacy skills. So, how are teachers and students prepared to meet the rigorous literacy expectations of the Common Core State Standards that establish a college and career readiness for all students?

Research Questions

1. How do teachers and students define literacy and multiliteracies?
2. What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?
3. What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom that enhances multiliteracies in the classroom?
4. What are the teachers' and students' perceived barriers to integrating technology in the classroom?

Purpose of the Study

The purpose of this dissertation study was to describe and explain the teachers' and students' perspectives of technology integration that enhances multiliteracies in the classroom. An explanatory sequential mixed methods design was used that involved collecting quantitative

data first and then explaining the quantitative results with in-depth qualitative data. From the surveys "Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom" and "Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom," data were collected from teacher participants and student participants to describe teachers' and students' perspectives toward the integration of technology at a high school in the southern United States. The qualitative phase was conducted as a follow up to the quantitative results to help explain the quantitative results. The intent of the follow up qualitative phase was to explain and clarify with the teacher and student participants at the high school the definition of multiliteracies and the integration of technology that enhances multiliteracies in the classroom. The rationale for this mixed methods research approach was for significance enhancement (Collins, Onwuegbuzie, & Sutton, 2006, pp. 83-84) by collecting a combination of qualitative and quantitative data to obtain richer data than would be obtained using only one type of data.

It was my desire through this dissertation study: (a) to broaden the definition of literacy with teachers and students, (b) to describe best practices of integration of technology in the classroom that enhances multiliteracies, (c) to encourage a student-centered curriculum that integrates technology that enhances multiliteracies in the classroom, (d) to identify needs for teachers' professional development that encourages proficient integration of technology that enhances multiliteracies in the classroom; and (e) to promote improved literacy skills that impact students' college and career readiness.

Significance of the Study

Provisions of the No Child Left Behind Act of 2001 (NCLB) encourage ongoing professional development programs for teachers to promote 21st century learning in the

classroom. These programs provide access to training and updated research in teaching and learning that meets the teachers' needs and encourages proficient use of technology in all classrooms. This dissertation study identified and described teachers' needs that will promote effective integration of technology that enhances multiliteracies in the classroom and allow for development of productive and effective professional development for teachers.

This dissertation study is important to education in support of an authentic, student-centered 21st century education for all students. An authentic, student-centered 21st century education includes the new literacy skills needed to "effectively communicate such technologies as text messaging, email, Facebook, Google, YouTube, and Second Life" (Baker, Pearson, & Rozendal, 2010, p. 2). The Enhancing Education through the Technology Act of 2001 (U.S. Dept. of Education, 2001) presents initiatives that provide school personnel with the means to incorporate technology into curricula and instruction that will align with the state academic content and student academic achievement standards that are reflective of 21st century learning. A significant goal of the Common Core State Standards is to ensure that upon graduation all students are college and career ready. Developing an authentic, student-centered curriculum that enhances literacy (multiliteracies) through the use of technology can promote college and career readiness for all students.

This dissertation study is important to education by adding to the discussion of multiliteracies and technology integration that enhances multiliteracies in the classroom. *Multiliteracies* is a relatively new concept acknowledged in education in the 1990s by the New London Group (Cazden, Cope, Fairclough, Gee et al., 1996, p. 63). While the number of studies addressing multiliteracies in the classroom is growing, there have been few studies considering both the secondary level teachers' and students' perspectives on technology integration that

enhances multiliteracies in the classroom. Knowledge gained from this dissertation study may be used to initiate and/or guide development and improvement of school instructional policies and/or the development of student-centered curricula to increase and support instructional and educational use of technology by teachers and students to enhance multiliteracies in the classroom.

Finally, this dissertation study is important to support the discussion of the mixed methods research approach. The approach of mixing qualitative and quantitative methods of research has met with discord for nearly a century. Only recently has the mixed methods research approach gained acceptable and reputable acknowledgement. In a 2004 article, Johnson and Onwuegbuzie discussed the paradigm "wars" and presented the position of mixed methods research as a natural complement to the traditional qualitative and quantitative research methods (Johnson & Onwuegbuzie, 2004). Since 2004, mixed methods research has been more accepted and used in studies including Palak and Walls' (2009) study on teachers' beliefs and technology practices.

Theoretical Background of the Study

This dissertation case study was based on the theoretical framework of post positivism transitioning to constructivism. This explanatory sequential mixed methods design began with a quantitative approach to data that typically lends itself to post positivist perspectives in the development of the survey instrument, followed by a qualitative approach to data that transitioned into assumptions of constructivism.

Post positivist. Post positivist views embrace (a) the ontology that reality exists but is intangible; (b) the epistemology that there are only approximations of reality; (c) the methodology that knowledge is gained through rigorously defined qualitative methods; and that

(d) the products of knowledge produced represent generalizations, descriptions, patterns, and a grounded theory (Hatch, 2002, p. 13). Post positivist research is most commonly aligned with quantitative methods of data collection and analysis. The survey instrument allowed for the collection of quantitative and qualitative data that described the teachers' and students' perspectives, or interpretation of their reality, toward the integration of technology that enhances multiliteracies in the classroom. Post positivism allows for "data collection and analysis processes [that] lead to descriptions of patterned behavior that participants use to make sense of their social surroundings" (Hatch, 2002, p. 15). As the researcher, I collected data that represented an accurate description of the teachers' and students' perspectives, while maintaining an objective position in relation to the participants and the data. From a deductive quantitative and qualitative data analysis, my theoretical framework transitioned to that of constructivism.

Constructivist. Constructivist views embrace (a) the ontology that multiple realities are constructed, (b) the epistemology that knowledge is a human construction of the researcher and participant; (c) the methodology that knowledge is gained through naturalistic qualitative methods; and that (d) the products of knowledge produced are represented through case studies, narratives, interpretations, and reconstructions (Hatch, 2002, p. 13). Constructivists assume that absolute reality is unknowable, and that individual perspectives construct individual realities. As the researcher, I relied on the qualitative data presented through interviews and classroom observations to inductively construct and explain in more depth the teachers' and students' perspectives of technology integration that supports multiliteracies in the classroom.

Research Design of the Study

The research design framework for this dissertation study was based on the explanatory sequential mixed research design by Creswell and Plano Clark (2011).

Explanatory sequential mixed methods research design. An explanatory sequential mixed methods research design is a two-phase research design that begins with quantitative data collection and analysis followed by qualitative data collection and analysis that leads to an overall interpretation of the data (Creswell & Plano Clark, 2011, p. 71). The initial quantitative phase (Phase I) is designed to address the study's research questions. The second, qualitative phase (Phase II) is designed to follow the results of the quantitative Phase I in order to explore and explain in more depth the results from the quantitative Phase I.

The purpose of this research study's design was to explain the quantitative results in more depth. An explanatory sequential mixed methods design was based on the post positivist paradigm in Phase I and the constructivist paradigm in Phase II. This design had a quantitative emphasis with the quantitative strand first, followed by the qualitative strand. The primary point of mixing was in data collection using a primary mixing strategy of connecting the two strands from quantitative data analysis to qualitative data collection. Results from the quantitative data were used to make decisions about sampling and data collection in Phase II. Finally, I—the researcher—interpreted the results to determine to what extent and in what ways the qualitative results explained and enhanced the quantitative results (Creswell & Plano Clark, 2011, pp. 81-86).

Mixing. "Mixing at the level of design occurs when the quantitative and qualitative strands are mixed during the larger design of the research process" (Creswell & Plano Clark, 2011, p. 67). Mixing for this dissertation study occurred at the theoretical framework level by mixing the post positivist paradigm then transitioning to a constructivist paradigm; and by mixing quantitative, qualitative, and mixed research questions for this dissertation study.

"Mixing during data collection occurs when the quantitative and qualitative strands are mixed during the stage of the research process when the researcher collects a second set of data" (Creswell & Plano Clark, 2011, p. 67). By connecting data, the results of one strand guided the collection of data for the other strand. For this dissertation study, the qualitative data collection from interviews and classroom observations were guided by the results of the survey data.

"Mixing during interpretation occurs when the quantitative and qualitative strands are mixed during the final step of the research process after the researcher has collected and analyzed both sets of data" (Creswell & Plano Clark, 2011, pp. 66-67). At this point in the study, I drew conclusions and inferences that reflected what had been learned from the study and how well the study answered the research questions.

Phase I: Survey. Fifty teachers in the high school were asked to voluntarily complete the survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom. The survey consisted of Likert-type scale questions and open-ended written responses. From the teachers who completed the survey, teacher participants were selected based on volunteering to participate further in the study and the established selection criteria: (a) content area currently teaching, (b) demographically representative of the population, and (c) availability to participate in an interview and classroom observation. Initial student participants were selected from the teacher participants' classes, again based on student voluntary participation.

Phase II: Interviews and classroom observations. Teachers' interviews and classroom observations were conducted with teacher participants based on their willingness to continue in the study, the content area in which they taught, and availability. Student interviews were

conducted with student participants based on their willingness to participate in the study, parent/guardian consent, and availability.

A donation to *Relay for Life* was made in honor of all teacher and student participants.

Research Data Collection Design

The primary purpose of collecting data in any research study is to gather data that will address the research questions. The key elements of this data collection design included: (a) sampling procedures, (b) obtaining permission, (c) collecting data, (d) recording the data, and (e) administering the procedures (Creswell & Plano Clark, 2011, p. 173).

The school site selected for this dissertation study was based on convenience. This high school (grades 10-12) is recognized locally and statewide for its commitment to "Excellence in Education." Due to the technology rich classrooms and open Wi-Fi for students and guests, this school site provided an excellent location for a study in technology that enhances multiliteracies.

Sampling procedures. Participant selection was based on a multistage convenience sampling design (Berg, 2009, p. 50). Teacher participants were selected from the population of the high school based on the content area in which they taught: English language arts, history/social studies, science, and vocational/technical subjects. The teacher participant sample was generated from selected teachers who demonstrated a willingness to participate in the study. Following administration and analysis of data collected from the teachers' surveys, teacher participants were selected to participate in a teacher interview and classroom observation based on specific criteria: (a) a willingness to continue in the study, (b) a representation of a cross section of content areas, grade levels, and gender, and (c) availability to continue with the interview and classroom observation.

Student participants were selected randomly from the classes of the sample teacher participants. Following the administration and analysis of data collected from the students' surveys, student participants were selected to participate in a student interview. Students were selected based on specific criteria: (a) a willingness to continue in the study, (b) an approval to continue in the study from a parent/guardian, (c) a representation of a cross section of grade levels, gender, and ethnicity of the school population, and (d) availability to be interviewed.

Obtaining permission. A written request to conduct the study was submitted to the building principal and to the school district superintendent (Appendices A-B). A written request was submitted to the University's Institutional Review Board. Approvals to conduct the study were received in writing before the study commenced. Participation in this dissertation study was voluntary. At each phase of the study, the participants were given the opportunity to participate or to withdraw. A letter of introduction to the study and letters of consent were issued to the teacher participants, student participants, and the parent/guardian of student participants (Appendices C-G). At the time of the surveys, interviews, and classroom observations, the participants were notified of their choice to participate or withdraw. Failure to withdraw from the study confirmed implied consent to participate. Participants were assured of their anonymity throughout the study to the fullest extent possible. Teachers were assured that the results of the study would in no way be associated with future employment with the district, and students were assured that the results of the study would in no way be associated with their academic records.

Collecting information. Quantitative and initial qualitative data were collected first, followed by additional qualitative data. The quantitative and initial qualitative data were collected from the survey instruments Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (Appendix H) and Students' Perspectives toward

Integration of Technology to Enhance Multiliteracies in the Classroom (Appendix I). Following the analysis of the teachers' and students' survey data using descriptive analysis and frequency counts, the additional qualitative data were collected via teacher and student semi-structured interviews, and open-ended classroom observations.

Recording the data. Through the administration of Qualtrics, quantitative and qualitative data from the teachers' and students' surveys were collected and recorded in the Qualtrics system. Both sets of data were recorded electronically. The qualitative data from participant interviews and classroom observations were collected and recorded personally by me—the researcher—using audio recording devices, transcriptions, and field notes.

Administering the procedures. Access to teacher and student participants were scheduled in accordance to school policy and the teacher's convenience and availability. Established protocols were followed for the collection, recording, and analysis of quantitative and qualitative data. All participant data were collected, recorded, and reported maintaining strict confidentiality and anonymity of teacher and student participants. All data were stored in password-protected programs with only the researcher having knowledge of the password to access the information. All information collected was kept confidential to the extent allowed by law and University policy.

Limitations of the Study

Generalizability cannot apply beyond the specific research site to the greater population due to the small sample size and the research on one institution. This dissertation study is representative of the participants from the selected school site. The sample size was limited due to the convenience sample design relying on the availability of participants. The availability of participants was affected by the time-period in which the study was scheduled. The 4th quarter of

the school year proved to be an inopportune time for a study for teachers and students engaged in standardized testing, competitions, playoffs, and activity schedules. Although a timetable was a voluntary impediment set by this researcher, the limited time established for this dissertation study did limit the sample size, sample design, and the time-period for data collection. Limited sample size and limited time with teachers and students resulted in adequate, but not abundant, data for this study.

Further limitations included the design of the survey instruments. The survey instruments addressed only the teachers' and students' perspectives of educational use of technology in the classroom. The survey instruments did not address the teachers' and students' perspectives of technology use outside the classroom. Outside experience with technology may have skewed the teachers' and students' perspectives of technology integration in the classroom, resulting in questionable validity of the survey instrument. To address the validity issue of the survey instruments, selected participant interviews and classroom observations clarified and explained the results from the survey instruments and minimized potential problems with validity. Cronbach's alpha was calculated to test the internal consistency of the survey items.

Scope of the Study

This explanatory sequential mixed methods study was limited in scope to a single case study of high school teachers and students who volunteered to be part of this dissertation study. This dissertation study consisted of teachers and students grades 10-12 in the southern United States. Data (quantitative and qualitative) were collected sequentially from the survey instrument first, followed by data collection from selected participant interviews and classroom observations.

Organization of the Study

This dissertation of the study is organized in five chapters. Chapter One contains discussions of introductory material, statement of the problem, research questions, purpose of the study, significance of the study, theoretical background, research design, research data collection design, limitations of the study, scope of the study, and definition of terms. Chapter Two contains discussions of related literature on the Common Core State Standards, history of literacy, theory and research of literacy, defining literacy, multiliteracies, and teachers' and students' perspectives toward integration of technology in the classroom. Chapter Three contains discussions of research methodology, explanatory sequential mixed methods design, research questions, role of the researcher, setting and participants, measuring instruments, protocol for data collection, and protocol for data analysis. Chapter Four contains discussions of quantitative and qualitative data analysis. Chapter Five contains discussions of research findings, conclusions, limitations of this dissertation study, implications for practice, and considerations for future research.

Definition of Terms

(a) 21st century skills – critical thinking, problem solving, creativity, innovation, communication, collaboration, and literacy

(b) Benchmark exams - a term used to describe the standard for judging a performance; used to tell what students should know by a particular stage in their education

(c) Connecting – connection of data results from one strand to the development of data collection of another strand; one strand supports data discovery for another strand

(d) Data comparison – comparing data from different sources

(e) Data display – reducing the quantitative data to tables and the qualitative data to charts and rubrics

(f) Data reduction – reducing data collected through statistical analysis of quantitative data or writing summaries of qualitative data

(g) Explanatory sequential design – a two-phase research design that begins with quantitative data collection and analysis followed up by qualitative data collection and analysis ending with interpretation

(h) Integration - the act or process of combining into an integral whole, as if a natural part of one's culture or way of life; being in harmony with the environment

(i) Mixed methods research – research method using both quantitative and qualitative research methods in the same study

(j) Mixing – the explicit interrelating of the study's quantitative and qualitative strands

(k) Multiliteracies - no longer just reading and writing; includes information literacy, media literacy, technology literacy, critical literacy, visual literacy, multimedia literacy, cultural literacy, etc.; literacy skills necessary to survive in the 21st century

(l) Perspective – point of view; the state of one's ideas; a way of regarding situations, facts, etc., and judging the relative importance

(m) Qualtrics – online survey software

(n) Technology – the making, usage, and knowledge of tools, machines, techniques, crafts, systems, or methods of organization in order to solve a problem or perform a specific function

CHAPTER TWO: LITERATURE REVIEW

Introduction

"Although literacy has been commonly defined as the ability to read and write, we now live in an age of multiple literacies" (McLaughlin & DeVoogd, 2011, p. 278).

Being literate in the 21st century requires students to be able to do more than just read, write, listen, and speak. According to the National Educational Technology Standards for Students (NETS-S, 2007), student technology standards focus on 21st century skills, Web 2.0 technologies, and collaboration. Students integrating technology with literacy develop (1) creativity and innovation; (2) communication and collaboration; (3) research and information literacy; (4) critical thinking, problem solving, and decision making; (5) digital citizenship; and (6) technology operations and concepts (ISTE, 2011; Shrum & Levin, 2009, p. 14).

Technology to enhance literacy in the classroom takes on increased importance in the success of 21st century students with the adoption of the Common Core State Standards of 2010: students employ technology to enhance their reading, writing, speaking, listening, and language skills while becoming familiar with various technological tools and mediums (CCSI, 2010, p. 7). New technologies have "accelerated the speed at which connections between speaking, listening, reading, and writing can be made, requiring that students be ready to use these modalities nearly simultaneously" (CCSI, 2010, p. 48). The nature of literacy is changing. "Literacy in the new communications environment is more productively approached by considering the broader affordances of the new digital communications technology for the production of different modes of meaning and their multimodal combinations" (Kalantzis, Cope, & Cloonan, 2010, p. 64). To prepare the 21st century generation of students with the literacy skills necessary for success in the

21st century, technology integration that enhances multiliteracies in the classroom should be an integral part of what and how the students learn and the teachers teach.

Society has changed dramatically in the past 20 years from manufacturing to service and technology. Alvin Toffler (1970), American writer and futurist, claimed that technology would revolutionize the world in three waves: agrarian, industrial, and post-industrial. The first wave was during the agricultural age, the second wave during the industrial age of the 1600s, and the third wave came during the 1950s that introduced basic technologies. Society has surpassed Toffler's ideas of basic technologies to full conception of the Information Age. "Today's children have grown up in an environment in which technology is everywhere and much of it is invisible" (Rosen, 2010, p. 26). These children are preparing for jobs that do not yet exist. The current job growth comes from a heuristic work—work that requires the creativity and novel solutions based on the 21st century skills of creativity and innovation, critical thinking and problem solving, and communication and collaboration. "If our schools continue to limit the literacy curriculum to reading and writing traditional, alphabetic, printed texts, then our children will be well prepared for 1950 but ill prepared for 2050" (Baker et al., 2010, p. 2). Becoming literate in today's culture requires a rethinking of what constitutes literacy in the 21st century.

This literature review focuses on related literature that discusses (a) the definition of literacy and multiliteracies, (b) the teachers' and students' beliefs, barriers, and level of proficiency in integrating technology that enhances multiliteracies in the classroom, and (c) the theory, research, and pedagogy of integrating technology that enhances multiliteracies in the classroom.

Background Information

Integrating technology into the classroom is not about teaching computer skills, but about creating engaging learning experiences in a 21st century literacy rich environment. Skills needed for success in the 21st century include critical thinking, problem solving, creativity, innovation, communication, collaboration, and multiple literacies (Schrum & Levin, 2009; Wagner, 2008). Technology in the classroom takes on increased importance in the success of 21st century students with the widely adopted Common Core State Standards of 2010: students employ technology to enhance their reading, writing, speaking, listening, and language skills while becoming familiar with various technological tools and mediums (CCSI, 2010, p. 7). A primary goal of the Common Core State Standards is to ensure that all students are career and college ready. In 2013, secondary schools adopting the Common Core State Standards (CCSS) will be challenged to align curriculum to meet career and college readiness standards of CCSS for all students. To prepare the 21st century generation of students, technology in the classroom should be an integral part of what and how the students learn and the teachers teach. One specific attribute of the Common Core State Standards is that learning outcomes from the standards will be assessed through a computer-driven assessment system developed by the Partnership for Assessment of Readiness for College and Careers (PARCC) in the state where this study occurred; other states are using a different consortia—Smarter Balanced Assessment Consortium.

PARCC is a consortium of 23 states working together to develop a common set of K-12 assessments in English language arts and math that correlate to the Common Core State Standards. These assessments are sequential in grades 3-12 and direct the student progress toward college and career readiness by the end of the high school experience. The projected

PARCC assessments will begin administration during the 2014-15 school-year. The PARCC assessment system will produce a more complete description of student performance grades 3-12 and utilize new technologies in assessment to report student data to educators in real time to provide time appropriate intervention. According to PARCC Assessment Design online, the "overall assessment system design will include a mix of constructed response items, performance-based tasks, and computer-enhanced, computer-scored items" (PARCC, 2012). This development is significant to the school site as it resides in one of the southern U.S. states participating in the PARCC consortium.

Common Core State Standards

As discussed in E.D. Hirsch, Jr.'s books *Cultural Literacy* (1987) and *The Knowledge Deficit* (2006), Wagner's *The Global Achievement Gap* (2008), and Willingham's *Why Don't Students Like School* (2009), the achievement gaps in education among American students widen at the close of each school year. To address and narrow these gaps (perceived global achievement gap and knowledge achievement gap) in education the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects established a standard for education that was adopted across America. According to the *Merriam-Webster* online dictionary, a standard is "something established by authority, custom, or general consent as a model and/or example…something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality" (http://www.merriam-webster.com/dictionary/standard). While states across America established a "standard" for education in the particular state, the standard did not necessarily meet the expectations of national standards, thus promoting an inequitable education among students across America. To develop a national, equitable education for all students, the

Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects was designed to be a model for all states to follow to promote college and career readiness in literacy for all students by the end of their high school experience. According to the National Governors Association Center for Best Practices and the Council of Chief State School Officers, "the Standards are (1) research and evidence based, (2) aligned with college and work expectations, (3) rigorous, and (4) internationally benchmarked" (CCSI, 2010).

According to the Common Core State Standards (CCSI, 2010), the standards establish the following literacy expectations for reading, writing, speaking, listening, and language:

(a) to read and comprehend complex literary and informational texts independently and proficiently (p. 35);

(b) to write routinely for a range of tasks, purposes, audiences, and modes (p. 41);

(c) to adapt speech to a variety of context, communication tasks, and modes (p. 48); and

(d) to acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening (p. 51).

The standards establish a "staircase" of increasing complexity in the literacy expectations for students as they progress through the grades. To meet the literacy expectations for reading, students must masterfully attempt the works of increasing complexity across genres, cultures, and centuries. The diverse exemplary literary and informational texts support the elements of cultural literacy encouraged through the standards. Through the various literary and informational texts (traditional and digital texts) students gain insights into knowledge and human conditions that serve as models for students' thinking and writing.

To meet the literacy expectations for writing, students must demonstrate a mastery of conveyance and defense of positional arguments. College and career ready students take the task, purpose, and audience into careful consideration—choosing words, information, structures, and formats purposefully; and combine elements of various types and modes of writing to produce a complex display of written expression. College and career ready students must demonstrate a mastery of technology skills when creating, refining, and collaborating on written projects.

Technology expanded the role of communication beyond just speaking and listening. Technology supports the acquiring and sharing of knowledge and information nearly simultaneously through various technological modalities. The standards require that students gain, evaluate, and present increasingly complex information, ideas, and evidence through listening and speaking as well as through media. Skills related to media use (both critical and production of media) are integrated throughout the standards.

The Common Core State Standards support the multiliteracies of digital literacy, information literacy, cultural literacy, visual literacy, critical literacy, multimedia, and multimodal literacy. In the CCSS document English Language Arts and Literacy in History/Social Studies, Science and Technical Subjects (CCSI, 2010), the college and career readiness anchor standards for reading, writing, speaking and listening state that all students must demonstrate skills ability:

(a) to integrate and evaluate content presented in diverse formats and media (p. 35),

(b) to use technology, including the Internet, to produce and publish writing and to interact and collaborate with others (p. 41),

(c) to gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism (p. 41),

(d) to integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally (p. 48), and

(e) to make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations (p. 48).

CCSS encourages students to become self-directed learners who seek out and use resources effectively. Students are encouraged to use technology thoughtfully to enhance their reading, writing, speaking, listening, language, and critical thinking skills. Students develop a sense of strengths and limitations of various technological tools and mediums when selecting and using those that are best suited to obtain the goal.

A Brief History of Literacy Instruction

Literacy has made revolutionary changes since the time of oral storytelling of the Medieval times to the digital literacies of the 21st century. Early American colonies linked religious instruction with the teaching of reading. American colonists began to develop their own educational resources sometime between 1686 and 1690 resulting in *The New England Primer*. This primer included the letters of the alphabet, syllabarium, the Lord's Prayer, a catechism, and various religious and instructional pieces (Applebee, 1974, pp. 2-3). Noah Webster set out to reform American spelling with his *Blue-Backed Speller* in 1783 and *The American Dictionary* in 1828 (Applebee, 1974, pp. 3-4). In 1836, William Holmes McGuffey introduced the *McGuffey Readers*—a six-book series of graded readers (Applebee, 1974, pp. 4-5). Reading instruction experienced a transition from oral reading and rote drills to silent

reading instruction—reading for meaning and understanding. High school students began to read newspapers critically and were encouraged "to bring their everyday life experiences to comprehending literary texts" (Alvermann, 2010, p. 57).

At the turn of the 20th century, educational philosophy began to make dramatic changes in the way educators approached educational pedagogy. In 1901, one of the oldest active educational organizations in this country was founded—New England Association of Teachers of English, later to be known as the National Council of Teachers of English (NCTE)—to address the issue of prescribed reading lists for college entrance. Today, NCTE embraces language, linguistics, literature, speaking, writing, listening, media, technology, standards, accountability, testing, pedagogy, English language acquisition, and social justice in education and society (Christenbury, 2010, pp. 3-4). As technology emerged into society, NCTE seized the opportunity to expand literacy beyond the traditional reading and writing of printed text. From the early 1930s through the early 1960s, NCTE produced "literacy recordings of writers reading their works and of professional readers rendering versions of poems" (Christenbury, 2010. p. 7) and "advocated the incorporation of television in schools" (Christenbury, 2010, p. 9). Walter Ginsberg promoted the use of film in the classroom in the 1930s; Ginsberg understood the need for pedagogical focus, so "his work outlined quality resources available to teachers that included a variety of films edited to suit the classroom in terms of content and length" (Christel & Hayes, 2010, p. 220). In the mid-twentieth century, NCTE advocated the development of reading skills deemed necessary for supporting the wartime effort—"reading for meaning, for evaluating newspaper accounts, and for practical purposes" (Alvermann, 2010, p. 59). As time progressed, literacy instruction was not solely concentrated on reading, but also on writing.

In 1973, a group of University and school-based teachers concerned with the declining skills of student writers joined together to create the National Writing Project (NWP, 2012). The National Writing Project has been promoting the craft of writing for over 35 years. By the 1980s, literacy was moving beyond the printed text. Word processors allowed for rapid and creative changes in the writing processes that in essence allowed writing to be a work in progress at all times (Herrington & Moran, 2009, p. 3-4); writing was becoming a multimodal literacy—the combination of the "print, spoken, visual, and digital processes in composing a piece of writing" (Herrington & Moran, 2009, p. 7). In the past twenty-five years, technology has become a significant focus of NCTE. Adopted by the NCTE Executive Committee, February 15, 2008, NCTE declared that 21st century readers and writers need:

(a) to develop proficiency with the tools of technology;

(b) to build relationships with others to pose and solve problems collaboratively and cross-culturally;

(c) to design and share information for global communities to meet a variety of purposes;

(d) to manage, analyze and synthesize multiple streams of simultaneous information;

(e) to create, critique, analyze, and evaluate multi-media texts; and

(f) to attend to the ethical responsibilities required by these complex environments. (NCTE, 2012)

Literacy continues to be a rapidly changing phenomenon—from orality to digital, multimodal, and beyond.

Theory and Research of the Understanding of Literacy

The seminal study "A pedagogy of multiliteracies: Designing social futures" conducted by the New London Group (1996) prompted a new way in which to view the pedagogy of

literacy. The purpose of the study was to "extend the idea and scope of literacy pedagogy to account for the context of our culturally and linguistically diverse and increasingly globalized societies, for the multifarious cultures that interrelate and the plurality of the texts that circulate" [among those cultures] (Cazden et al., 1996, p. 61). A second purpose of the study was to "argue that literacy pedagogy now must account for the burgeoning variety of text forms associated with information and multimedia technologies" (Cazden et al., 1996, p. 61). The conclusion and agreement resulting from the New London Group discussions were (a) what students needed to learn was changing, and (b) the nature of literacy pedagogy was changing radically. The New London Group developed a programmatic manifesto of "theoretical overview of the current social context of learning and the consequences of social change for the content (the "what") and the form (the "how") of literacy pedagogy" (Cazden et al., 1996, p. 63). From these discussions, the term "multiliteracies" was coined to mean (a) the "multiplicity of communication channels and media, and the increasing saliency of cultural and linguistic diversity" (Cazden et al., 1996, p. 63); and (b) a "focus on the realities of increasing local diversity and global connectedness" (Cazden et al., 1996, p. 64). The changes in literacy pedagogy by the New London Group meant a design change in the elements of meaning-making processes: linguistic, visual, audio, gestural, spatial, and multimodal patterns of meaning that relate to the first five modes of meaning. According to Cazden et al. (1996), changes in literacy pedagogy requires a restructuring of pedagogy that incorporates instructional methods of situated practice (p. 85), overt instruction (p. 86), critical framing (p. 86), and transformed practice (p. 87). Cazden et al. (1996) determined that by restructuring literacy pedagogy in schools, teachers would be:

> Simulating work relationships of collaboration, commitment, and creative involvement; using the school as a site for mass media access and learning; reclaiming the public space

of school citizenship for diverse communities and discourses; and creating communities of learners that are diverse and respectful of the autonomy of life-worlds. (pp. 72-73)

Labbo and Reinking (1999) considered the relationship between literacy research and practice in their study taking the position that "multiple realities unifies diverse writings over an extended period by those who have considered the role of new digital technologies in literacy instruction" (p. 478); that as technologies change, so will literacy. Resulting from their study, Labbo and Reinking (1999) developed a framework for integrating technology with literacy instruction:

(a) new digital technologies should be available for literacy instruction,

(b) new digital technologies should be used to enhance the goals of conventional literacy instruction,

(c) new technologies should be used to positively transform literacy instruction,

(d) new technologies should be used to prepare students for the literacy of the future, and

(e) new technologies should be used to empower students. (p. 481)

Tierney and Sheehy (2005) presented a longitudinal study of secondary students with high access to digital literacies. These students were found to experience major shifts in their thinking about text, attitudes toward text, and approach to the presentation of their ideas. The researchers were able to demonstrate that the students with high exposure to digital literacies were able to embed ideas within other ideas, and present varied perspectives—all of which represented the complex, multilayered, multifaceted 21st century digital text (Tierney & Sheehy, 2005, pp. 116-117). Tierney and Sheehy's research supports the premise of the paradigm shift from traditional literacy to 21st century multiliteracies.

Mills (2009) addressed the "need for literacy pedagogy to respond to the changes in the multimedia textual environment" (p. 103). Mills (2009) cited three reasons as to why a multiliteracies pedagogy has not been embraced: (1) "multiliteracies aim to move literacy education forward from an antiquated pedagogy of exclusively formal standard, monomodal" (p. 105) literacy to one that is "inclusive of informal, open-ended, multimodal forms of communication, which cross national boundaries and support productive diversity" (p. 105); (2) "advocates of multiliteracies see reading as a critical, social practice, rather than purely a means of cultural transmission" (p. 105); and (3) "historically valued texts are not representative of the kaleidoscope of texts and literacies that children encounter in the society [21st century]" (p. 106). Mills (2009) proposed a multimodal design that "expresses the complexity and interrelationship of more than one mode of meaning—combining linguistic, visual, auditory, gestural, and spatial modes" (p. 106). Mills (2009) further claimed:

> To continue to teach to a narrow band of print-based genres, grammars, and skills [would be] to ignore the reality of textual practices outside of schools. Students must be free to engage in new and multimodal textual practices, rather than simply reproduce a tightly confined set of linguistic conventions. (p. 108)

Discussions started with the New London Group served to be a starting place for literacy pedagogical changes. There will continue to be arguments for and against this change in literacy pedagogy; therefore, a continued need for research is warranted.

Defining Literacy in the 21st Century Classroom

"Literacy [is] paramount in learning, not only for language development, but also as the foundation of all academic disciplines including science and mathematics" (Huffaker, 2005, p. 91). What is literacy? The term literacy has expanded beyond the basic reading and writing in

English Language Arts. One definition for 21st century literacy is "a range of information and communications media using digital technologies, including technologies for the creation and storage of text, still and moving images and sound, and the distribution of this content through local computing systems and the Internet" (Cope & Kalantzis, 2010, p. 87). The nature of literacy is changing and the "multiliteracies approach helps students learn to be savvier users and organizers of online resources, use technologies to facilitate revision and collaboration throughout the writing process, and use technologies to achieve authentic goals and reach real audiences for their research" (Borsheim, Merritt, & Reed, 2008, p. 88). Literacy now includes literacy across all curricula: English language arts, mathematics, science, social studies, technical and vocational studies, fine arts, etc. with the inclusions of multiliteracies: digital literacy, information literacy, critical literacy, visual literacy, multimedia/multimodal literacy, cultural literacy, and all other literacies.

The rapidly changing phenomenon of literacy is creating a paradigm shift from traditional literacy to 21st century multiliteracies that include communication technologies and multimedia texts. "Although literacy has been commonly defined as the ability to read and write, we now live in an age of multiple literacies" (McLaughlin & DeVoogd, 2011, p. 278). Traditional literacy does not recognize or adequately use the meaning and learning potentials inherent in different modes. Traditional literacy confines "itself to the monomodal formalities of written language" (Cope & Kalantzis, 2010, p. 101). This narrowing of literacy is unrealistic for 21st century literacy "given the multimodal realities of the new media and broader changes in the communications environment" (Cope & Kalantzis, 2010, p. 101). The foundation of multiliteracies lies with the technologies that impact the nature of texts, and the manner in which people use and interact with text.

According to Kalantzis et al. (2010), "while traditional print-based forms of literacy continue to dominate school curriculum, pedagogy, and assessment, in their out-of-school lives students are increasingly participating in online worlds" (p. 62), digital cultures, and various literacy (reading, writing, creating) websites. "These experiences are transforming students' expectations of and orientations toward texts, literacy, and pedagogy. Learners' eager adoption of practices using new technologies presents challenges to traditional school-based teaching and learning relationships, pedagogies, and curricula" (Kalantzis et al, 2010, p. 62).

According to Borsheim et al. (2008), creating a 21st century multiliteracy classroom is dependent upon the teacher:

> Teachers who employ a multiliteracies pedagogy offer their students ample opportunities to access, evaluate, search, sort, gather, and read information from a variety of multimedia and multimodal sources and invite students to collaborate in real and virtual spaces to produce and publish multimedia and multimodal texts for a variety of audiences and purposes. (p. 87)

Teachers who integrate technology in the classroom introduce their students to multiliteracies that prepare the students for their career and college opportunities. The overall perspective of literacy is that it is pluralistic and embedded in diverse context.

Multiliteracies

Multiliteracies in the classroom requires a broader, more relevant agenda for literacy pedagogy—one that requires a rethinking of what constitutes literacy for the 21st century. Traditionally, literacy teaching has been confined to the written language, with an emphasis on reading print.

The terms “multiliteracies” and “new literacies” are umbrella categories that attempt to name the ever-changing texts of the Internet and other non-print media, and the literacy practices that technology imposes (Bean & Harper, 2011, p. 63). Multiliteracies challenge traditional print literacies, shifting authority and authorship over reading and writing norms from a central institution or individual, to broader and more diversified audiences and purposes; this shift encourages collaboration, communication, and collective production in a new medium (Bean & Harper, 2011, p. 64).

“Multiple literacies are diverse, multidimensional, and learned in different ways” (McLaughlin & DeVoogd, 2011, p. 278). According to Mills (2009), the use of technology to enhance multiliteracies in the classroom meets with diverse opinions even among literacy scholars; however:

> Despite the competing discourses concerning multiliteracies, literacy scholars are united in their view that global trends call for multiliteracies approaches that incorporate a broadened range of hybrid literacies and new pedagogies. Significant changes are occurring in the form of rapidly emerging modes of communication, increased cultural diversity, evolving workplace cultures, new challenges for equitable education and the changing identities of students. The proliferation of powerful, multimodal literacies demands that educators transform literacy programmes to teach new forms of communication, which are necessary to participate fully in our dynamic and culturally diverse society. (p. 111)

Digital literacy. Digital literacy is the ability to use digital technology, communication tools or networks to locate, evaluate, use, and create information. Alvermann (2005) explores the significance of adolescents’ engagement with digital technologies. Adolescents use

information and communication technologies to negotiate identity and meaning within globally defined and self-defined literacy practices; adolescents use multimodality (photo, video, audio) techniques and tools to express their identity in a digital format while creating meaning. According to Kalantzis et al. (2010):

> Meaning making in the digital communications environment of the 21st century is being transformed. Sound, written language, still images, and moving images can all be made, stored, and distributed through the same media because they can all be reduced to a common platform that is the code of the digital world. (p. 62)

Digitalized technology includes social networking tools such as Facebook, film and music dissemination tools such as YouTube, and social tools for knowledge and inquiry such as Google Docs and wikis (Beach, Hull, & O'Brien, 2011, p. 162). Digital literacy is driven by hypertextality. Print text is linear: reading from beginning to end without detouring from the original text. "The idea that books are linear and the Internet is multilateral is based on the assumption that readers of books necessarily read in a linear way…[and] the Internet is an endless, seamless web of cross-linkages" (Cope & Kalantzis, 2010, p. 89). Digital text is nonlinear with the potential to hyperlink to other digital modes to create meaning. According to Luke (2000), hypertext information immerses the reader into:

> An intertextual and multimodal universe of visual, audio, symbolic, and linguistic meaning systems. In hypertext navigation, reading, writing, and communication are not linear or unimodal (that is, exclusively language- and print-based), but demand a multimodal reading of laterally connected, multi-embedded and further hotlinked information resources variously coded in animation, symbols, print text, photos, movie clips, or three-dimensional and manoeuvrable graphics. (p. 73)

The iGeneration likes to read and write—on the Web. According to Rosen (2010), digital literacy with Web 2.0 is about:

> Taking material that already exists on the web, adding material of your own creation (e.g., audio commentary, written messages), mixing it together in a unique, eye-catching, and interesting way, and posting it online for all to see and for others to comment upon (p. 141).

When students use Web 2.0 tools and other electronic tools, they are transforming the practice of literacy; they are transferring their designs of meaning from one context to another, thus, practicing digital literacy.

Information literacy. Information literacy is the competency to locate, evaluate, organize, comprehend, create, and communicate off-line and online information appropriately within legal, ethical, and social guidelines. The purpose of information literacy is to (a) access and evaluate information, and (b) use and manage that information. Information literacy in the 21st century requires that students access information efficiently and effectively and evaluate that information critically and competently by reading broadly and deeply in all content-areas (CCSI, 2010). Subsequently, students should be able to (a) "use information accurately and creatively" to solve an issue or problem, (b) "manage the flow of information from a wide variety of sources," and (c) "apply a fundamental understanding of the ethical and legal issues surrounding [associated with] the access and use of the information (Partnership for 21st Century Skills, 2011).

To develop informational literacy skills, students should be expected to read broadly and deeply in all content-area subjects. Content-area literacy is essential to students' learning in every subject; however, many "content-area teachers don't think incorporating reading is in their

job" (Ash, 2003, p. 20). Ash (2003) discussed the importance of teachers using literacy strategies to promote effective literacy in the content-area, although, many of the content-area teachers know little about using or teaching literacy strategies. Informational reading should include magazines, technical/informational texts, charts, graphs, multimedia texts, and digital texts.

Critical literacy. Critical literacy is the ability to question, challenge, and evaluate the meanings and purposes of various texts and multimedia. Critical literacy engages the student in questioning, examining, or disputing the opinion of an author; analyzing and evaluating text; questioning origin and purpose; and taking action by representing an alternative perspective (McLaughlin & DeVoogd, 2011, p. 279). Critical literacy engages a citizenry that unpacks the implicit and explicit messages conveyed by text (spoken, written, visual). The goal of critical literacy is "to position students as citizens who understand the ideological nature of texts, be able to read, respond, and produce texts from a critical perspective, and who are agents of texts rather than victims of texts" (Vasquez, Harste, & Albers, 2010, pp. 265-266).

Students of the iGeneration have often been criticized for their online search strategies as "skimming and squirreling behavior" that does not exactly parallel critical literacy expectations (Considine, Horton, & Moorman, 2009, p. 475). A report commissioned by the British Library Joint Information Systems Committee in 2008 (as cited in Considine et al., 2009) concluded that "modern youth [a] have a poor understanding of their information needs, [b] find it difficult to develop effective search strategies, and [c] spend little time evaluating information either for relevance, accuracy, or authority" (p. 475). Critical literacy focuses on agency and taking action (interaction) with texts; critical literacy is not a passive acquaintance with texts. To develop

critical literacy skills, students must have opportunities to make meaning of texts, as well as interrogate texts.

Critical media literacy. Critical media literacy is the ability to understand "how the print and non-print texts that are part of everyday life help to construct knowledge of the world and the various social, economic, and political positions they occupy with it" (Alvermann, Moon, & Hagood, 1999, pp. 1-2). Since the introduction of the television in the 1950s, society has been bombarded with multiple media. Media is an integral part of the way the 21st century society learns and communicates. Media literacy is embedded in all areas of education and warrants a critical approach to the messages being communicated through media. Critical media literacy engages the ability to question, analyze, interpret, evaluate, and create media messages. According to Rosen (2010), media literacy emphasizes:

(a) a critical thinking skill that allows audiences to develop independent judgments about media content,

(b) an understanding of the process of mass communication,

(c) an awareness of the impact of media on the individual and society,

(d) the development of strategies with which to discuss and analyze media messages,

(e) an awareness of media content as a text that provides insight into our contemporary culture and ourselves, and

(f) the cultivation of an enhanced enjoyment, understanding, and appreciation of media content. (pp. 150-151)

Research on the importance of critical media literacy emphasizes the "importance of developing within children and adolescents a critical awareness of the social, political, and economic messages emanating from popular fiction, music, movies, comics, magazines, videos,

computer games, and other popular culture forms" (Alvermann et al., 1999, p. 4). According to Alvermann et al. (1999), there are two significant reasons why students should develop an ability to read and critique popular media: (1) students need to "question how their identities are constructed by various forms of popular culture," and (2) students need to "evaluate such [popular culture] messages for their social, political, economic, and aesthetic contents" (p. 4).

Visual literacy. Visual literacy is the ability to decode, interpret, and communicate using a combination of traditional print and digital imagery: photos, drawings, computer generated images, television, websites, videos, logos, symbols, charts, fine art, graphic organizers, musical notations, manuscripts, maps, and graphs. Visual literacy is the ability to understand and produce visual messages and meaning. According to the North Central Regional Educational Library, visually literate students:

(a) understand basic elements of visual design, technique, and media;

(b) are aware of emotional, psychological, physiological, and cognitive influences in perceptions of visuals;

(c) comprehend representational, explanatory, abstract, and symbolic images;

(d) are informed viewers, critics, and consumers of visual information;

(e) are knowledgeable designers, composers, and producers of visual information;

(f) are effective visual communicators; and

(g) are expressive, innovative visual thinkers and successful problem solvers.

(Brumberger, 2011, p. 21)

With the emergence of the World Wide Web in the 1990s, literacy became visual by nature and "colors, icons, and photos became as important as words in a highly interactive visual environment" (Jukes, McCain, & Crockett, 2010, p. 114). Visual literacy is a constant in the

students' daily lives. Effective teachers recognize the influence of visual literacy in the content-area subjects and capitalize on students' interest in the internet to integrate visual literacy instruction into their curriculum.

Multimedia/multimodal literacy. Multimedia and multimodal literacies are modes of literacy within the category of "new literacies." Multimedia is the ability to interpret, understand, design, and create content that uses traditional and digital images, photographs, video, animation, music, sound, texts, and typography. In the 21st century, multimedia literacy is viewed as important for occupational purposes (production of multimodal content), civic purposes (participation in responsible social networking), and artistic (digital photography, video) purposes (Warschauer, 2007, p. 43).

Multimedia literacy refers to the new forms of literacy made possible by digital technology development that extends beyond the basic reading and writing of the alphabetic code, and should include some variety of an audio and visual component. "The tools available to students at school, and the arrangement of its social environment, often discourage or outright ban students from engaging in the development of creative, multimedia activities on sight" [school campuses] (Rosen, 2010, p. 146).

The multimodal component of literacy incorporates the methods and tools necessary to create and communicate multiple modes of literacy. Multimodal refers to the ability to decode and engage multiple modes of literacy: linguistic, gestural, spatial, visual, audio forms of communication. Multimodal literacy may not always be technology-driven; it may consist of aural, visual, dramatic, and other literacies, or a combination of literacies.

A challenge for current literacy researchers is to promote recognition that literacy can no longer focus solely on the alphabetic print and be the primary source in literacy education.

A shift towards the recognition of visual, audio, multimedia, multimodal and other modes of expression in literary research and pedagogy are necessary to remain current with 21st century literacy and to narrow the "gap between mono-modal school policy and multimodal forms of living and communication" (Rowsell & Pahl, 2011, p. 179). Curriculum materials have been developed in multimodalities to meet the diverse learning styles of students; it is the teacher's responsibility to integrate multimedia and multimodalities into the classroom for engaged learning. According to Rosen (2010):

> A student could go online to learn about the ancient Incas by reading materials on a website, viewing historical photos, listening to an audio podcast by an archeologist on a dig in South American, watching a vodcast by an expert halfway around the world answering questions at a press conference, playing a video game simulating Inca life, conversing with experts through online discussions, or even entering a virtual Inca village. (p. 108)

Expanded modes of texts that include multimedia/multimodality such as sound, animation, gestures, or images can take a disengaged learner and turn him/her into a critical meaning maker.

Cultural literacy. Cultural literacy is the familiarity with and the ability to understand the idioms, allusions, and informal content of a language that creates and constitutes the culture of a society, and to understand and appreciate the similarities and differences in those customs, values, and beliefs of other societal cultures. According to E. D. Hirsch, Jr. in his book *Cultural literacy: What every American needs to know*, cultural literacy is a common body of knowledge of the society in which citizens are a part and which allows them to communicate effectively with others, govern themselves, and share in that society's rewards. The World Wide Web offers a global society to the 21st century student, and thus students need to recognize that the English

language and all its Anglo-Saxon dominance no longer belongs to any single group or nation, that the global society recognizes the need for and the appreciation of multiple languages and diverse cultures. The perspective of several literacy scholars is that cultural literacy is pluralistic and embedded in diverse contexts; influenced by socio-political events; shaped by the ecology of culture, gender, and class; and is linked to everyday life (DiPardo, 2005, pp. 29-30; McLaughlin & DeVoogd, 2011, p. 278; Rowsell & Pahl, 2011, p. 180; Tate, 2011, p. 187). According to Hawisher, Self, Moraski, and Pearson (2004), the cultural ecology of digital literacy in the 1960s, 1970s, 1980s, and 1990s:

> Raised and educated a culture that valued, and continues to value, alphabetic and print literacies, many of these teachers remain unsure of how to practice these new literacies, unsure how to value new-media literacies, unsure how to practice these new literacies themselves, and unprepared to integrate them at curricular and intellectual levels appropriate for these particular young people [21st century students]. (p. 671)

Preparing students for 21st century college and careers requires that teachers embrace cultural diversity that acknowledges 21st century global technologies. In today's society, students need to experience the world outside their individual community and culture. Simply using computers or connecting to a global network does not ensure that teachers are preparing their students to read, write, and live in the 21st century. However, making good use of technologies expands the possibilities for student learning outside their community and culture. Literacy is embedded within a complex matrix of language, economics, social relations, and technologies. Embracing the multiliteracies enhanced by technology in the classroom may be a catalyst for teacher pedagogical change that focuses on multiliteracies experiences for student-centered curriculums.

Social literacy. Integrating technology that enhances multiliteracies is more than just bringing a computer into the classroom. "New" literacies include social networking tools such as Facebook, YouTube, Wikis and the virtual world. These and other social networking tools are influencing the 21st century societal culture and impacting literacy education in ways only seen through the experience of multiliteracies.

According to Rosen (2010), social networks offer several benefits to education:

1. Students love social networks and actively engage with them for hours each day.
2. Social networks offer vehicles for the transmission of information in a variety of modalities, and links to the internet providing unlimited access to information sources.
3. Social networks provide connectedness, communication, and group learning for the students in school and out of school.
4. Social networks provide cooperative learning experiences.
5. Social networks present an environment that is more immersive than a traditional classroom. (pp. 107-108)

A virtual world in education replicates an authentic experience for the student within the classroom. This experience allows for a 3D look into a 2D world that promotes investigation and exploration. A popular virtual experience is Second Life. This website is based on three-dimensional modeling technology that allows users to meet and socialize with other users, participate in a variety of activities, and create complex objects, buildings, environments, and characters (Rosen, 2010, pp. 119-120). There are many applications for the virtual world: virtual tours (Sistine Chapel, Louvre), virtual labs (ecology systems, planetary systems, experiments, dissections), virtual simulations (space flight, disaster preparedness), and virtual

classrooms (courtroom, art museum, musical concert), all of which can promote literacy in the classroom.

Multiliteracies in the Classroom

A multiliteracies classroom would look like any other classroom except, literacy in all its forms is honored, respected, and practiced. Multiple literacies are in continuous use observing a balance of individualization and collaboration, with multimodal meaning making in progress.

Teachers need to rethink spatial and temporal boundaries in the classroom. Learning can take place anywhere, anytime, synchronous, asynchronous, face-to-face, or Skype. Web 2.0 tools allow students to communicate to multiple audiences within and beyond their classrooms, enhancing their sense of engagement in constructing and sharing their ideas. Web 2.0 literacy tools (digital tools) include, but are not limited to, digital video/storytelling, social networking sites, cell phones, blogs, wikis, online book clubs, and podcasts that involve both accessing and producing knowledge in ways that move beyond passive consumption to active construction of knowledge mediated by hyperlinks, interactivity, multimodality, and social networking (Beach et al., 2011, p. 162).

According to Hawisher et al. (2004):

> Schools are not the sole—and, often, not even the primary—gateways through which people [students] gain access to and practice digital literacies. English composition teachers often have little connection to, and a limited understanding of, the range of literacy practices that happen in digital environments reached through other gateways. (p. 644)

Technology has revolutionized the way individuals interact with literacy—the way information is produced, distributed, and received. Because of the availability and accessibility of digital

technologies, students bring a richer and often different set of literacy practices to school; unfortunately, these literacy practices typically are not measured on any standardized tests, so they often go unacknowledged or underused by teachers.

Secondary level students with disabilities often struggle to meet the demands of the general education curriculum. Poor reading skills and a lack of effective learning strategies are contributing factors to students' lack of academic achievement (Boyle et al., 2003, p. 203). The integration of technology into daily instruction targets fundamental literacy skills while promoting collaboration, communication, and cooperation among students with and without disabilities for the purpose of meeting the requirements of the general education curriculum in an inclusive classroom setting (Gallagher, 2006, p. 190). Technology can be universally beneficial for all students as a means of learner engagement or conveyance of instructional content (King-Sears, Swanson, & Mainzer, 2011, p. 569). "As Web 2.0 tools continue to evolve and become universally available, students with disabilities will benefit from the common practice of multimodal learning and responding, lessening the reliance on more conventional assistive technologies to foster literacy" (King-Sears et al., 2011, p. 577).

The combination of reading, writing, and technology presents unique opportunities to improve and address the contemporary multiliteracies needs of students. The literacy habits of students outside school do not necessarily reflect the literacy habits in school. The challenge is to incorporate those literacy habits outside of school into the literacy curriculum inside the school. Students are engaged learners when they are interested in the topic and have opportunity to share that interest with other students via chat rooms or other collaborative work sites. Wikis provide an opportunity to display student literacies. "A wiki consists of a set of web pages where collaborators contribute and modify information about specific subjects" (Tarasiuk, 2010,

p. 547). Because the wiki is open to the World Wide Web, students tend to take pride and responsibility in their work, especially if they know the whole world will see it.

Digital book talks are another way to highlight students' comprehension through digital literacy. Digital book talks incorporate the traditional literary elements while displaying them through audio, video, multi-media formats. Web 2.0 tools such as Animoto.com, Storybird.com, Voki.com, or Prezi.com are valuable resources for creating and publishing the students' masterpieces. Presentation programs such as Keynote, PowerPoint, or Open Office are also options for creating and publishing students' digital book talks or storyboards.

Media literacy is a novel way of expanding literacy beyond the written text. Incorporating media literacy (film clips, websites, photographs, graphic novels, music, editorial cartoons, lyrics, and advertisements) into the learning experience provides not only an informational literacy experience, but motivates students to participate in engaged learning. Integrating "multimodal response strategies into everyday literacy instruction builds comprehension and literary interpretation while giving learners purposeful experience in using these modalities" (Whitin, 2009, p. 408).

It is always risky to use technology to replicate traditional paper-based literacy instruction. However, through the use of multimedia software, visual, linguistic, audio, and temporal, elements are interrelated in ways not possible with non-digital media. Multimedia projects are conducive to all content areas and literary genres. As with all instructional preparation, it is necessary to have clear objectives, and ample time to instruct and construct.

Curwood and Cowell (2011) seized the challenge to replicate traditional paper-based literacy with digital iPoetry. Curwood and Cowell worked together to design and implement a digital poetry curriculum for high school sophomores. Their goal was to infuse new literacy

practices with the genre of poetry to enhance students' critical literacy, increase audience awareness, and encourage the students' progressive use of multiple modalities. After the students read, critiqued, and wrote poetry using traditional print text, the students used digital tools to reinterpret those same poems using multimodal elements. The result of this experience was that the students gained a deeper meaningful understanding of the poems. The iPoetry experience is an example of how imperative it is for teachers to embrace new literacy practices so that "rigor and engagement are inextricably tied to a curriculum that invites emotional investment, immersion, and intellectual challenge" (Curwood & Cowell, 2011, p. 111).

Multiliteracies, while applicable to all content areas, build on the traditional elements of literacy (reading, writing, listening, and speaking), but require new skills, strategies, and methods to navigate through complex systems of texts, signs and symbols; and critically evaluate, synthesize, produce, and distribute new knowledge in a timely manner using emergent technologies. According to Leu (2010), the elements of "new" literacies are defined as:

(a) new literacies that include the new skills, strategies, dispositions, and social practices that are required by new technologies for information and communication;

(b) new literacies that are central to full participation in a global community;

(c) new literacies that regularly change as their defining technologies change; and

(d) new literacies that are multifaceted and our understanding of them benefits from multiple points of view. (p. x)

Teachers' and Students' Perspectives toward Integration of Technology

Rosen (2010) discusses the emerging learning styles of the iGeneration (pp. 44-46). He refers to Gardner's multiple intelligences to support a learning environment that capitalizes on the visual, auditory, and tactile/kinesthetic abilities needed to interact with technology.

Rosen (2010) further discusses the need to "rewire" education (pp. 199-226) by addressing teachers' beliefs about using technology in the classroom, perceived barriers to using technology in the classroom, and teachers' perceived levels of proficiency when using technology (pp. 179-197). The overarching theme in Rosen's (2010) book was that the iGeneration tends to be disengaged in the traditional approaches to education, however, actively engaged in educational approaches that incorporate technology. This phenomenon generates a "gap" between teachers' and students' perspectives of technology integration in the classroom.

According to Rosen (2010), this "gap" occurs between teachers' and students' perspectives of technology and its use in the classroom, and to address the "gap," Rosen (2010) listed his top eleven recommendations for closing the "gap," all of which required teachers to "rewire" their pedagogy (pp. 218-226). In attempts to narrow the "gap," schools attempt to make new resources and tools available to teachers; however, these new tools do not necessarily mean new learning is occurring with the students. According to Cope and Kalantzis (2010), "from the scope of possibility in the new media, teachers and curriculum designers all-too-often selectively do things with them [multimedia] that are not much more than conventional" (p. 88). Teachers need more than just the technology tools; they need training to integrate the technology tools to create effective engaging learning experiences for the students. According to Cope and Kalantzis (2010), at some point teachers must concede that schools are:

> Knowledge-producing communities, and create in learners a sense that they [learners] themselves are knowledge producers. . .[and] would not be reinventing the world any more or less than an expert does. They [learners] would be just as reliant on knowledge sources, but be rebuilding knowledge [for] themselves in an active, engaged way as if they were an expert. (p. 97)

Schools should not be viewed as communities of command and compliance, but as communities of reflective co-construction where learning is a shared engagement between teachers and students. Effective integration of technology is one means of bridging the "gap" between teachers and students in an effort to promote a learning environment that encourages and supports multiliteracies. The teachers' and students' perspectives of roles, responsibilities, and outcomes play an integral part in bridging the "gap."

Perspective is one's point of view. A story given by Baker et al. (2010) of three blind men and an elephant demonstrates multiple perspectives when presented with the same content. In this story, each blind man was presented with a different part of the elephant, and each man had a different perspective of the elephant. The blind man who was feeling the leg of the elephant said that elephants were round and rough like a tree trunk. The blind man who was feeling the trunk of the elephant claimed that elephants were wiggly and supple like a fat snake. The blind man who felt the ear of the elephant stated that elephants were thin and malleable like a fan (p. 4). Approaching the integration of technology to encourage multiliteracies in the classroom is much like the elephant—large and complex with multiple perspectives, much like the concept of multiliteracies.

Byous (2007) conducted a study of high school literacy teachers' perspectives of technology integration after participating in a state-mandated technology professional development course. Data collected from Byous' study indicated that teachers' perspectives of literacy and technology affected their technology integration and determined their future adoption of technologies. The data also indicated that available technology was not being used to its greatest potential by the teachers who completed the professional development course, and

that time was by far the most frequently perceived barrier to integrating technology in the classroom.

Teachers' and students' perspectives of technology (beliefs about technology, proficiency level in using technology, and the perceived barriers to using technology) are instrumental in the integration of technology in the literacy classroom. Palak and Walls (2009) conducted a study that focused on teachers' beliefs and technology practices and determined:

> (a) teachers use technology most frequently for preparation, management, and administrative purpose; (b) teachers use of technology to support student-centered practice is rare even among those who work at technology-rich schools and hold student-centered beliefs; [and] (c) teachers in technology-rich schools continue to use technology in ways that support their already existing teacher-centered instructional practices. (p. 417)

Many teachers focus on teaching students technology skills but are uncomfortable or unskilled with integration of technology for active learning. Authentic integration of technology requires teachers to meet the needs of students smoothly, skillfully, and effectively.
Gorder (2008) presented a study of teachers' perceptions of instructional technology integration in the classroom. The purpose of Gorder's study was to determine teachers' perceptions of instructional technology integration in the classroom. The study was designed to explore technology integration practices of each teacher and compare these practices to other teacher technology practices based on teacher gender, age, years of service in the teaching field, grade level taught, content area, and education level. Findings from Gorder's study suggested that teachers who use technology more regularly are more likely to integrate technology into the classroom for daily learning—technology becomes part of the classroom culture. Other findings

from Gorder's study suggested a significant difference in technology integration or use based on grade level taught; however, there were no significant differences based on gender, age, teaching experience, content area, and educational level.

Teachers typically are strong in content knowledge, but often learn technology from the students. Sheingold (as cited in Gorder, 2008) stated that "integrating technology in the classroom is not about teaching students to operate computers, but integrating technology is about helping teachers to use technology as a tool for learning" (p. 63). Teachers frequently attempt to mechanize learning by integrating technology in the classroom that often results in no more than conventional teaching and learning. Technologies themselves are not the agents of social change; however, they are symptoms of a social change—a culture in which students are knowledge producers rather than knowledge consumers; a culture in which learning is authentic and student-centered; a culture in which literacy becomes multiliteracies. According to Cope and Kalantzis (2010):

> Some of the new learning is reminiscent of authentic education, when learners connect knowledge with personal experience, are immersed in new experiences and are asked to apply their learning in real-world contexts. But the new learning does more, by insisting on the higher-order conceptualizing. Insofar as navigation of the new media requires higher-order skills of conceptualization and abstraction, learning that engages students in and through new media environments will support pedagogical experiences appropriate to our moment, in and for its characteristic cartographies and its grammars. (p. 103)

Teachers integrating technology that enhances multiliteracies recognize the potential that multiliteracies unleash new learning.

According to Kalantzis et al. (2010), the integration of new media tools in the classroom and continued teaching practices "reflect an old agenda for literacy [education]—one that focuses on monomodal print literacy, driven in part by system-mandated literacy policies, and assessment regimes" (p. 64). Traditional texts provide readers a linear experience with literacy; whereas, hypertexts provide the possibility of non-linear readings as the reader chooses and navigates a literacy path. Integration of technology with "a broader, more relevant agenda for literacy pedagogy requires a rethinking of what constitutes literacy for the 21st century" (p. 64).

Technology can be a catalyst for change in instructional practices in the classroom when not hindered by real or perceived barriers. In a study conducted by Rakes, Fields, and Cox (2006), the study included 186 participants from 36 schools who completed 300 hours of professional development in the uses and integration of technology in the classroom. To determine the level of classroom use of technology after the professional development, a 50-item Likert-type scale instrument (LoTi) was completed. Rakes et al. (2006) found a positive relationship between personal and classroom use of technology and the use of constructivist instructional practices among rural teachers in rural schools; however, the data from Rakes et al.'s study also indicated a high level of teachers did not effectively integrate technology in their classroom because they perceived a lack of access to the equipment or the lack of time to use technology in the classroom as barriers.

In a mixed methods study conducted by Lumpe and Chambers (2001), they determined that teachers' beliefs regarding the integration of technology in the classroom were significant predictors to teachers' use of technology in the classroom. "The primary purpose of this study was to develop a technology-related context beliefs instrument" (Lumpe & Chambers, 2001, p. 97). To measure this phenomenon, Lumpe and Chambers developed the Beliefs about

Teaching with Technology (BATT) instrument. Twenty teachers were selected to identify categories to assess teachers' context beliefs of technology in the classroom. The teachers narrowed the categories to fourteen of which two questions were developed to assess each category on the premise of enabled beliefs and likelihood beliefs. For validation of the BATT instrument, participants completed two other assessment instruments containing self-efficacy and engaged learning items. Analysis of the data supported content validity of the BATT instrument through correlation of the means, high alpha coefficients, and factor analysis. Evidence supported the premise that the BATT instrument appeared to be a valid and reliable measure of teachers' context beliefs about teaching with technology (Lumpe & Chambers, 2001). The application for the uses of this instrument became more than just measuring teachers' beliefs about integrating technology in the classroom. This instrument gave reason to review the effectiveness of the school's technology program and lend direction for future professional development experiences.

Ivers (2002) conducted a study with 200 K-12 teachers in 40 different Orange County California schools set out to help teachers integrate technology into their instruction. The participants responded to a pre- and post-test regarding the teacher's perceived level of technology proficiency. The teachers completed 120 hours of technology training prior to the post-test. The researcher's conclusion of this study stated that "teachers do not feel prepared to teach with technology, yet the pre-test data of this study suggests that the majority of teachers rate themselves as "intermediate users" of most technologies" (Ivers, 2002, p. 5). Intermediate technology users use the computer as a teaching/management tool—to generate worksheets, create presentations, or to record grades and attendance. Intermediate users do not appear confident in using technology as a tool for student work. Teaching with technology is more than

generating worksheets or lecturing from of a PowerPoint presentation. Teachers who consider themselves highly proficient with technology tend to integrate a variety of technologies providing their students opportunities to use technology as a thinking and creativity tool (Ivers, 2002, p. 5).

In Hew and Brush's (2007) meta-analysis of existing studies from 1995 to spring 2006, they identified six significant barriers to the integration of technology in the classroom:

(a) resources – technology, time, access to available technology, and technical support (pp. 226-227);

(b) institution – leadership, school time-tabling (block scheduling), and school planning (pp. 228-229);

(c) subject culture – tradition in presenting the subject (p. 231);

(d) attitudes and beliefs – teachers' beliefs about technology integration in curriculum (pp. 229-230);

(e) knowledge and skills – teacher skill level and familiarity with pedagogy in using technology (pp. 227-228); and

(f) assessment – emphasis on high stakes test results (p. 230).

Hew and Brush (2007) identified time as a major barrier to the integration of technology and stated that the research had shown "teachers need hours to preview web sites, to locate photos, etc. . . . Teachers who were willing to work longer hours paid a personal price in "burn out" and an eventual exit from the school" (p. 227). Time as a barrier to technology integration in the classrooms was identified in other studies as well.

One of the observations resulting from Gorder's (2008) study was that "administrators and school leaders must recognize that it takes time to integrate technology. Teachers are busy

teaching in the classroom and need more time for learning, planning, and preparation to integrate technology" (p. 74). Other recommendations from Gorder's (2008) study included more collaboration among teachers to share ideas on technology integration, and more professional development to learn how to integrate technology into the classroom more effectively (p. 74).

In a mixed methods study of 1,000 K-12 art teachers, Rogers (2000) identified similar barriers to the integration of technology as Hew and Brush, and Gorder. Rogers (2000) not only identified time as a significant barrier to the integration of technology, but she also recognized the element of "fear" in teachers trying to integrate technology:

> Personal time needed to build skills or create new teaching materials is considerable, particularly for teachers just beginning to use new technologies. The panic that sets in, often called the fear factor, stops many teachers from successful infusion of technology in their teaching. (p. 461)

To overcome barriers to the integration of technology in the classroom, Hew and Brush (2007) identified five significant strategies:

(a) having a shared vision and technology integration plan (pp. 232-235),

(b) overcoming the scarcity of resources (pp. 235-236),

(c) changing attitudes and beliefs (p. 237),

(d) conducting professional development (pp. 237-239), and

(e) reconsidering assessments (pp. 239-240).

According to Ringstaff and Kelly (as cited in Hernandez-Ramos, 2005), conditions required to see effective technology integration by teachers in schools included:

(a) changing teacher beliefs about teaching and learning,

(b) sufficient and accessible equipment,

(c) placement of equipment: classroom vs. lab,

(d) computer and network access at home,

(e) long-term planning for the integration of technology,

(f) technical and instructional support, and

(g) technology integration within the curricular framework (p. 42).

To support constructive and effective use of technology in the classroom, Labbo and Reinking (1999) described a framework for integrating technology with literacy instruction. That framework incorporated the premises that new digital technologies should (a) be available for literacy instruction, (b) enhance the goals of conventional literacy instruction, (c) transform literacy instruction in a positive manner, (d) prepare students for the literacy of the future, and (e) empower students (Labbo & Reinking, 1999, p. 481).

Identification of barriers to the integration of technology and strategies to confront those barriers is an integral part to the integration of technology that enhances multiliteracies in the classroom.

Summary

Literacy takes on a new definition in the 21st century and part of that definition includes multiliteracies, an approach becoming the new norm for literacy expectations. This chapter included a discussion on the literacy expectations of the Common Core State Standards, theory and research associated with the understanding of literacy, the definition of literacy, the multi-facets of literacy in multiliteracies, and teachers' and students' perspectives toward integration of technology.

The review of the literature supports the discussion that literacy is changing and technology is an integral component of literacy in the 21st century. The literature establishes the

awareness that teachers' perspectives toward the integration of technology have a direct effect on the effectiveness of technology integration. The students' perspectives toward the integration of technology were not well represented in this review. Only two studies were found in the literature search to include student perspectives and the studies focused primarily on the teachers' findings.

CHAPTER THREE: METHODS

Methodology

This chapter describes the methodology and design of this dissertation study by discussing (a) the mixed methods research design, (b) the research questions, (c) the role of the researcher, (d) the participants and setting, (e) the measuring instruments, (f) the protocol for data collection, and (g) the protocol for data analysis.

Creswell and Plano Clark's (2011) explanatory sequential mixed methods design was used as a guide to develop the research design for this dissertation study (p. 71). This dissertation study design was classified as a mixed methods research design because: (a) the qualitative and quantitative approaches were mixed within the level of design, the data collection stage, and the data interpretation stage, (b) the initial quantitative and qualitative data were collected sequentially, and (c) both qualitative and quantitative data and data analysis were given approximately equal emphasis throughout the research process (Creswell & Plano Clark, 2011, p. 67-68).

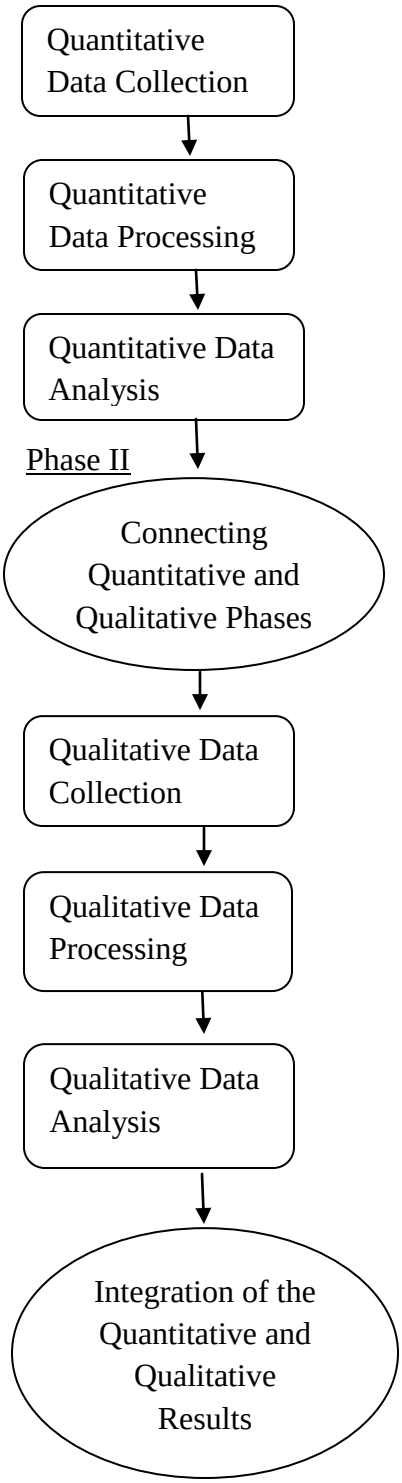
Explanatory Sequential Mixed Methods Design

This dissertation study was conceptualized and conducted following the framework based on the explanatory sequential mixed methods design by Creswell and Plano Clark (2011), as seen in Figure 1. The explanatory sequential mixed methods research design is a two-phase research design that begins with quantitative data collection and analysis followed by qualitative data collection and analysis that lead to an overall interpretation of the data. The initial phase (Phase I) was designed to address the study's research questions. The second phase (Phase II) was designed to follow the results of Phase I and explain in more depth the results from Phase I. The purpose of this design was to explain the quantitative results in more depth. The

explanatory sequential mixed methods design was based on the post positivist paradigm in Phase I and the constructivist paradigm in Phase II. The primary point of mixing was in data collection. The primary mixing strategy was connecting the two strands from quantitative data analysis to qualitative data collection. The results from the quantitative data were used to make decisions about sampling and data collection in Phase II. Finally, I - the researcher - interpreted the results to determine to what extent and in what ways the qualitative results explained and enhanced the quantitative results (Creswell & Plano Clark, 2011, pp. 81-86).

The method of survey was preferred because the data collection was more economical and allowed for rapid analysis. The use of the survey data allowed for generalization from the sample to the population so inferences could be made about the perspectives toward the integration of technology, the technology skill levels associated with multiliteracies, and the perspectives of barriers to the integration of technology in the classroom to enhance multiliteracies. The method of interview was preferred to clarify misconceptions of data and to delve deeper into the participants' perspectives on the integration of technology to enhance multiliteracies in the classroom. Classroom observation was preferred to enhance the data of the surveys and interviews, and to clarify and explain the quantitative survey data. Mixed research methods (qualitative and quantitative) were used to maximize interpretation of the data. The questions guiding this dissertation study represented quantitative and qualitative research questions.

Figure 1: Visual Model for Explanatory Sequential Mixed Methods Design



	Procedure	Product
Quantitative Data Collection	• Web-based survey (n = 25 teachers; (n = 92 students)	• Numeric data • Text data
Quantitative Data Processing	• Transfer quan data to SPSS • Read, re-read open response data	
Quantitative Data Analysis	• Descriptive statistics • Cronbach's Alpha • *t*-tests • Open coding • Thematic coding • Axial coding • Frequency counts	• Descriptive statistics • Cronbach's Alpha • *t*-tests results • Codes and themes • Frequency counts
Connecting Quantitative and Qualitative Phases		• Cases (n = 117) • Interview protocol • Classroom observation protocol
Qualitative Data Collection	• Teacher interviews • Student interviews • Classroom observations	• Text data (interview transcripts, documents, artifact description) • Image data (photographs) • Audio data (recordings)
Qualitative Data Processing	• Transcribe interviews to text • Read, re-read interviews	
Qualitative Data Analysis	• Open coding • Thematic coding • Axial coding • Frequency counts	• Frequency counts • Codes and themes
Integration of the Quantitative and Qualitative Results	• Interpretation and explanation of the quantitative and qualitative results	• Discussion • Implications • Future research

Research Questions

The scope of the research questions delved into the perspectives and integration of technology to enhance multiliteracies in content areas. These questions were developed to produce qualitative and quantitative data.

1. How do teachers and students define literacy and multiliteracies?
2. What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?
3. What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom that enhances multiliteracies in the classroom?
4. What are the teachers' and students' perceived barriers to integrating technology in the classroom?

The Role of the Researcher

For this dissertation study, as a teacher/researcher, researcher biases and insights resided in my own experiences as a teacher and participant of the Schools of Tomorrow Today program. The Schools of Tomorrow Today program was an initiative sponsored by Apple Inc. to integrate computers into the classrooms to promote 21st century learning experiences. Because of my experience in the classroom, I believed that integration of technology to enhance multiliteracies in the classroom was important and should be actively supported by all teachers, administrators, students, and parents. I realized my biases favor high cognitive levels of technology integration in an interactive classroom environment. Given my biases, I maintained a focus on data collected and, to the extent possible, allowed those data to guide my analysis.

Setting and Participant Selection

Setting selection. The school site selection for this dissertation study was based on convenience. The high school consisted of grades 10-12 with a total of approximately 800 students, 60 teachers, 3 counselors, 2 administrators, and multiple administrative staff members. The student population was 49% male and 51% female; 37% grade 10, 32% grade 11, and 31% grade 12. The teacher student ratio was 1:13. The ethnicity of the student population consisted of 2% Asian/Pacific Islander, 5% Hispanic, 85% Caucasian, less than 1% American Indian/Alaskan, less than 1% African American, and 7% two or more races. Twenty-five percent of the student population was eligible for the free and reduced lunch. Ninety-seven percent of the teachers were certified in their content area, with 35% of the teachers holding Master's degrees (NCES, 2009; NORMES, 2012).

The school site has been recognized locally and throughout the state for its mission of "Excellence in Education" that has been acknowledged through Golden Apple Awards, exemplary pass rates on student AP exams, above national averages on ACT exams, 80%+ student proficiency and advanced scores on benchmark and end of course exams, a graduation rate of 96% (2010-2011), and over a million dollars in scholarships awarded to graduating seniors annually. Dropout rate for this school was less than 1%. This school site reported a remediation rate of 34% of the students requiring remediation in one or more of the core content areas in 2010-2011 (NORMES, 2012).

This school has been recognized for its excellence in athletics and campus environment. The school has won numerous state championships in football, basketball, volleyball, baseball, softball, tennis, and golf. The campus presented an educational environment that supported an open Wi-Fi network to students and visitors, technology rich classrooms, state-of-the-art athletic

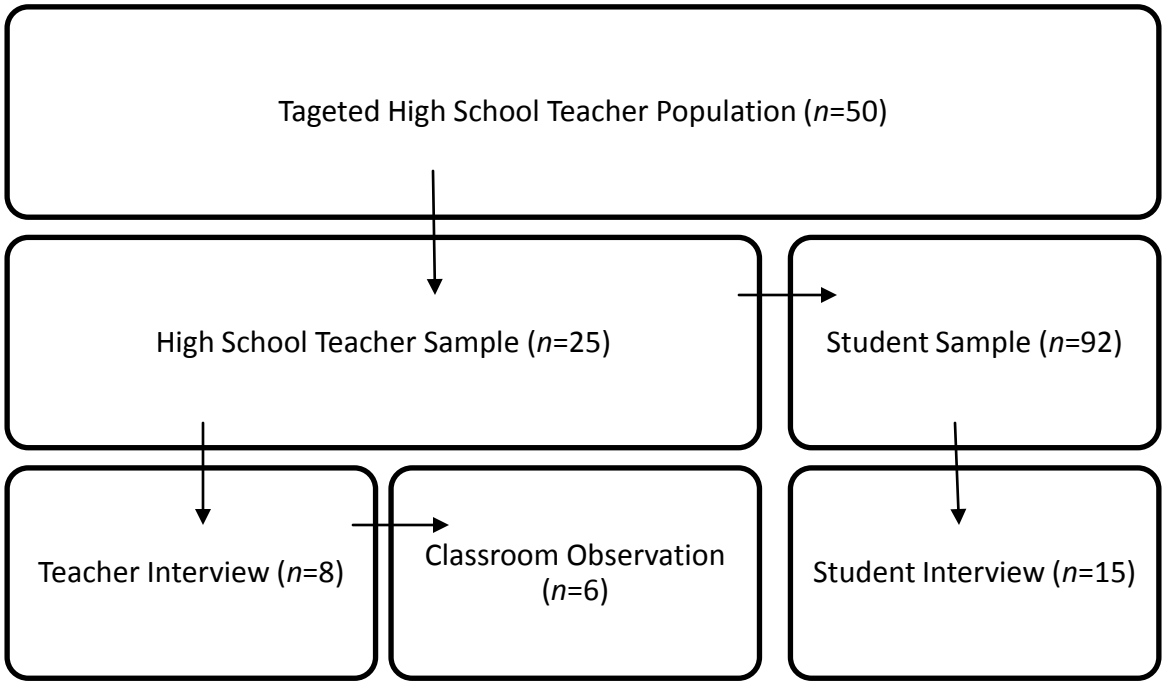
and vocational facilities, and policy and procedures that support college and career readiness for all students. Classrooms in this school site were equipped with Smartboards, projectors, document cameras, and portable computer carts. Due to the technology rich classrooms, this school site provided an excellent location for a study in technology that enhances multiliteracies in the classroom. According to the Asst. Superintendent of the district, this school site anticipates substantial growth and change within the district in the next decade due to the expected expansion of industry in the local area. In preparation of the expected growth, the results from this dissertation study would benefit students, parents, and administrators in the development of future curriculum and facilities.

Participant selection. Participant selection was based on a convenience sampling design. Initial teacher participants were selected from the population of the high school teachers based on the teachers' willingness to volunteer to participate in the study. Following administration and analysis of data collected from the teachers' surveys, teacher participants were selected to participate in a teacher interview and classroom observation. Teachers were selected based on the following criteria: (a) a willingness to continue in the study, (b) a representation of a cross section of content areas, grade levels, and gender, and (c) availability for an interview and classroom observation.

Student participants were selected randomly from the classes of the sample teacher participants. Following the administration and analysis of data collected from the student surveys, student participants were selected to participate in a student interview based on the following criteria: (a) a willingness to continue in the study, (b) an approval to continue in the study from a parent/guardian, (c) a representation of a cross section of grade levels, gender, and ethnicity representative of the school population, and (d) availability for an interview.

The purpose of this participant selection method was (a) to ensure a cross section of content areas in which to determine perspectives of technology integration that enhances multiliteracies across the curriculum, and (b) to select participants across grade levels, gender, and ethnicity that are representative of the school population. Figure 2 illustrates the convenience sampling design of the participant selection.

Figure 2. Convenience Sampling Design



Phase I: Participant selection. Fifty high school teachers from the English language arts, history/social studies, science, and technical/vocational subjects were asked to complete the survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom. From the teachers who completed the survey (n = 25), teacher participants were selected based on the established criteria: (a) the willingness to continue in the study, (b) the content area currently teaching, and (c) the availability for interview and classroom observation. To maximize the strength of the sample, I selected two teacher participants from each of the

following content areas: English language arts, social studies/history, science, and vocational/technical studies. In an attempt to maximize the student sample diversity, I selected one teacher participant from each content area to solicit student volunteers for the study. Student participants from the selected classes were given the opportunity to participate in this dissertation study. To avoid duplication of student participants, if the student was in a selected class more than once per day, the student participant would only be allowed to participate in the study during one class period. Approximately 200 students were approached about participating in this dissertation study resulting in the sample of student participants (n = 92) for Phase I of the study. Student participants were asked to complete the survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom.

Phase II: Participant selection. At the close of the teacher survey, teacher participants were asked if they would be willing to continue participation in this dissertation study through a face-to-face interview and a classroom observation. The face-to-face interview consisted of one 15-20 minute semi-structured interview. The classroom observation consisted of a 20–40 minute observation of technology integration in the classroom that enhances multiliteracies in the classroom.

At the close of the student survey, student participants were asked if they would be willing to continue participation in this dissertation study through a 10-15 minute face-to-face interview. Student participants were selected for face-to-face interviews from the teacher participant classes. Student participant selections were based on: (a) the student's willingness to participate in the study, (b) parent/guardian consent, (c) completion of the survey, and (d) availability for an interview.

A donation to *Relay for Life* was made in honor of all teacher and student participants.

Measuring Instruments

The measuring instruments for this dissertation study consisted of four parts: Likert-type scale items, written responses, face-to-face interviews, and classroom observations. Selected items from the survey instruments were field-tested with pre-service teachers during a summer internship at the University. With minimal modification and clarity, these items were deemed to be appropriate and applicable for this dissertation study.

The Technology Skills, Beliefs, and Barriers Scale, designed by Dr. Thomas Brush of Indiana University, served as the anchor document for the design of my survey instrument. The survey instruments, Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom and Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom, emerged from the models Technology Skills, Beliefs, and Barriers Scale (Rosen, 2010, pp. 193-197), Basic Technology Competencies for Educators Inventory (BTCEI; http://www.tcet.unt.edu/insight/ilib/btcei/info/), Beliefs about Teaching with Technology (BATT) Instrument (http://www.tcet.unt.edu/insight/ilib/batt/), Student Technology Survey - Panhandle Area Educational Consortium (www.paec.org/teacher2teacher/ studentnetssurveyt2t.pdf), and Students and Information Technology in Higher Education, 2010 (EDUCAUSE). Each of these model surveys addressed a basic premise to design a survey that assessed (a) teachers' and students' beliefs in integrating technology in the classroom, (b) teachers' and students' self-perspectives of proficiency skill levels in using technology associated with multiliteracies, and (c) teachers' and students' perceived barriers to integrating technology in the classroom. As seen in Appendix L, the Survey Question Matrix aligned each survey item with a corresponding source.

Survey. The surveys were organized and developed by identifying 21st century literacy skills that demonstrated appropriate use of technology for enhancing multiliteracies in the classroom. To further develop these surveys, the beliefs and barriers to integrating 21st century literacy skills with technology were considered from related literature and survey instruments.

The teacher survey instrument Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom consisted of four demographic items, forty-eight Likert-type scale items that addressed technology beliefs, technology skills associated with multiliteracies, and perceived technology barriers, and four open-ended written response items. Items 5 through 18 addressed the participants' beliefs in using technology in the classroom. The Likert-type scale labels included (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, (5) strongly agree. Items 19 through 42 addressed the participants' self-perspective of technology skill level associated with multiliteracies. The Likert-type scale labels included (1) I cannot do this, (2) I can do this with some assistance, (3) I can do this independently, and (4) I can teach others how to do this. Items 43 through 52 addressed the participants' self-perceived barriers to integrating technology in the classroom. The Likert-type scale labels included (1) is not a barrier, (2) is a minor barrier and (3) is a major barrier. The Likert-type scale was used because (1) this type of scale provided a systematic way to convert qualitative data to quantitative data for a mixed methods research approach, and (2) an attitude scale provided a more accurate response with three, four, and five degrees of perspectives. Items 53 through 56 addressed the participants' perspectives on the role of technology, 21st century skills for college and career, preparation for Common Core State Standards, and suggestions or comments about the integration of technology in the classroom. The survey was administered

using the Qualtrics program through the University, and participants submitted their responses electronically.

The student survey instrument Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom consisted of four demographic items, forty-five Likert-type scale items that addressed technology beliefs, technology skills associated with multiliteracies, and perceived technology barriers, and three open-ended written response items. Items 5 through 17 addressed the participant's beliefs in using technology in the classroom. The Likert-type scale labels included (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, and (5) strongly agree. Items 18 through 41 addressed the participants' self-perspective of technology skill levels associated with multiliteracies. The Likert-type scale labels included (1) I cannot do this, (2) I can do this with some assistance, (3) I can do this independently, and (4) I can teach others how to do this. Items 42 through 49 addressed the participants' self-perceived barriers to integrating technology in the classroom. The Likert-type scale labels included (1) is not a barrier, (2) is a minor barrier, and (3) is a major barrier. Items 50 through 52 addressed participants' perspectives on the role of technology, 21st century skills needed for college and career, and suggestions or comments regarding the integration of technology in the classroom. As stated above, the survey was administered using the Qualtrics program through the University, and participants submitted their responses electronically.

Interviews. Based on participant selection, teachers participated in a 15-20 minute semi-structured interview, and students participated in a 10-15 minute semi-structured interview. The interview process followed the collection and analysis of the survey data. The purpose of the interview sessions was to explore, explain, and clarify the responses obtained from the survey data. For the interview process, I - the researcher - used several prompts to initialize the

conversation as well as to keep the interview focused on the research topic of integration of technology that enhances multiliteracies in the classroom. I exercised discretion and research ethics in exploring subjects that came up in the participants' responses. I only explored additional topics outside of the prompt if it concerned the research topic. Teacher interviews (n = 8) lasted approximately 15-20 minutes and student interviews (*n* = 15) lasted approximately 10-15 minutes. I reserved the right to request additional time for interviewing if it deemed appropriate and profitable.

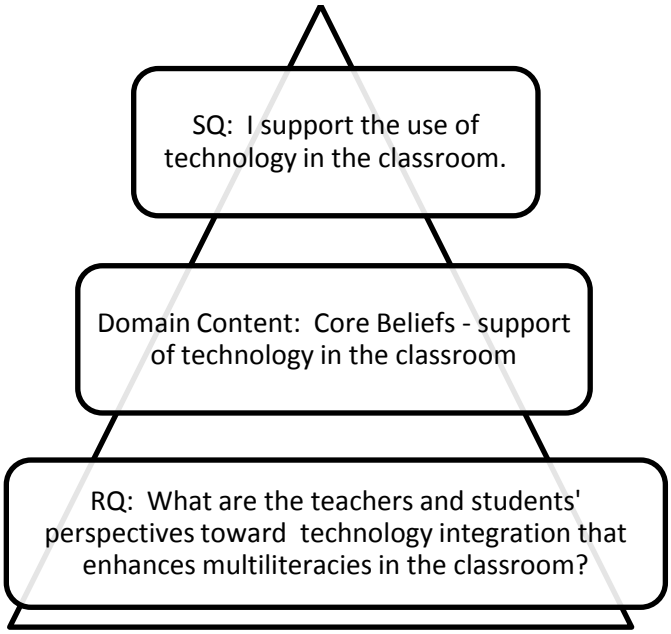
Classroom observations. Classroom observations were conducted following the collection of data from Phase I. Teacher participants selected for an interview consented to the classroom observation. Classroom observations (*n* = 6) of teacher participants consisted of 20-40 minute observations of technology integration in the classroom. A semi-structured observation matrix (Appendix M) and field notes were used to identify specific behaviors and pedagogy integrating technology that enhances multiliteracies in the classroom. Again, the purpose of the classroom observation was to clarify and explain in detail the responses recorded on the survey instrument.

Validity of survey instrument. The primary purpose of this survey instrument was to identify and measure teachers' and students' beliefs in integrating technology in the classroom, self-perceived technology skill levels associated with multiliteracies, and self-perceived barriers to integrating technology in the classroom. The identification of beliefs, skill levels, and barriers guided the researcher in explaining how the integration of technology enhances multiliteracies in the classroom.

Content validity is the extent to which a measurement reflects the specific intended domain of the content. To determine content validity of these surveys, each survey item was anchored to a domain content, which was grounded in a research question.

For example, as seen in Figure 3, the Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom survey item "I support the use of technology in the classroom" was anchored in the domain content of "core beliefs" in using technology in the classroom which was grounded in the research question "what are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom."

Figure 3: Content Validity of Survey Instrument.



Survey items 5-18 of the survey instrument were anchored in the domain Core Beliefs and grounded in the research question "what are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom." The domain contents for core beliefs included content knowledge as a priority, motivational tool, pedagogical instruction, responsibility to teach others, student learning, student needs, support of technology in the

classroom, technology limits interaction, and technology takes time. Survey items 19-42 of the survey instrument were anchored in the domain "skill level" and grounded in the research question "what are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom." The domain contents for these items included critical literacy, cultural literacy, digital literacy, information literacy, multimedia literacy, social literacy, technology literacy, visual literacy. Survey items 43-52 of the survey instrument were anchored in the domain "barriers" and grounded in the research question "what are the teachers' and students' perceived barriers to integrating technology in the classroom." The domain contents for these items included availability, accessibility, and support of equipment and resources, level of knowledge, technology as engagement to learning, and time. As seen in Appendix N, the survey question was aligned with the research question, the domain, and the content.

The survey instrument Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom was designed in the same manner as the Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom. Survey items 5-17 of the survey instrument were anchored in the domain Core Beliefs and grounded in the research question "what are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom." The domain contents for core beliefs included content knowledge as a priority, motivational tool, pedagogical instruction, responsibility to teach others, student learning, student needs, support of technology in the classroom, technology limits interaction, and technology takes time. Survey items 18-41 of the survey instrument were anchored in the domain "skill level" and grounded in the research question "what are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom." The domain contents for these items included critical literacy,

cultural literacy, digital literacy, information literacy, multimedia literacy, social literacy, technology literacy, visual literacy. Survey items 42-49 of the survey instrument were anchored in the domain "barriers" and grounded in the research question "what are the teachers' and students' perceived barriers to integrating technology in the classroom." The domain contents for these items included availability, accessibility, and support of equipment and resources, level of knowledge, technology as engagement to learning, and time.

The primary purpose of this survey instrument was to identify and measure teachers' and students' beliefs in integrating technology in the classroom, self-perceived technology skill levels associated with multiliteracies, and self-perceived barriers to integrating technology in the classroom. The identification of beliefs, skill levels, and barriers guided the researcher in explaining how the integration of technology enhances multiliteracies in the classroom. The instrument, once demonstrated in the present study, may have uses in other venues in the future.

Protocol for Data Collection

A written request to conduct the study was submitted to the building principal and to the school district superintendent. A written request was submitted to the University's Institutional Review Board. Approvals to conduct the study were received in writing before the study commenced. Participation in this dissertation study was voluntary. At each phase of the study, the participants were given the opportunity to participate or to withdraw. A letter of introduction to the study and letters of consent were issued to the teacher participants, student participants, and the parent/guardian of student participants. At the time of the surveys, interviews, and classroom observations, the participants were notified of their choice to participate or withdraw. Participants were assured of their anonymity throughout the study and all subsequent presentations and publications emanating from it. Teachers were assured that the results of the

study would in no way be associated with future employment with the district, and students were assured that the results of the study would in no way be associated with their academic records.

Quantitative data collection. The study was introduced to the participants along with the request for their participation. Protocol for participant participation was discussed: willingness to participate, option to withdraw at any stage of the study, and parent/guardian approval where applicable. Quantitative data were collected using the survey instruments Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom and Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom. These surveys were administered through Qualtrics online survey system provided by the University. All data were stored in password-protected programs only accessible to the researcher. All information collected was kept confidential to the extent allowed by law and University policy.

Qualitative data collection. To further the explanation of the survey responses, selected teacher and student participants participated in semi-structured interviews and open-ended classroom observations.

Interviews. The semi-structured face-to-face interviews were conducted with selected participants. Teacher participant interviews lasted approximately 15-20 minutes, and the student participant interviews lasted approximately 10-15 minutes. Questions for the interviews were designed to clarify, explain, and explore responses from the participant surveys. Interviews were recorded using an audio recording device, and then transcribed into text. All interviews were scheduled in accordance to school policy, during school hours, on campus, and at the convenience of the individual teacher and student.

Classroom observations. Observations were conducted in the classrooms of selected teacher participants. Six classroom observations were conducted to gather data regarding the inclusion of multiliteracies and integration of technology. A semi-structured matrix was developed to guide the classroom observation in clarifying, explaining, and exploring responses from the participant surveys. Teachers' classroom observations were scheduled at the teachers' discretion and availability. Photos of the class environment were taken and observation notes were manually recorded using the Classroom Observation Matrix as a guide.

Protocol for Data Analysis

Data were prepared for analysis through data reduction, data display, and data connection and interpretation as described by Creswell and Plano Clark (2011, pp. 203-248).

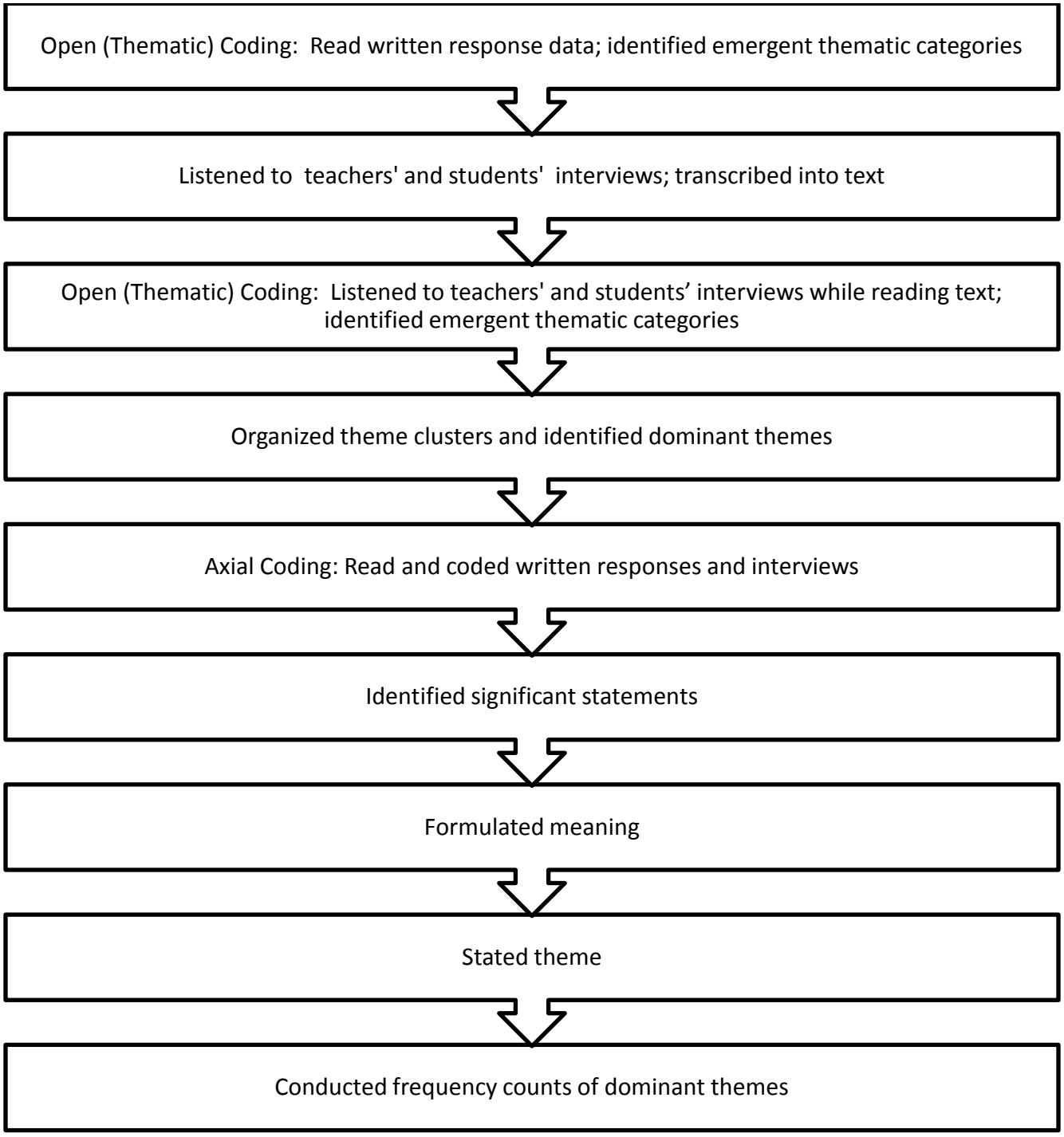
The data were analyzed using SPSS 20 (Statistical Package for Social Sciences; SPSS, Inc., 2012) and the data were both descriptive and comparative. The responses from the teachers' and students' surveys were collected and entered into SPSS 20 and the mean variances of teachers' and students' responses regarding the beliefs, skill levels, and barriers were calculated using the *t*-test. The *t*-test was utilized on this descriptive study to determine significant differences in perspectives of integration of technology by teachers and students. Descriptive statistics were used to describe the quantitative data (mean, *SD*, sample size, categorical percentages) of the participant demographics, percentages of teachers' and students' beliefs in integrations of technology, percentages of teachers' and students' perceived technology skill levels associated with multiliteracies, and percentages of teachers' and students' perceived barriers to technology integration. Tables were developed representing this data. Cronbach's Alpha was calculated to determine internal consistency of the measurement instruments.

Data reduction. The quantitative data were exported from the Qualtrics online survey system and copied to a separate Excel spreadsheet where they were prepared for input into SPSS 20 for descriptive statistics calculations and development of Tables. Based on grounded theory iterative methods of analysis, the qualitative data from the written responses were exported from the Qualtrics online survey system and copied to Microsoft Word for text analysis using inductive open thematic coding, and axial coding (Bergman, 2010, p. 389-390). Using an inductive open thematic coding process, the qualitative data from the written open-responses and interviews were read to identify emergent thematic categories. The data were read again for axial coding for frequency of themes (Figure 4). The frequency of themes in each participant response was counted and calculated as part of the quantitative descriptive statistics.

Data display. Descriptive statistics from the quantitative and qualitative data were organized in Table format representing mean, *SD*, sample size, and categorical percentages. Thematic coding and axial coding were organized in Table format representing theme, significant statements, formulated meaning, frequency, and percentage.

Data connection and interpretation. Data connection occurred with the qualitative collection of data for Phase II building on the quantitative data results from Phase I. The data responses from the teachers' and students' surveys provided categorical and thematic direction for refinement of the semi-structured interview questions and open-ended classroom observations. Analysis and interpretation of the quantitative and qualitative data connection were conducted to address how the qualitative results provided further clarification and explanation of the quantitative survey data results. The quantitative and qualitative data were reviewed in Excel Spreadsheet, SPSS 20, and a Microsoft Word document to explore and develop a fuller, richer description and explanation of the data.

Figure 4. Data Processing of Teachers' and Students' Qualitative Data



Summary

The explanatory sequential mixed methods approach was chosen for this dissertation study utilizing a two-phase research design that began with quantitative data collection and

analysis followed up with qualitative data collection and analysis that lead to an overall interpretation of the data. The study was designed to clarify and explain the results from the quantitative survey instrument. The survey instruments were intended to collect data on teachers' and students' perspectives toward the integration of technology to enhance multiliteracies in the classroom. These instruments measured teachers' and students' basic beliefs toward technology integration, self-perceived technology skill levels associated with multiliteracies, and self-perceived barriers to integrating technology in the classroom. The surveys were followed by selected participants for completion of interviews and classroom observations. Data analysis consisted of data reduction, data display, and data connection and interpretation.

CHAPTER FOUR: RESULTS

Results

This dissertation study focused on the integration of technology to enhance multiliteracies in the classroom. Being literate in the 21st century classroom requires students to be able to do more than just read and write using a traditional textual format. Literacy has taken on an expanded definition to include digital literacy, information literacy, critical literacy, visual literacy, social literacy, cultural literacy, etc.: thus, multiliteracies.

The purpose of this dissertation study was to explain teachers' and students' perspectives toward the integration of technology to enhance multiliteracies in the classroom. The study design consisted of a two-phase explanatory sequential mixed methods approach to research. In Phase I, teacher and student participants completed a survey that consisted of Likert-type scale responses and open-ended written responses. The survey addressed teachers' and students' beliefs regarding the integration of technology, perceived technology skill levels associated with multiliteracies, and perceived barriers to integrating technology that enhances multiliteracies in the classroom. This chapter contains a general analysis of the data using descriptive and inferential statistics to describe and explain teachers' and students' perspectives toward the integration of technology that enhances multiliteracies in the classroom: Phase I data collection and data analysis, and Phase II data collection, data analysis, and interpretation of data.

Reliability of Survey Instrument

The measuring instruments for this dissertation study consisted of four parts: Likert-type scale items and written responses from the survey, face-to-face interviews, and classroom observations. The surveys were organized and developed by identifying 21st century literacy skills that demonstrated appropriate use of technology for enhancing multiliteracies in the

classroom. The teacher survey instrument Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom consisted of five demographic items, forty-eight Likert-type scale items that addressed technology skills associated with multiliteracies, technology beliefs, and perceived technology barriers, and four open-ended written response items. The student survey instrument Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom consisted of five demographic items, forty-five Likert-type scale items that addressed technology beliefs, technology skills associated with multiliteracies, and perceived technology barriers, and three open-ended response items. The Likert-type scale labels for beliefs in the integration of technology included (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, and (5) strongly agree. The Likert-type scale labels for the level of technology skills associated with multiliteracies included (1) I cannot do this, (2) I can do this with some assistance, (3) I can do this independently, and (4) I can teach others how to do this. The Likert-type scale labels for barriers to integrating technology in the classroom included (1) is not a barrier, (2) is a minor barrier, and (3) is a major barrier. A sample of 25 student participant responses and 25 teacher participant responses was used to calculate Cronbach's alpha for the teacher survey items, the student survey items, and the composite teacher and student survey items, as seen in Table 1. The items were clustered in groups: technology beliefs, technology skills associated with multiliteracies, and perceived technology barriers. Cronbach's alpha demonstrated a weak reliability of survey items regarding teachers' and students' beliefs to the integration of technology, a strong reliability of survey items regarding teachers' and students' perspectives toward the skill levels associated with multiliteracies, and an acceptable reliability of survey items regarding teachers' and students'

perspectives toward barriers to integrating technology in the classroom that enhances multiliteracies.

Phase I - Data Collection and Data Analysis

To explain teachers' and students' perspectives toward the integration of technology to enhance multiliteracies in the classroom, this dissertation study addressed the following four research questions:

1. How do teachers and students define literacy and multiliteracies?
2. What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?
3. What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom that enhances multiliteracies in the classroom?
4. What are the teachers' and students' perceived barriers to integrating technology in the classroom?

The responses collected addressing these research questions resulted in the following data. The computer programs Microsoft Word, Microsoft Excel, and SPSS 20 were used to assist in the statistical analysis of the data.

Participant demographics. The population of the selected high school site consisted of approximately 800 students, 60 teachers, 3 counselors, 2 administrators, and multiple administrative staff members. The student sample for this dissertation study consisted of 92 participants: 48% male and 52% female; 25% grade 10, 20% grade 11, and 55% grade 12. The ethnicity of the student sample consisted of 89% Caucasian, 5% Hispanic/Latino, 2% Asian, 2% Native American, and 2% other races not designated.

Fifty high school teachers from the population were asked to complete the survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom. Twenty-eight teachers completed the survey. Three teacher participants were excluded because they did not fit the prescribed categories. Twenty-five teachers representing English language arts, social studies, science, and technical and vocational subjects were selected for the study. The teacher sample for this dissertation study consisted of 25 participants: 24% male and 76% female; 28% English language arts teachers, 20% social studies teachers, 12% science teachers, and 40% technical and/or vocational course teachers. The age ranges of the teacher participants consisted of 36% ages 25-34, 44% ages 35-55, and 20% ages 56 and older. The ethnicity of the teacher sample consisted of 96% white, and 4% Hispanic/Latino.

Quantitative survey data. Teacher and student participants responded to their respective survey items using the Qualtrics online survey system provided by the University. The survey data were collected from the survey responses and analyzed using percentages for each of the questions represented on the teacher and student surveys (Tables 2, 3, 4). The descriptive statistics described the sample size, mean, *SD*, and standard error mean of the participants' beliefs regarding the integration of technology (Table 5), perceived technology skill levels associated with multiliteracies (Table 6), and perceived barriers to integrating technology that enhances multiliteracies in the classroom (Table 7). Comparison of means for each corresponding teachers' and students' responses was calculated using the independent samples *t*-test in SPSS 20 (Tables 8, 9, 10). Cohen's *d* was calculated to establish the strength of relationship between the means.

Of the student participants, 100% reported using technology in their English language arts class; 61% reported using technology in their history/social studies class; 52% reported

using technology in their math class; 48% reported using technology in their science class; 18% reported using technology in their music/art class; 16% reported using technology in their business education class; 7% reported using technology in their PE/health class; 2% reported using technology in their ESL class; 1% reported using technology in their SPED/GT class; and 38% reported using technology in other classes.

Qualitative survey data. Teacher and student participants responded to their respective survey open-ended written response items using the Qualtrics online survey system provided by the University. The survey data were collected from the survey responses and analyzed using open thematic coding, axial coding, and frequency counts. The written responses were read and thematically coded, followed by a second reading and then axial coded for frequency of themes. The frequency of themes in each participant response was counted and calculated as part of the quantitative descriptive statistics.

Data analysis. The first step was to identify key words, phrases, and statements in context, followed by a systematic reduction of data to theme codes. To complete this step, responses were read to identify discrete words, phrases, and statements that specifically addressed the open-ended question. These discrete words, phrases, and statements were clustered to determine unifying themes. This process was performed for each set of responses per open-ended question. The significant statement, formulated meaning, and theme were recorded in Table format (Tables 11, 13, 15, 17, 19, 21, 23). The final step was to read the responses again using an axial coding system to determine the frequency each response mentioned the theme. After the frequency percentage was calculated the information was presented in a Table format (Tables 12, 14, 16, 18, 20, 22, 24).

Response distribution: Participants' beliefs toward the integration of technology. The distribution of percentages of teachers' and students' perspectives toward the integration of technology in the classroom appeared to be primarily in agreement, as reflected in Table 2. Further comparison of the means reflected a significant difference in the means of only one item: teaching teachers and students how to use technology isn't my responsibility. Grouping the percentages demonstrated a stronger impression of the teachers' and students' perspectives: 60% of the teachers disagreed with the statement, where 28% of the students disagreed with the statement; 16% of the teachers agreed with the statement, where 31% of the students agreed with the statement; and 24% of the teachers and 40% of the students neither agreed or disagreed with the statement.

Response distribution: Participants' perspectives of technology skill levels associated with multiliteracies. As seen in Table 3, students' technology skill levels associated with multiliteracies appeared to be more proficient than those of the teachers'. Of the 24 survey items listed in this domain, 12 items reflected similar teachers' and students' perspectives toward technology skill levels associated with multiliteracies, where 12 items reflected a significant difference in the teachers' and students' perspectives toward technology skill levels associated with multiliteracies. Students appeared to be more proficient in the technology skills associated with multimedia and social networking.

Response distribution: Participants' perspectives of barriers to integrating technology that enhances multiliteracies in the classroom. As presented in Table 4, the teachers' and students' perspectives of barriers to integrating technology that enhances multiliteracies in the classroom appeared to be similar; with the exception of one survey item that reflected a significant difference in the comparison of means: the level of knowledge about technology as a

teacher and as a student. Access to the internet while on campus appeared to be the predominant barrier for both teachers and students to integrating technology in the classroom to enhance multiliteracies. Teachers' most dominant barrier to integrating technology in the classroom was the element of time.

Descriptive statistics: Participants' beliefs toward the integration of technology in the classroom. The survey data were analyzed to determine the mean, *SD*, and standard error of the mean. This analysis provided descriptive statistics from the sample participants regarding participants' beliefs toward the integration of technology in the classroom. The Likert-type scale labels for beliefs in the integration of technology included (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, and (5) strongly agree. Analysis was conducted on the fourteen items in the core beliefs domain. The means for the greatest agreement of the statement in this domain reflected the perspectives that teachers (M = 4.48, SD = 0.918) and students (M = 4.76, SD = 0.500) support the use of technology in the classroom. The means for the greatest disagreement of the statement in the domain of core beliefs reflected teachers (M = 2.16, SD = 0.898) and students (M = 2.18, SD = 0.948) perspectives that students have so many other needs that technology is a low priority; thus, technology is a high priority for students according to the teachers' and students' perspectives. The data for the survey items in the core beliefs domain are shown in Table 5.

Descriptive statistics: Participants' perspectives of technology skill levels associated with multiliteracies. The survey data were analyzed to determine the mean, *SD*, and standard error of the mean for teachers' and students' perspectives of technology skill levels associated with multiliteracies in the classroom. The Likert-type scale labels for the level of technology skills associated with multiliteracies included (1) I cannot do this, (2) I can do this with some

assistance, (3) I can do this independently, and (4) I can teach others how to do this. Analysis was conducted on the twenty-four items in this domain. Data indicated that the teachers' strongest level of proficiency was in information literacy skills (M = 2.86), and their weakest level of proficiency was in multimedia skills (M = 2.24). Data indicated that the students' strongest level of proficiency was in social literacy skills (M = 3.43), and their weakest level of proficiency was in digital literacy (M = 2.41). The complete data set for the skill level and literacy domain is presented in Table 6.

Descriptive statistics: Participants' perspectives of barriers to integrating technology that enhances multiliteracies in the classroom. The survey data were analyzed to determine the mean, *SD*, and standard error of the mean for the perspectives of barriers to integrating technology that enhances multiliteracies in the classroom. The Likert-type scale labels for barriers to integrating technology in the classroom included (1) is not a barrier, (2) is a minor barrier, and (3) is a major barrier. The teachers' (M = 1.72, SD = 0.737) and students' (M = 1.40, SD = 0.594) level of knowledge about technology appeared to not be a barrier to integrating technology in the classroom; however, there is a significant difference in the comparison of the means. Teachers' most perceived barrier to the integration of technology in the classroom was the element of time (M = 2.36, SD = 0.757). Students' most perceived barrier to the integration of technology in the classroom was the access to the internet (M = 2.39, SD = 0.741). Table 7 shows the complete data set for the barriers domain.

Comparison of means: Participants' beliefs toward the integration of technology. The survey data were analyzed for comparison of means between the teachers' and students' perspectives toward the integration of technology. Thirteen survey items were compared revealing there was a significant difference in the means of one survey item: teaching teachers

and students how to use technology isn't my responsibility (M = 2.32, SD = 1.145; M = 3.03, SD = 0.895), t(-2.883), p = .007, two-tailed, d = -0.691. The remaining comparisons of means for participants' beliefs toward the integration of technology are seen in Table 8.

Comparison of means: Participants' perspectives of technology skill levels associated with multiliteracies. The survey data were analyzed for comparison of means between the teachers' and students' perspectives of technology skill levels associated with multiliteracies. Twenty-four survey items were compared revealing significant differences in the means of nine survey items:

1. DSK – Social literacy: communicating with others using technology (M = 2.96, SD = 1.136; M = 3.79, SD = 0.525), t(-3.567), p = .001, two-tailed, d = -0.938
2. ESK – Social literacy: using social networking websites and social bookmarking (M = 2.88, SD = 1.166; M = 3.63, SD = 0.606), t(-3.105), p = .004, two-tailed, d = -0.807
3. KSK – Multimedia: using audio-creation software (M = 1.96, SD = 1.172; M = 2.48, SD = 1.011), t(-2.196), p = .030, two-tailed, d = -0.475
4. LSK – Multimedia: using video-creation software and creating videos to video-sharing websites (M = 2.52, SD = 1.085; M = 3.02, SD = 0.864), t(-2.136), p = .040, two-tailed, d = -0.510
5. NSK – Social literacy: using online multi-user computer games (M = 2.28, SD = 1.061; M = 3.03, SD = 0.943), t(-3.444), p = .001, two-tailed, d = -0.747
6. PSK – Social literacy: using voice over internet protocol (VoIP) from the computer (M = 2.36, SD = 1.114; M = 3.01, SD = 0.920), t(-2.995), p = .003, two-tailed, d = -0.636

7. QSK – Multimedia: using podcasts, webinars, video streaming (M = 2.08, SD = 0.997; M = 2.52, SD = 0.978), t(-1.995), p = .048, two-tailed, d = -0.446
8. RSK – Visual literacy: using photo-sharing websites (M = 2.20, SD = 1.225; M = 2.79, SD = 1.064), t(-2.393), p = .018, two-tailed, d = -0.514
9. SSK – Information literacy/Social literacy: creating wikis (M = 1.96, SD = 0.978; M = 3.36, SD = 0.750), t(-7.724), p = .000 two-tailed, d = -.1.606

The comparisons of means for participants' perceived technology skill levels associated with multiliteracies are shown in Table 9.

Comparison of means: Participants' perspectives of barriers to integrating technology that enhances multiliteracies in the classroom. The survey data were analyzed for comparison of means between the teachers' and students' perspectives of barriers to integrating technology that enhances multiliteracies in the classroom. Eight survey items were compared revealing significant differences in the means of only one survey item: my level of knowledge about technology as a teacher (M = 1.72, SD = 0.737) and my level of knowledge about technology as a student (M = 1.40, SD = 0.594), t(2.249), p = .026, two-tailed, d = 0.479. The comparisons of means are shown in Table 10.

Thematic coding, axial coding, and frequency counts. The initial data analysis included thematic coding, axial coding, and frequency counts of the teachers' and students' written responses collected from the survey.

Thematic coding and axial coding: Teachers' responses to "What is the role of technology in the classroom?" Teacher participants regarded the role of technology as either a tool (95%) or a barrier (5%) in the classroom. Those who considered the role of technology as a tool in the classroom categorized its purpose in the classroom as following: administrative,

assessment, attention, college/career readiness, cognitive, cultural, informational, instructional, and social. The primary use of technology in the classroom was to support student learning (cognitive, 34%). Followed by the use of technology to gain and maintain the students' attention (16%). Technology was used to perform administrative tasks (13%) by the teachers and students. Responses claiming that technology was essential in the classroom and that it was a way of life for the students were followed with repeated responses that failure to recognize and utilize various technologies in the classroom would not adequately prepare the students for college and careers (13%). Significant statements, formulated meanings, and themes, as seen in Table 11, represent the primary responses from the teachers' written responses, and Table 12 presents the axial coding of theme, frequency, and percentage of the primary responses from the teachers' written responses.

Thematic coding and axial coding: Teachers' responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?"

Teachers overwhelmingly responded technology literacy (25%) as the most frequent response. Technology literacy included basic computer operations and familiarity of the dominant software programs. Technology literacy was closely followed by traditional literacy (18%) and social literacy (18%). Students must possess proficient skills in reading and writing, and effective communication skills – not only in text, but face-to-face. The teachers identified critical literacy (15%) as an important skill for the 21st century. Critical literacy included analytical skills, ability to evaluate and problem solve. Information literacy (13%) was also identified as a necessary skill for students to be able to research and evaluate for reliable sources of information. Teachers' data responses for "What new literacy skills must be learned by any 21st century

student in order to prepare for college and career?" are presented by thematic code in Table 13 and axial code in Table 14.

Thematic coding and axial coding: Teachers' responses to "What are the steps you as a teacher need to take to prepare yourself for the literacy (multiliteracies) expectations of the Common Core State Standards?" The teachers identified three dominant themes for this prompt: preparation (49%), knowledge of CCSS (34%), and implementation (17%). It was apparent that many teachers lacked the understanding to implement fully the literacy expectations of CCSS. Teachers identified personal needs to prepare themselves for the implementation of the literacy expectations of CCSS. Teachers who were more familiar with CCSS identified changes they are making in their pedagogical approach to student learning in the classroom that will address the literacy expectations of CCSS. Teachers' data responses are organized by thematic code in Table 15 and axial code in Table 16.

Thematic coding and axial coding: Teachers' suggestions or comments about the integration of technology. The final teacher written response prompt was "What suggestions or comments would you, as a teacher, make about (a) integration of technology that promotes multiple forms of literacy in the classroom, (b) integration of technology that supports learning and the assessment of learning, and/or (c) integration of technology that enhances teacher instruction and student learning?" There were conflicted opinions regarding the integration of technology that enhances multiliteracies, learning and assessment of learning, and teacher instruction and student learning. The dominant response to this prompt was emotionally charged with excitement, anxiety, uncertainty, apprehension, and fear of failure (42%). The integration of technology in the classroom created a plethora of emotional responses by teachers who were not comfortable and proficient with the integration of technology. The integration of technology

to enhance multiliteracies in the classroom stimulated anxiety toward the unknown. The integration of technology to enhance multiliteracies (17%) in the classroom generated conflicting opinions by teachers; some teachers embraced the diversity of the multiliteracies, while others did not. Teachers' response data are organized by thematic code in Table 17 and axial code in Table 18.

Thematic coding and axial coding: Students' responses to "What is the role of technology in the classroom?" Student participants identified the primary role of technology in the classroom as that of a tool to be used to accomplish and/or enhance other tasks performed in the classroom. Student participants identified the two primary uses of technology in the classroom: to gather information (28%) sources from the internet and other electronic sources, and to enhance or assist in their cognitive learning processes (26%). A significant number of students identified the internet as a source to promote their research conducted in the classroom, and to help them in developing deeper understanding of a particular topic being discussed in the classroom. Student participants also identified the role of technology to enhance traditional literacy (reading and writing) skills (9%) and the enhancement and development of multiliteracies (19%) through the use of technology. Student participants reported an increase in online reading of digital texts and writing of essays. The students also identified technology in the classroom to help with administrative tasks (11%) for themselves and their teachers and to help with instructional strategies for teachers. Student participants reported the use of the school administrative system Edline by teachers and students for submitting, tracking, and grading assignments; verifying and updating grades; and reviewing and posting to the calendar for daily events and assignments. Students' data responses are presented by thematic code in Table 19 and axial code in Table 20.

Thematic coding and axial coding: Students' responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career? The primary response from the students was literacy (20%). Students responded that students must maintain proficient reading and writing skills. They were quick to follow up with technology literacy of basic skills and equipment (18%) and technology literacy of software programs (15%). The students' data responses are organized by thematic code in Table 21 and axial code in Table 22.

Thematic coding and axial coding: Students' suggestions or comments about the integration of technology in the classroom. The final student written response prompt was "What suggestions would you make about integrating technology that promotes multiple forms of literacy in the classroom? (a) How can the integration of technology support learning and the assessment of learning? (b) How can technology be used to enhance teacher instruction and student learning?" Students seemed to be interested in enhanced cognitive abilities supported or promoted with the integration of technology (20%), integration of technology in instruction (15%), and the potential for technology to gain and maintain the students' attention (12%). Additional themes are presented by thematic code in Table 23 and axial code in Table 24.

Phase II - Data Collection and Data Analysis

Teachers' interviews. Based on participant selection, 8 teachers participated in a 15-20 minute semi-structured interview. The interview process followed the collection and analysis of the survey data. The purpose of the interview sessions was to explore, explain, and clarify the responses obtained from the survey data. Teachers' interviews were focused on (a) technology to enhance multiliteracies in the classroom, (b) other uses of technology in the classroom, (c) barriers to integration of technology in the classroom, and (d) the definition of literacy and

multiliteracies. For the interview process, I - the researcher - used several prompts to initialize the conversation, as well as, to keep the interview focused on the research topic of integration of technology to enhance multiliteracies in the classroom. I exercised discretion and research ethics in exploring subjects that came up in the participants' responses. I only explored additional topics outside of the prompt if it concerned the research topic.

Students' interviews. Based on participant selection, 15 students participated in a 10-15 minute semi-structured interview. The interview process followed the collection and analysis of the survey data. The purpose of the interview sessions was to explore, explain, and clarify the responses obtained from the survey data. Students' interviews focused on (a) uses of technology in the classroom, (b) barriers to integration of technology in the classroom, and (c) the definition of literacy and multiliteracies. For the interview process, I - the researcher - used several prompts to initialize the conversation as well as to keep the interview focused on the research topic of multiliteracies in the classroom and the integration of technology. I exercised discretion and research ethics in exploring subjects that came up in the participants' responses. I only explored additional topics outside of the prompt if it concerned the research topic.

Classroom observations. Six observations were conducted in the classrooms of selected teacher participants to gather data regarding the inclusion of multiliteracies and integration of technology in the classroom. A semi-structured matrix was developed to guide the classroom observation in clarifying, explaining, and exploring responses from the participants' surveys and interviews. Teachers' classroom observations were scheduled at the teachers' discretion and availability. Photos of the class environment were taken and observation notes were manually recorded. Using the Classroom Observation Matrix as a guide, following are the narratives of the classroom observation data collected.

Textual literacy. Textual literacy included the written language (print and digital). Evidence of textual literacy was recorded in all the classroom observations: textbooks, reading books, posters, various student handouts, laptops, e-readers, and iPhones. The primary source of textual literacy was the printed text.

Digital literacy. Digital literacy included the ability to locate, organize, understand, evaluate, and analyze information using digital technology, as well as, how to find, use, summarize, evaluate, create, and communicate information while using digital technologies. Evidence of digital literacy was recorded in several classes: social studies, vocational, and science. Students of the social studies class were searching the internet and reading about various works of art. Students of the vocational class were searching the internet and reading various recipes in preparation of meal planning. Students of the science class were searching and reading about various animals to complete an animal kingdom portfolio.

Visual literacy. Visual literacy included the ability to decode, interpret, and communicate using a combination of traditional print and digital imagery, graphics, charts, and videos; the ability to interpret, negotiate and make meaning from information presented in the form of an image: photos, drawings, computer generated images, television, websites, videos, logos, symbols, charts, fine art, graphic organizers, musical notations, manuscripts, maps, and graphs. Evidence of visual literacy was recorded in all classes. The primary examples of visual literacy were the various posters displayed in the classrooms. The vocational classroom displayed inspirational and informational posters. The science classroom displayed environmental and informational posters. The English language arts classroom displayed literary, informational, and student created posters. The social studies classroom displayed geographical, government, history, and inspirational posters. In additional to the posters in the

social studies classroom, various cultural artifacts were displayed in the classroom. Visual literacy enhanced by technology was demonstrated in a social studies classroom when the students were viewing various works of art on the internet for selection to complete a project. Another example of visual literacy enhanced by technology was in a social studies classroom, the teacher used a graphic organizer to communicate information on Native American tribes and cultures. The students completed the graphic organizer during the teacher's lecture and viewed the responses on the screen as projected from the document camera.

Critical literacy. Critical literacy included the text used to question the social construction of self; critical perspectives toward text; analysis of texts; and the ability to read texts in an active, reflective manner in order to better understand power, inequality, and injustice in human relationships. Evidence of critical literacy was recorded in a social studies classroom and an English language classroom. In the social studies classroom, the students were viewing the film *Ghandi* and discussing the cost of freedom. The teacher emphasized the sacrifices made for freedom using the example of Ghandi with his stand for equal rights and freedom. The teacher helped the students make the connection to a real-life situation in Arizona regarding racial profiling: "Everyone who "looked" Mexican needed to carry "proof" of citizenship." The teacher concluded the discussion by helping the students realize Ghandi demonstrated an openness to diversity and a respect for others race and religion.

In the English language arts classroom, the students were assigned the task to write a letter to William Wordsworth responding to his poem "The world is too much with us." The students' task was to respond to the ideas presented in the poem with supporting evidence from the text. The letter was to explain how Wordsworth's concerns were relevant to current times in society and how the student responded to those issues. Due to the absence of the laptops in the

classroom, students were encouraged to use traditional literacy practices: pencil/pen, paper, text, dictionary/thesaurus. A few students were frustrated by the lack of access to technology to complete the task; however, the students did manage to complete the task as assigned using the traditional methods of literacy.

Cultural literacy. Cultural literacy included the knowledge of history, contributions, and perspectives of different cultural groups including one's own group, necessary for the understanding of reading, writing, and other media. Cultural literacy also included the ability to converse fluently in the idioms, allusions and informal content that created and constituted a culture. Evidence of cultural literacy was recorded in a social studies classroom. A student demonstrated the Native American flute and discussed the history and cultural aspects of this flute. The student played an original piece of music on the flute and recited an original poem inspired by the music of the flute. The student also shared an original CD recording that she had created using technology to overlay audio tracks of the flute music, recitation of an original poem, and natural sounds of a bubbling brook, birds, and fire in a fireplace. The teacher followed this demonstration with additional information presented in a graphic organizer of the Native American tribes: geographic group, tribes, transportation, economy, animals, dwellings, food, climate, ancestors, government, lifestyle, duties, art, storage, religion, relations, communication, and special terms. This information was projected onto the screen that provided a visual organization for the discussion.

Social literacy. Social literacy included the ability for an individual to successfully and deliberately mediate his/her world of family members, workers, and citizens that contributed to one's life-long learning; a person's ability to interact, maintain and build relationships with other people, and to work collaboratively; and the ability to use technology to communicate via social

networks. Evidence of social literacy was limited in the classrooms. In an English language arts classroom, the students' desks were arranged in groups of three to four students per group to facilitate collaboration. In a vocational classroom, students were interacting regarding their assigned project; however, they were not arranged to facilitate a collaborative work assignment. When teachers were asked about collaborative work opportunities, several teachers responded they did not use group or collaborative opportunities frequently because (a) too much time was wasted in friendly chit-chat, and (b) the teacher could not effectively assess a grade to each individual student. When students were asked about social networking sites at school, students responded they did not use and were not allowed to use social networking sites at school. Further examination of the school's Edline (Learning Content Management System) found that collaboration, discussion, and blog tools are available on Edline specifically designed for student collaboration opportunities that would be monitored by the teacher.

Information literacy. Information literacy included the competency to find, evaluate, and use off-line and online information appropriately within legal, ethical, and social guidelines; and the ability to locate, organize, understand, evaluate, analyze information and communicate information effectively. Evidence of information literacy was recorded in a social studies classroom and a vocational classroom. The primary source for information literacy was the internet. Students of the social studies class were searching the internet for works of art in which the students were required to document the name of the work of art, the artist, the cost, and the websites in which they located this information. In the vocational classroom, the students were working on individual projects "All About Me" in which they included personal photos, texts, and music. The students were instructed to include a bibliography slide at the end of the presentation that cited any sources used that were not their personal work.

Multimedia. Multimedia included the ability to interpret, understand, design, and create content that uses traditional and digital images, photographs, video, animation, music, sound, texts, and typography; and the use of computers to present and create text, graphics, video, animation, interactivity, and sound in an integrated way. Evidence of multimedia was recorded in several classrooms. In the social studies classroom, the teacher used the film *Ghandi* to discuss cultural and historical issues. In the vocational classroom, students were working on a multimedia project "All About Me" which included images, sound, and transitions. When asked, other teachers provided evidence of several PowerPoint presentations that were used throughout the school year in their classrooms. Teachers also provided evidence of video clips and audio tracks that were used in the classrooms during the school year. The primary source of multimedia in the classroom appeared to be PowerPoint presentations created by the teachers to introduce information in a textual, visual format, or PowerPoint presentations created by the students as a project.

Multimodal. Multimodal included audio, visual, and verbal literacy; the ability to decode and engage with multiple modes of literacy: linguistic, gestural, spatial, visual, audio forms of communication; and having more than one mode, modality, or maxima functioning simultaneously. Evidence of multimodal activity was recorded in a vocational classroom. Soft music played in the background as students worked on assignments. In another vocational classroom, students listened to personal iPods while working on projects. When asked, other teachers stated they allow their student to listen to iPods while working on assignments and projects; while other teachers stated they did not allow students to listen to iPods in their classrooms.

Data analysis. The interview data were collected from the interview responses and analyzed using thematic coding, axial coding, and frequency counts. The interview responses were transcribed and thematically coded, followed by a second review of the audio and transcripts, then axial coded for frequency of themes. The frequency of themes in each participant response was counted and calculated as part of the quantitative descriptive statistics.

The first step was to identify key words, phrases, and statements in context in the teachers' and students' interviews, followed by a systematic reduction of data to theme codes. These discrete words, phrases, and statements were clustered to determine unifying themes. This process was performed for each teacher and student interview. The significant statement, formulated meaning, and theme were recorded in Table format (Tables 25 and 27). The second step was to listen to and read the interview responses again using an axial coding system to determine the frequency each response mentioned the theme. After the frequency percentage was calculated the information was presented in a Table format (Tables 26 and 28).

Thematic coding, axial coding, and frequency counts. Following the analysis of the survey data, Phase II began with teachers' and students' interviews. The data were recorded using an audio recorder and later transcribed into text. The text was read and coded using thematic coding, axial coding, and frequency counts. Following are the data represented in Table format.

Thematic coding and axial coding: Teachers' interviews – technology to enhance multiliteracies in the classroom. Through the course of the teachers' interviews, there was sufficient evidence to support that technology to enhance multiliteracies in the classroom was present. While the use of multimedia was overwhelmingly discussed and presented through the use of audio, video, and PowerPoints, it was not included in Table 25 because its dominance

would negatively skew the presence of the other multiliteracies presented in the interviews. Other dominant literacies discussed and supported with evidence included critical literacy (40%), cultural literacy (20%), digital literacy (15%), information literacy (16%), and visual literacy (9%). Other literacies were mentioned in the interviews but were not substantially supported with evidence and frequency. Teachers' data responses are presented by thematic code in Table 25 and axial code in Table 26.

Thematic coding and axial coding: Teachers' interviews – other uses of technology. Technology was used in the classrooms for other purposes than to enhance multiliteracies: administrative tasks, assessment, CCR, to facilitate classroom instruction, and to gain and maintain the students' attention. The dominant use was for administrative tasks (28%). Some of the administrative tasks included typing papers, updating grades, attendance, and submitting assignments online. Other uses of technology are presented by thematic code in Table 27 and axial code in Table 28.

Thematic coding and axial coding: Teachers' interviews – barriers to integrating technology to enhance multiliteracies. In the teacher interviews, teachers repeatedly stated that time (45%) served as a barrier to integrating technology to enhance multiliteracies in the classroom. The teachers discussed the time needed for training, practice, curriculum development and integration of technology. Barriers to the integration of technology in the classroom are presented by thematic code in Table 29 and axial code in Table 30.

Teachers' interviews: Definition of literacy and multiliteracies. When asked, teachers defined literacy as:

- the ability to read and write, and to apply the literacies to real-life situations;

- the ability to communicate one's thoughts and opinions clearly and to be able to understand other people's thoughts and opinions – not limited to just writing and reading;
- the ability to comprehend and understand the material presented and even the student giving back that information to make sure he/she understands; an exchange of information, concepts, and ideas; and
- the ability to express thoughts in an educated and meaningful way so that someone else can understand his/her point of view or what he/she is thinking; not just oral or written, but technology, tone of voice, and body language.

Teachers defined literacy as an ability to read, to write, to communicate, and to comprehend. Teachers have integrated more than just the reading and writing into literacy; they have integrated multiliteracies into literacy. Teachers defined multiliteracies as:

- the ability to read or comprehend materials across a wide spectrum, not just the written word, but articles, newspapers, advertisements, cartoons;
- to comprehend things globally in multi-platforms;
- the understanding of literacy – images, pictures, text;
- the use of books, paper, pencils, cell phones, computers - the incorporation of technology into literacy and communication across the globe; and
- the understanding across the board – that which is heard, seen, felt, touched, embraced, discussed.

According to the teachers' definition of literacy and multiliteracies, literacy has merged with multiliteracies; thus, the integration of technology in the classroom has modified the definition of literacy in the classroom.

Thematic coding and axial coding: Students' interviews - uses of technology in the classroom. Through the student interviews, students stated that technology enhanced multiliteracies in the classroom. The dominant use of technology in the classroom was for multimedia (38%) presentations and projects, typically PowerPoint. Students also stated that technology allowed easy access to information (26%) to complete research assignments. Multiliteracies enhanced by technology are presented by thematic code in Table 31 and axial code in Table 32.

Thematic coding and axial coding: Students' interviews - barriers to integrating technology to enhance multiliteracies in the classroom. In the students' interviews, the school filter (32%) and the limited types of technology (23%) were identified as primary barriers to integrating technology to enhance multiliteracies in the classroom. Students further identified abuses to equipment, equipment failures, and diverse skill levels as barriers. Students' responses are presented by thematic code in Table 33 and axial code in Table 34.

***Students' interviews: Definition of literacy and multiliteracies*.** When asked, students defined literacy as:

- reading and writing;
- study of sentence structure, grammar, reading, and writing;
- anything written or on the Internet; and
- the ability to read anything with words and pictures.

Students overwhelmingly voiced the traditional definition of literacy: reading and writing. When asked to define multiliteracies, the students repeatedly voiced a connection of reading and writing with technology and media. Students defined multiliteracies as:

- any literacy that is not conventional – music literacy, computer literacy, visual literacy;
- different forms of communication with the computer; and
- reading text messages, emails, and anything on the Internet.

One of the students used the Target Stores, Inc. sign as an example of multiliteracies – visual and textual. His reasoning was that there was more than one mode of communication – the picture and the words, so it must be "multiple literacies."

Summary

This chapter presented the results of the data analysis for Phase I and Phase II (quantitative and qualitative data). Initially the data were analyzed for mean values and standard deviations in the teachers' and students' perspectives toward the integration of technology, perceived technology skill levels associated with multiliteracies, and perceived barriers to the integration of technology that enhances multiliteracies in the classroom. This initial data analysis included thematic coding, axial coding, and frequency counts of the teachers' and students' written responses collected from the survey. Following the analysis of Phase I, refinement of teachers' and students' interview questions was conducted in order to further explain and explore the responses from the survey in Phase II. Teachers' and students' interviews were conducted and the data were transcribed into text, read, and coded using thematic coding, axial coding, and frequency counts. The data collected from the classroom observations provided supplemental narrative to enhance the data collected from the surveys and interviews.

CHAPTER FIVE: CONCLUSIONS TO MULTILITERACIES IN THE CLASSROOM ENHANCED BY TECHNOLOGY

Discussion

For hundreds of years the definition of what it meant to be literate has not changed: if one could read and write paper-based text, one was considered literate (Tracey, Storer, & Kazerounian, 2010, p. 108). Staying literate in the 21st century means one must master new and ever-changing technologies in order to maintain that status. Technology continues to become more ubiquitous in our daily lives while radically transforming the definition of literacy. Literacy is a rapidly changing phenomenon that is more than just reading and writing; it involves multiliteracies of the 21st century—audio, video, critical, cultural, information, social, visual, etc.

As the literature review chapter of this dissertation study indicated, technology integration to enhance multiliteracies in the classroom carries measurable baggage. Teachers and students involved in this study concurred with literature and supported this study with complementary data on beliefs, barriers, and skill levels associated with technology integration that enhances multiliteracies in the classroom.

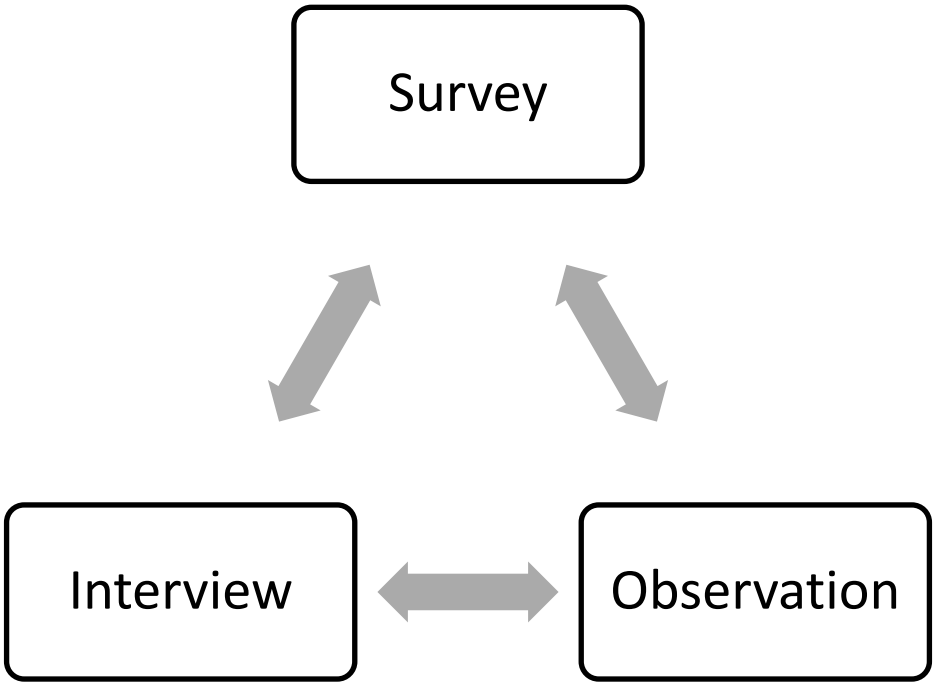
This chapter offers responses to the research questions of this dissertation study, conclusions, limitations, implications for practice, and future considerations for research.

Summary of the Study

The purpose of this dissertation study was to describe and explain the teachers' and students' perspectives of technology integration that enhances multiliteracies in the classroom. An explanatory sequential mixed methods research design was used that involved the collection of quantitative data first, followed by the collection of qualitative data. A triangulation

(Mathison, 1988) of the survey instruments, face-to-face interviews, and classroom observations served to validate the data collection method (Figure 5).

Figure 5. Triangulation of Method



This study examined teachers' and students' (a) beliefs toward the integration of technology in the classroom that enhances multiliteracies, (b) technology skill levels associated with multiliteracies, (c) perceived barriers toward the integration of technology in the classroom, and (d) definition of literacy and multiliteracies. The study was limited to one high school site in the southern United States. Participants in this study included 25 teachers and 92 students. The high school employed teachers and enrolled students during the school year the study was completed.

A teachers' survey and a students' survey were developed to gather quantitative data. The survey items addressed the technology skill levels associated with multiliteracies, and beliefs and perceived barriers to the integration of technology. The written response items of the

survey addressed the role of technology, the definition of literacy and multiliteracies, and other comments or suggestions made by the teachers and students.

Face-to-face interviews with teachers and students were conducted to clarify and explain the responses from the survey instruments. Follow-up classroom observations were conducted to further enhance and validate the data collected from the surveys and interviews.

Research Questions

To conclude this dissertation study a review of the research questions follows:

1. How do teachers and students define literacy and multiliteracies?
2. What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?
3. What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom that enhances multiliteracies in the classroom?
4. What are the teachers' and students' perceived barriers to integrating technology in the classroom?

How do teachers and students define literacy and multiliteracies?

Literacy is a radically changing phenomenon. The concept of multiliteracies was penned by the New London Group sixteen years prior to this dissertation study; and although the teachers and students of this dissertation study were not familiar with the term multiliteracies, they defined multiliteracies with similar concepts as the New London Group—multiple communication channels and media (Cazden et al., 1996, p. 63). The rapidly changing phenomenon of literacy is creating a paradigm shift from traditional literacy to 21st century multiliteracies that include communication technologies and multimedia texts.

The definition of literacy starts with the traditional foundations of reading and writing and culminates with multiliteracies. 21st century literacy incorporates "a range of information

and communications media using digital technologies" (Cope & Kalantzis, 2010, p. 87). According to the teachers' and students' responses, literacy is the ability to communicate a message or information in a platform comprehensible to the receiver. Literacy is communicated in print and digital text—using audio, video, visual, cultural, social, information, and other cues. Literacy, at times, uses multimodal methods to communicate a message or information to the receiver. Whether literacy is mono-modal or multimodal, print or digital, literacy integrates the multiple contents, facets, and modes of literacy to communicate a message or information, thus creating multiliteracies.

What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?

What is the role of technology in the classroom? From the survey written responses, teachers indicated that the role of technology was to serve as a tool. The primary uses of technology were to support cognitive development of the students, to obtain and maintain the attention of the students, to facilitate administrative tasks, and to facilitate and promote students' college and career readiness.

Teachers elaborated during the interviews on the role of technology in the classroom used as a tool. The primary function of technology in the classroom was to support cognitive learning experiences. According to the teachers' responses, technology allows teachers to address the diverse learning styles and interests of the students and to facilitate those learning experiences.

Another function of technology discussed by the teachers was the use of technology to gain and maintain the students' attention. Attention literacy was an emerging literacy—one that was encountered twice in my literature review. Teachers shared that technology has an incredible power to engage a disinterested student and immerse him/her in learning with

technology. Teachers supported their comments with evidence of students engaging in reading text online, researching for Webquests, and creating multimedia projects.

From the survey written responses, students indicated that the role of technology was to serve as a tool with two primary uses: (1) to gather information from the Internet and other electronic sources, and (2) to enhance or assist in the students' cognitive learning processes.

In the students' interviews, students elaborated on the role of technology to facilitate and enhance cognitive learning experiences. Students repeatedly claimed that technology made it easier to learn. Students expressed the benefits of using technology to learn were that students could (a) experience different points of view from their teachers' to construct their own knowledge and points of view, and (b) experience learning in ways not possible in the classroom—virtual labs, virtual tours, and virtual worlds.

Teachers' and students' perspectives. Teachers and students indicated agreement in the following perspectives toward technology integration that enhances multiliteracies in the classroom:

- teachers (92%) and students (99%) supported the use of technology in the classroom,
- teachers (88%) and students (91%) agreed that a variety of technologies were important for student learning,
- teachers (84%) and students (95%) agreed that incorporating technology into instruction helped students learn,
- teachers (100%) and students (92%) agreed that technology helps teachers and students do things in class that they could not do without technology,
- teachers (92%) and students (86%) agreed that knowledge about technology improves teacher instruction, and

- teachers (92%) and students (91%) agreed that technology facilitates instructional strategies.

Data from the survey indicated a strong support of technology in the classroom by teachers and students. In the interviews, teachers and students both acknowledged the necessity of technology integration in the classroom. Teachers and students both indicated that technology was a part of the 21st century culture—that it is a way of life in every aspect of school, work, and recreation.

While the following items indicated a lesser degree of agreement between the teachers' and the students' perspectives, there was no significant statistical difference between the teachers' and students' perspectives. These items would benefit from further review:

- teachers (64%) and students (50%) agreed that content knowledge should take priority over learning technology skills,
- teachers (60%) and students (79%) agreed that motivation to teach and motivation to learn increased with technology, and
- teachers (88%) and students (61%) agreed that technology supports real-life meaning in the classroom.

There was a slight but not statistically significant difference, (M = 2.28, SD = 0.737; M = 2.63, SD = 1.035), t(-1.585), p = .116, two-tailed, d = -0.390), in the teachers' and students' perspectives toward technology that limits social/face-to-face interactions between teachers and students. Sixty-four percent of the teachers and 54% of the students disagreed with the statement that technology limits social interaction; 32% of the teachers and 29% of the students neither agreed nor disagreed, and 4% of the teachers and 18% of the students agreed with the statement. The conclusion was that teachers and students disagreed with this statement; therefore, teachers'

and students' perspectives reflected that technology did not limit the social/face-to-face interactions between teachers and students.

There were differing opinions among the teachers interviewed regarding the use of technology that limits social/face-to-face interactions. Some teachers indicated that technology seriously detracted from the face-to-face interaction among individuals as seen with texting and other social networks. One teacher stated:

> I think that I see the students becoming less and less able to communicate with each other because they text all the time. Rather than talk to someone setting right next to them they will send them a text message. (Teacher interview)

Other teachers did not view technology as limiting face-to-face interaction. Teachers viewed technology as an additional means in which the students communicated with teachers—email—and teachers communicated with students—EdLine.

Of the fourteen items listed in the beliefs section of the surveys, one item indicated a statistical significant difference in perspectives between the teachers and students. Teachers (60%) and students (28%) agreed that teaching teachers and students how to use technology isn't their (teachers' or students') responsibility. I attribute the disparity in responses to the teachers' perspectives toward professional learning communities and a natural instinct for teachers to want to teach regardless of the content. Twenty-four percent of the teachers neither agreed nor disagreed, while 16% of the teachers agreed with the statement. Teachers' interviews indicated that teachers felt they did not have time to teach computer skills in the content classes. Teachers expressed a need for students to enroll in computer classes to learn basic computer skills. Forty percent of the students neither agreed nor disagreed with the statement, while 31% of the students agreed with the statement. Students indicated that it was easier to do the assignment by

himself/herself than to teach someone else how to use the technology, or it was easier to work with someone that already knew how to use the technology. Students expressed a concern that there was not enough time in class to learn computer skills and get the assignment done. Several students also indicated that they did not know enough to teach others.

One item applied to teachers only: 36% of the teachers agreed, 48% disagreed, and 16% neither agreed nor disagreed with the statement that technology took time to incorporate into the curriculum, time that may be used to develop other instructional strategies. Conflicting responses from the teachers were given on this item. This item would benefit from further review because teachers indicated time as a significant barrier to technology integration.

There was sufficient evidence in the teachers' and students' interviews to support that technology to enhance multiliteracies in the classroom was present. The use of multimedia—audio, video, PowerPoint presentations—was by far the dominant mode used to enhance multiliteracies in the classroom. The PowerPoint presentations were used to communicate information to the students, or they were assigned as student projects. Other literacies supported by technology in the classroom included: critical literacy, cultural literacy, information literacy, and visual literacy.

Critical literacy. Critical literacy included text used to question the social construction of self; critical perspectives toward text; analysis of texts; and the ability to read texts in an active, reflective manner in order to better understand power, inequality, and injustice in human relationships. Teachers indicated that students frequently engaged in critical literacy that required problem solving and critical thinking in the classroom, and technology was integrated with many of these experiences. Teachers discussed students' multimedia projects where the students selected text, images, music, and transitions to reflect the students' identity and to

communicate a message. In my discussions with the students, they indicated some of their favorite projects were the "All About Me" project in a computer class, critical analysis video in history, and comparisons of works of art in social studies. Students indicated that they really had to read deeply, view content with a critical lens, and think creatively about their selections and the message they wanted to convey in the finished product.

Cultural literacy. Cultural literacy included the knowledge of history, contributions, and perspectives of different cultural groups including one's own group, necessary for the understanding of reading, writing, and other media. According to Alvermann et al. (1999), the use of popular culture in the classroom is important because (a) students "are more likely to make more informed decisions about how they live their lives," and (b) students "learn how to evaluate such messages for their social, political, economic, and aesthetic contents" (p. 4). The use of modern or "pop" culture supported cultural literacy in the classroom. Teachers indicated that modern culture and traditional heritage were important aspects of cultural literacy. Teachers also indicated the use of technology brought ancient and modern cultures into the classroom. In the teachers' interviews, teachers indicated that the use of popular culture helped students make the connection from text to life. Students also indicated a connection from literature, history, math, and science to life. One of the students commented, "It's everywhere" (Student interview).

Information literacy. Information literacy included the competency to find, evaluate, and use off-line and online information appropriately within legal, ethical, and social guidelines; and the ability to locate, organize, understand, evaluate, analyze information and communicate information effectively. In the teachers' interviews, teachers indicated how they appreciated the ease and convenience to which they could look up information on the Internet at the time and

point most appropriate to learning—just in time learning. Teachers also discussed the importance of teaching students effective, legal, and ethical manners in which to acquire and use information. When talking with the students during their interviews, the students indicated a lack of knowledge and skill beyond Google searches when researching. Most students were unfamiliar with school based databases or how to access and use those databases.

Visual literacy. Visual literacy addressed the ability to decode, interpret, and communicate using a combination of traditional print and digital imagery, graphics, charts, and videos; ability to interpret, negotiate and make meaning from information presented in the form of an image: photos, drawings, computer generated images, television, websites, videos, logos, symbols, charts, fine art, graphic organizers, musical notations, manuscripts, maps, and graphs. Teachers indicated exposure to visual literacy enhanced by technology when viewing pieces of art or other images on the computer. Teachers also indicated that exposure to visual literacy in the classroom was primarily in printed format—images, posters, cartoon, newspapers, and magazines. Printed visual literacy was supported with students' comments who indicated they used graphic novels to enhance their understanding of a work, or viewed political cartoons in the newspaper to understand satire and discuss political issues.

Other uses of technology in the classroom. Other uses of technology in the classroom included: administrative tasks, college and career readiness, student attention, facilitating classroom instruction, and assessment.

Administrative tasks. Teachers indicated that the dominant use of technology in the classroom was for administrative tasks: typing papers, updating grades, attendance, posting assignments to EdLine, organizing information files, and submitting online assignments. Students indicated in their interviews that students frequently use technology to type papers and

submit the assignments online. Teachers and students both indicated this was a skill necessary for college and career readiness. Students also indicated they use EdLine to file documents in their "file locker" so they can retrieve them and continue to work on them later or at home.

College and career readiness. Teachers indicated that technology was used as a tool for students' college and career readiness. Teachers indicated a true concern to prepare the students for college and career—students must have some basic technology skills regardless where they go to college, work, or live. Technology is going to be a part of everyday life and students must be prepared when they encounter it. Talking with students during the students' interviews, many of them acknowledged the importance of technology for college and career readiness. One student shared the experience of his mother who was a nurse and who had had to learn new technologies to perform the duties of her job. The students genuinely appeared interested and concerned about preparing for entrance into colleges and careers.

Student attention. Teachers indicated that technology was used to gain and maintain students' attention. Teachers indicated that students "tune-in" and were willing to work with things on the computer that they might refuse to do otherwise. Teachers indicated that students who were not normally motivated would be motivated if they were given technology. Technology tended to serve as a classroom management tool as students were engaged and stayed on task. As discussed previously, this was an emerging literacy for this dissertation study.

Facilitate classroom instruction. Teachers indicated that technology helped them facilitate classroom instruction. Ways in which teachers used technology to facilitate instruction were through project-based learning, video-clips to introduce or review content, and virtual labs and virtual tours. One teacher indicated that the use of virtual labs was a safety issue. Students completed the virtual lab prior to the physical lab so the students would be aware of the

consequences of not following directions—sometimes experiencing a virtual explosion. Another teacher indicated that the use of virtual tours allowed the students to "visit" someplace they may not otherwise be able to visit.

Assessment. Teachers indicated that technology assisted in standardized assessments such as Quizlet, Star Reader, and My Access. In teachers' interviews, teachers indicated interest in the ability to provide instant, or real-time, feedback to the students by using these Web 2.0 assessment tools; however, they also expressed hesitancy in using them as a "grade" because of the teachers' lack of comfort in their personal technology skills. Teachers also indicated that they felt it was still necessary to provide the students personal feedback from the teachers.

What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom that enhances multiliteracies in the classroom?

Skill levels were grouped according to association with the particular literacy categories: technology, social, digital, visual, information, and multimedia.

Technology literacy. Teachers identified technology literacy as the knowledge and skills of basic computer operations and familiarity of the dominant software programs that promoted success in students' daily lives in college and career. Skills associated with technology literacy included: word-processing skills, spreadsheets, presentation programs, and web-based tools. Teachers and students indicated high proficiency in word processing skills, spreadsheets, and presentation programs. Teachers and students indicated emerging proficiencies in using web-based tools; students indicated a higher proficiency than teachers did in this content.

Social literacy. Social literacy addresses the ability for an individual to successfully and deliberately mediate his/her world of family members, workers, and citizens who contribute to one's life-long learning; an individual's ability to interact, maintain and build relationships with

others and work collaboratively integrating the use of technology to communicate via social networks. Teachers identified social literacy as skills in effective communication, not only in text, but face-to-face. They also indicated that social skills required a development of responsible citizenry that followed the students through all aspects of life—college and career. Skills associated with social literacy included an ability to communicate with others using technology; using IM tools, social networking websites, online computer games, and VoIP; and creating wikis. There were significant differences in five of the six perspectives between teachers and students toward skill levels associated with social literacy.

Teachers (52%) and students (76%) were in agreement with the statement they could teach others how to communicate with others using technology. Teachers (40%) and students (20%) indicated they could communicate independently with others using technology. Teachers and students both indicated high proficiency levels in communicating with others using technology.

According to Rosen (2010), there is a "gap" between teachers' and students' skill levels associated with social literacy when using instant communication tools. This "gap" may very well be accentuated by generational differences. Adult generations (digital immigrants) strive to catch up with iGeners (digital natives); however, the "gap" continues to exist.

Nearly twice as many students (85%) indicated they could teach others to use IM tools, as could teachers (44%). The "gap" was evident again between teachers and students using social networking websites. Students (68%) indicated higher proficiency than teachers (40%) in using social networking.

Students indicated a high proficiency in using multi-user computer games. Thirty-eight percent of the students indicated they could do this independently, while 37% of the students

could teach others. Teachers (32%) indicated an emerging proficiency in using multi-user computer games.

Students indicated a higher proficiency in using voice over Internet (VoIP) than did the teachers. Thirty-six percent of the students indicated they could use VoIP independently, while a similar 36% of the students could teach others to use VoIP. Twenty-eight percent of the teachers indicated they could not use VoIP, while an emerging 28% of the teachers indicated they could use VoIP with some assistance.

Students indicated a higher proficiency than the teachers did in creating wikis. Fifty percent of the students indicated they could teach others to create a wiki, while 40% of the teachers indicated they could not create a wiki.

Classroom observations indicated minimal evidence of social literacy in the classrooms: minimal collaborative work and no social networking opportunities allowed for the students.

Digital literacy. Digital literacy addresses the ability to locate, organize, understand, evaluate, and analyze information using digital technology, as well as, how to find, use, summarize, evaluate, create, and communicate information while using digital technologies. Skill levels associated with digital literacy included: using web-authoring tools, desktop publishing tools, e-books, e-textbooks, and e-portfolios. There were no significant differences between teachers' and students' perspectives toward skill levels associated with digital literacy.

Students (45%) indicated an emerging proficiency in using web-authoring tools, while teachers (44%) indicated they could not use web-authoring tools. Teachers (63%) indicated a higher proficiency than students (58%) in using desktop publishing software, while 37% of the students indicated an emerging proficiency in using desktop publishing software. Student

enrollment in Computer Business Application courses may contribute to the proficiency levels obtained in those courses.

Teachers (72%) indicated a marginally higher proficiency than students (67%) did in creating e-portfolios. Teachers (38%) indicated a higher proficiency than students (17%) in using e-books or e-textbooks. Twenty-nine percent of the teachers indicated they could use e-books or e-textbooks independently, while 8% could not use e-books or e-textbooks; 40% of the students indicated they could use e-books or e-textbooks independently, while 22% of the students could not use e-books or e-textbooks. Teachers (96%) and students (95%) indicated a proficiency in using textbook publisher resource websites.

In teachers' and students' interviews, both teachers and students indicated that technology enhanced the exposure to digital literacy and that most students responded positively to digital literacy. One teacher described students' reactions to completing a Webquest on various poets as engaging. The teacher claimed that students were engaged in learning about the poets and using technology to enhance the students' learning. Other teachers commented about using e-readers or putting the text online—online reading was more engaging for the students than putting a textbook in their hands. When students were asked which they preferred print or digital text, several responded emphatically digital text. Others expressed comfort in holding the printed text in their hands and even fanning the pages to get the new book smell.

Classroom observations indicated digital literacy enhanced by technology primarily consisted of Internet-based searches. Literacy was supported primarily by printed text.

Visual literacy. Skills associated with visual literacy included the ability to decode, interpret, and communicate using a combination of traditional print and digital imagery. The survey instruments did not adequately address skill levels associated with visual literacy. One

item addressing photo-sharing websites indicated a significant difference between teachers' and students' perspectives of visual literacy in connection to photo-sharing websites. Students (34%) indicated a higher proficiency than teachers (21%) did in using photo-sharing websites. Teachers' and students' interviews indicated primary uses of technology to enhance visual literacy in the classroom were to take pictures and record videos for projects. Teachers indicated that the primary sources of visual literacy for the students were textbook images and student created images. Students indicated that the primary source of visual literacy was PowerPoint presentations used in teachers' lectures.

Information literacy. Teachers identified information literacy as skills to locate, evaluate, organize, and communicate reliable sources of information. Skills associated with information literacy included using search engines, keyword/subject searches, citation and bibliography tools, skills to evaluate reliability and credibility, and skills to understand and apply ethical and legal practices to digital information. There were no significant differences between teachers' and students' perspectives toward skill levels associated with information literacy.

Teachers (60%) indicated a higher proficiency than students (49%) in using a search tool to perform keyword/subject searches in an electronic database. Reasoning perhaps for this response was that teachers were more familiar with searching for peer-reviewed articles in research databases, and students were not as familiar or accustomed to using database searches for research. Students (85%) indicated a higher proficiency than teachers (64%) in using a search engine such as Google, Bing, or Yahoo to search for information on the web.

Students indicated a marginally higher proficiency than teachers did in using citation or bibliography tools. Twenty-nine percent of the teachers and 23% of the students indicated they

could teach others to use citation or bibliography tools, while 29% of the teachers and 38% of the students indicated they could use citation and bibliography tools independently.

Teachers indicated a higher proficiency than students did in evaluating the reliability and credibility of online sources of information. Twenty-four percent of the teachers and 21% of the students indicated they could teach others to evaluate the reliability and credibility of online sources of information; 44% of the teachers and 36% of the students indicated they could do this independently. An emerging 24% of the teachers and 38% of the students indicated they could do this with some assistance.

Teachers indicated a higher proficiency than students did in understanding the ethical, legal issues surrounding the access to and use of digital information. Teachers (52%) and students (38%) indicated they could do this independently, while 16% of the teachers and 18% of the students indicated they could teach others the ethical and legal issues surrounding the access to and use of digital information.

In the teachers' interviews, teachers expressed the importance for the students to have a full comprehension of plagiarism and proper citation of sources, and the consequence for plagiarism and improper citations. During the students' interviews, students indicated a general comprehension of plagiarism. They also indicated how to cite a source using bibliography tools such as Word or Web 2.0 citation tools. The students did not fully acknowledge the severity of consequences of plagiarism. One student addressed credibility of websites by noting sites ending in .gov or .net as the "safest" sites, and sites with commercials were not the best to use. This same student indicated that Wikipedia was not a good source to use for research because anyone could change the information on the page. Overall, teachers and students did not indicate comfortable levels in identifying credibility and validity when evaluating websites.

Classroom observations indicated that the primary source of information was the teacher or Internet-based searches. The use of legal, ethical, and social guidelines was encouraged by the teachers; however, in many of the classes these guidelines had not been reviewed or discussed.

Multimedia. Skills associated with multimedia included using audio and video creation software, online virtual worlds, podcasts, webinars, video streaming, and creating and modifying a multimedia product. There were statistically significant differences between teachers' and students' perspectives of multimedia skills in three of the five survey items: using audio-creation software, video-creating software, podcasts, webinars, and video streaming.

Students indicated a higher proficiency than teachers did in using audio-creation software. Students (41%) indicated they could use audio-creation software with some assistance, while teachers (48%) indicated they could not use audio-creation software.

Students indicated a higher proficiency than teachers did in using video-creation software. Students (36%) indicated they could teach others to use video creation software, while teachers (32%) indicated an emerging proficiency in using video-creation software with some assistance.

Students indicated a higher proficiency than teachers did in using podcasts, webinars, and video streaming. Students (16%) indicated they could teach others to use podcasts, webinars, and video streaming. Four percent of the teachers indicated they could teach others to use podcasts, webinars, and video streaming, while 29% of the teachers indicated they could not use podcasts, webinars, and video streaming.

Students indicated a higher proficiency than teachers did in creating and modifying a multimedia product. Fifty-seven percent of the students and 40% of the teachers indicated they

could create and modify a multimedia product independently or teach others. An emerging 37% of the students and 44% of the teachers indicated they could create and modify multimedia products with some assistance. Five percent of the students and 16% of the teachers indicated they could not create or modify multimedia products.

Students indicated a higher proficiency than teachers did in using online virtual worlds. Fifty percent of the students and 32% of the teachers indicated they could use online virtual worlds independently or teach others to use online virtual worlds. There was an emerging 36% of the teachers and 30% of the students who indicated they could use online virtual worlds with some assistance. Thirty-two percent of the teachers and 20% of the students indicated they could not use online virtual worlds.

Students' interviews indicated that the primary uses of multimedia in the classroom were teacher created PowerPoint presentations and student created PowerPoint presentations as an assignment. Students indicated exposure to multiple PowerPoint programs—Animoto, Prezi, Keynote, and PowerPoint. Audio and video were used in the classrooms to support learning experiences by listening to literary works or viewing subject content videos.

Classroom observations supported the teachers' and students' comments that the primary sources of multimedia were video clips, PowerPoint for presentation of information, and PowerPoint for student projects.

Cultural literacy. Teachers' interviews emphasized modern culture and traditional heritage are important aspects of cultural literacy. Teachers indicated a concern in students' lack of a basic foundation in cultural literacy—their heritage and the heritage of others. One teacher shared an experience and the importance of using modern culture in the classroom and how students made the connection from text to real-life.

Classroom observations indicated cultural literacy enhanced by technology in the classroom. A presentation of Native American flute playing and an original digitally created recording of the flute playing with nature sounds and an original poem recitation accompanied the music. The presentation was followed by discussions of various Native American tribes.

Multimodal. Multimodal addresses visual literacy and verbal literacy—an ability to decode and engage with multiple modes of literacy: linguistic, gestural, spatial, visual, and audio forms of communication. Classroom observations indicated the primary source of multiple modes of literacy was music while students were engaged in other activities. Multimodal literacies in the truest sense were not used to enhance multiliteracies in the classroom.

21st century skills for college and career readiness. Through written responses and interviews, teachers and students indicated the most important literacy skills needed by 21st century students were technology literacy and traditional literacy. Teachers indentified traditional literacy as proficient skills in reading and writing. Students supported this definition and further asserted that students must maintain proficient reading and writing skills through life. Teachers and students also indicated that technology literacy of basic skills and equipment, and technology literacy of software programs were essential for all 21st century students. Other literacy skills indicated by the teachers and students included information literacy, social literacy, and critical literacy.

Technology to enhance multiliteracies in the classroom. Teachers and students indicated that the following literacies enhanced by technology were present in the classroom: digital literacy, critical literacy, information literacy, visual literacy, and multimedia.

Digital literacy. Teachers and students indicated that technology enhanced digital literacy in the classroom. Students indicated they read stories on EdLine, completed Webquests,

and even had their "textbook" online. Teachers indicated that students were engaged with digital literacy more so than printed texts.

Critical literacy. Teachers and students indicated they used technology to enhance critical literacy in the classroom. Teachers and students indicated that students had completed several projects in which students engaged in critical analysis of images, information, and multimedia. Classroom observations included a discussion of freedom enhanced by viewing a film, analysis of art, and analysis of poetry.

Information literacy. Teachers and students indicated they used technology to enhance information literacy. The emphasis in information literacy was on Internet-based research. Students did not exhibit a strong comprehension or comfort level with the legal and ethical issues related to the use of others information. Students indicated an understanding that plagiarism was wrong, but did not fully comprehend how to avoid or correct the issue of plagiarism.

Visual literacy. Teachers and students indicated some use of technology to enhance visual literacy in the classroom—primarily through the use of PowerPoint presentations and films. Students indicated it helped to see what the teacher was lecturing about as well as hear it. Students also indicated that graphic novels (text through images) were not used in the classroom for instruction, but some students used the graphic novels on their own to augment understanding of the text.

Multimedia. Teachers and students indicated they used technology to enhance multimedia in the classroom, with an emphasis on video and audio. Multimedia was used in the classroom to listen to poems or stories from CD, watch films, listen to music, and create PowerPoint presentations. Students indicated that teachers used PowerPoint to give instruction notes and guide lectures.

What are the teachers' and students' perceived barriers to integrating technology in the classroom?

As indicated in the literature review, there are several perceived barriers to the integration of technology in the classroom. Overall, teachers (56%) and students (68%) indicated that the use of technology to promote engaged learning was not a barrier to technology integration in the classroom. Following, however, are the most dominant barriers identified by the teachers and students.

Access. Teachers and students indicated access to equipment and access to the Internet were barriers to technology integration in the classroom. Teachers (56%) and students (60%) identified the lack of or limited access to computers as a barrier. Teachers (92%) and students (84%) further identified the level of access to Internet sites while on campus as a barrier to technology integration in the classroom.

Knowledge about technology. Teachers and students indicated that knowledge about technology and skill levels were barriers to technology integration in the classroom. Teachers (76%) and students (75%) indicated the level of teacher skills and student skills were barriers to technology integration in the classroom.

In the teachers' interviews, teachers indicated that students' diverse skill levels in the classroom served as a barrier to the integration of technology. Not all students were required to take technology courses in their high school experience. Teachers indicated they (teachers) had to take content instruction time to teach technology skills. Teachers understood the necessity of doing this, but resented that they had to lose valuable time for instruction in the content. Teachers advocated basic computer skills and familiarity of dominant software programs for all students.

In the students' interviews, students indicated that diverse students' skill levels did not usually cause a problem in the classroom; however, the diverse teachers' skill levels were somewhat a distraction and a barrier to technology integration in the classroom. Students indicated that technology was a distraction when the teachers tried to use it and didn't really know how to use it. The teachers' lack of technology skills were also a distraction when the teachers did not know how to fix a problem and students took class time to fix the problem. Teachers' lack of technology skills were a barrier to technology integration in that if the teachers did not know how to use different types of technology, they would not integrate it into the classroom. Ivers (2002) indicated that intermediate users do not appear confident in integrating technology as a tool for student learning—only a tool for administrative tasks—and teachers who consider themselves highly proficient in technology skills tend to integrate a variety of technologies in student learning experiences (p. 5).

There was a significant statistical difference between teachers' and students' perspectives about knowledge of technology. Teachers (56%) indicated that their (teachers') level of knowledge about technology was a barrier, while 65% of the students indicated their (students') level of knowledge about technology was not a barrier to technology integration in the classroom. Teachers are less likely to integrate technology in the classroom when they are uncomfortable with technology. Students indicated more confidence in technology skills; however, 35% of the students lacked confidence in using technology in the classroom—this may represent the students who have not completed technology classes during their high school experience.

Software programs. Fifty-two percent of the teachers indicated the availability of software in their school was a barrier to technology integration in the classroom, while 55% of

the students indicated this was not a barrier to technology integration. The differing perspectives may be attributed to teachers' knowledge of specific content area software programs available for education and students' knowledge of Web 2.0 tools available on the Internet. High percentages of teachers (48%) and students (45%) did not indicate software programs as a barrier. This item would benefit from further review.

Equipment. Teachers (59%) indicated the quality of accessible technology in the classroom was a barrier; while 50% of the students indicated this was a barrier to technology integration in the classroom, 50% of the students did not indicate this was a barrier. In the teachers' interviews, teachers indicated that inconsistent availability of technology in the classroom kept teachers and students from integrating technology into the daily classroom culture. Teachers also indicated difficulties in the classroom when the smartboard didn't work or the projector bulb burned out. These equipment failures were not easily or quickly remedied—the process to request repairs appeared to be a lengthy and time consuming one—a barrier in itself that could be addressed. According to Hew and Brush (2007), the lack of access to equipment and technical support are resource barriers: "Without adequate hardware and software, there is little opportunity for teachers to integrate technology into the curriculum" (p. 226). Fabry and Higgs (1997; as cited in Hew & Brush, 2007) stated that "access to technology is more than merely the availability of technology in a school; it involves providing the proper amount and right types of technology in locations where teachers and students can use them" (p. 226). Access and quality equipment are essential to technology integration in the classroom. In students' interviews, students indicated that too often teachers and students have become so dependent upon certain equipment and technologies, that when they (teachers and students) experience equipment or technology failures they don't know what to do without it.

Technical support. Students (58%) indicated the lack of technical support was a barrier, while 52% of the teachers indicated this was not a barrier to technology integration in the classroom. Through the teachers and students interviews, teachers and students indicated that the student log-in process served as a barrier to integrating technology in the classroom. Primary reasons students could not log-in were identified as (a) students failed to log-out on another computer in the network, (b) students forgot their password to log-in and have to have it reset, and (c) the log-in process took so long to connect to the network. Teachers and students agreed that the log-in process "eats-up" valuable class time—time that was taken from the students' time to learn. According to Cuban, Kirkpatrick, and Peck (2001; as cited in Hew & Brush, 2007):

> Teachers need adequate technical support to assist them in using different technologies. Employing a limited number of technical support personnel in a school severely hinders teachers' technology use. More often than not, these technical supported personnel were often overwhelmed by teacher requests, and could not respond swiftly or adequately. (p. 227)

There were additional barriers that the teachers commented on that the students did not: pedagogy, time, and budget.

Pedagogy. Teachers (60%) indicated that their (teachers) level of knowledge about ways to integrate technology into the curriculum was a barrier to technology integration in the classroom. Teachers are like students in the realm of education; without knowledge, training, and practice of effective integration of technology they are ineffective in the classroom. Studies by Rakes et al. (2006) and Ivers (2007) indicated change in teacher pedagogy after participating

in quality professional development; however, other barriers were cited that impeded full success in the teachers' pedagogical change—time and access to equipment.

Time. Teachers (84%) indicated time needed to implement a technology integrated curriculum was a barrier to technology integration in the classroom. In the teachers' interviews, teachers indicated that time was a significant barrier to technology integration in the classroom—time for training, practice, and integration. According to Gorder (2008), "teachers are busy teaching in the classroom and need more time for learning, planning, and preparation to integrate technology" (p. 74). Time as a barrier was cited in several studies of the literature chapter of this dissertation study—Gorder (2008), Hew and Brush (2007), and Rogers (2000).

Budget. In the teachers' interviews, teachers indicated that the lack of funds and budget to purchase equipment, materials, and subscriptions to technology sources served as a barrier to technology integration in the classroom. Teachers indicated they used personal funds to purchase materials and subscriptions to enhance technology integration in the classroom.

Following are additional barriers that the students commented on that the teachers did not. These barriers were identified during the students' interviews: school filter, limited types of technology, and abuses of equipment.

School filter. Students indicated that the school filter was a significant barrier to technology integration in the classroom. Students indicated frequent occurrences when they tried to access a site that was school/educational related and access was denied. Students indicated that to by-pass the "system" many students used their personal devices with personal Internet access.

Limited technology. Students indicated that the limited types of technology available in the classroom were a barrier to the integration of technology. The most frequently mentioned

type of technology not allowed in the classroom was the cell phone. Students indicated there was disparity among classes and teachers in which cell phones could be used. Students indicated a feeling of uncertainty in compliance with school policy with regard to cell phone use. Students indicated they did not see a consistency in cell phone use in the classrooms and application of consequences across the student body for inappropriate use of the cell phone.

Abuses of equipment. Students indicated that the abuses of equipment were barriers to technology integration in the classroom. Students indicated the primary abuses of equipment included (a) accessing sites not allowed for the task, or (b) using cell phones to text during class. Students who abused the use of equipment violated the school's usage policy and violated the teachers' trust. Students commented that teachers tended to be reluctant to using technology in the classroom when the students violated the teachers' trust and abused the students' privileges to use technology in the classroom. This was supported with teachers' comments regarding cell phone use in the classroom. There was a divided opinion among teachers using cell phones in the classroom. Many teachers were comfortable with cell phone use in the classroom, while others were not comfortable with cell phone use in the classroom and did not allow the cell phones to be used. Those who did not allow cell phone use in the classroom indicated an uneasiness in the ability to monitor student activity on the cell phone.

Conclusions

The integration of technology in the classroom is more than using technology or incorporating technology into a lesson plan. Integration of technology involves the assimilation of technology into the daily culture and climate of the classroom and the school. Integration of technology becomes a way of life in the classroom and the school environment as a whole.

The review of teachers' and students' beliefs toward the integration of technology reflected an overwhelming support for the integration of technology in the classroom. Teachers' and students' skill levels necessary for technology integration that enhances multiliteracies were intermediate—areas of proficiency and areas of deficiency. Teachers and students indicated several perceived barriers to the integration of technology.

There were conflicting comments about technology that enhanced multiliteracies, learning and assessment of learning, and teacher instruction and student learning. Teachers indicated that technology was often met with excitement, anxiety, uncertainty, apprehension, and fear of failure. The integration of technology to enhance multiliteracies in the classroom generated conflicting opinions by teachers; some teachers embraced the diversity that multiliteracies brings to the classroom, while others did not. The integration of technology in the classroom for assessment was not readily supported by the teachers. Teachers indicated concerns about the administration of testing with technology and the ease in which documents can be cut and pasted, or shared. Teachers identified personal needs regarding the integration of technology: time, training, and practice. To become proficient at a skill requires time for training, time for practice, and time for integration. Teachers indicated there was a lack of time to address adequately all the needs to effectively integrate technology in the classroom to enhance multiliteracies.

Students indicated an interest in enhanced cognitive abilities supported or promoted with the integration of technology, integration of technology in instruction, and the potential for technology to gain and maintain the students' attention. Students indicated that the integration of technology helped students learn and understand content more effectively, and allowed for opportunities to experience diverse points of view. Students acknowledged the integration of

technology allowed for teachers to use varying instructional approaches to address the different learning styles and interests of the students. Students also indicated that the integration of technology gained or maintained the students' attention. Students recognized and acknowledged the generational "gap" between the digital immigrants and the digital natives. Students indicated that technology was part of the students' culture—a way of life for iGeners.

Teachers and students viewed the role of technology as a tool to accomplish tasks and facilitate learning experiences. Teachers tended to use technology for administrative, preparation, and classroom management purposes. Teachers conservatively used technology to support student-centered curricula, while teachers continued to use technology for traditional teacher-centered instructional practices. Technology was not a tool to replace the teacher. The teacher still fills an important role in the classroom; however, the role of the teacher is changing as pedagogy integrates technology. Integration of technology encourages student-centered curriculum with teachers as facilitators and mentors. The teachers' roles can be identified in the Multiliteracies Pedagogy Framework presented by the New London Group: situated practice, overt instruction, critical framing, and transformed practice (Cazden et al., 1996, pp. 82-88). In situated practice, teachers ground instructional plans in student-centered needs and interests. In overt instruction, teachers' intervention occurs at the students' point of need. In critical framing, teachers are involved in the critical analysis and purpose of texts in student curriculum. In transformed practice, teachers and students obtain deeper understandings from the deconstruction and the creation of meaning-making from multimodal contexts. Although the New London Group addressed a new multiliteracies pedagogy sixteen years ago—before the introduction of Common Core State Standards—the discussions from the new London Group

were highly insightful and intuitive to the needed pedagogical changes occurring with the adoption of CCSS.

Overall, teachers and students indicated strong support in the integration of technology to enhance multiliteracies in the classroom. Teachers and students engaged in discussions of multiliteracies in the classroom and the role technology played in enhancing multiliteracies. Technology serves an important role in the iGeners culture and it is important to integrate technology in all aspects of their lives—college, career, and recreation. When educators fail to acknowledge and integrate aspects of the 21st century culture into the classroom, educators miss essential teaching and learning opportunities for the students.

What steps do teachers need to take to prepare for literacy (multiliteracies) expectations of the Common Core State Standards? Teachers indicated knowledge, preparation, and implementation were the steps necessary to meet the literacy expectations of the Common Core State Standards. Several teachers indicated a lack of sufficient knowledge about CCSS to implement the literacy expectations in the classroom. Teachers with knowledge of CCSS identified personal needs to implement effectively the literacy expectations in the classroom as time, technology, and training. Teachers further identified pedagogical changes to implement the literacy expectations of CCSS in the classroom: to learn how to create and support the student-centered learning environment with the teacher as a facilitator.

Limitations of this Dissertation Study

Self-reported data. The primary sources of data were self-reported data collected from the teachers' surveys, the students' surveys, and the teachers' and students' interviews. These data were self-reported data based exclusively on participants' perspectives. Self-reported data may not be as accurate as other types of research. Due to the ending of the school year,

participants were unavailable for follow-up interviews to further clarify and explain previously collected responses. Because participation was voluntary, it is possible that some perspectives toward the integration of technology have been omitted. Also, because the researcher was acquainted with many of the participants, this acquaintance may have influenced some of the responses given in either the surveys or the interviews. Additional perspectives may have emerged from the same participants with a different researcher.

Generalizability of this dissertation study. While the sample size was adequate to generalize a description and provide explanation to the teachers' and students' perspectives toward the integration of technology to enhance multiliteracies in the classroom, this study cannot be generalized beyond the specific participants of the selected school site to the greater population due to the small sample size and the research on one institution. If this study were to be conducted again, it is my recommendation to expand the sample size and research sites. Sample size would be increased with multiple case studies which could produce different results than indicated in this study.

Reliability of the survey instrument. The survey instruments had a strong reliability in measuring teachers' and students' skill levels associated with multiliteracies; however, the reliability in measuring teachers' and students' beliefs to integration of technology and barriers to integration of technology were marginally acceptable. Misinterpretation or mixed format of the statements may have contributed to the variances in reliability. If this study were to be conducted again, it is my recommendation that the survey instruments be revised to reflect a parallel structured format, address additional beliefs and barriers to the integration of technology that enhances multiliteracies in the classroom, and address additional technologies associated with multiliteracies.

Time of this dissertation study. Although time was a voluntary impediment for me—the researcher—the limited time established for this dissertation study did limit the sample size, sampling design, and the time-period for data collection. The scheduled time for data collection was the 4th quarter of the school year. Due to the time-period for this study, the sample size was limited by availability of teachers and students, thus affecting the sample size and sample design of the study. Time to collect data was also limited to the availability of the teachers and students. With the frequency of standardized testing, competitions, playoffs, and activity schedules, this proved to be an inopportune time for teachers and students to participate in a study. If this study were to be conducted again, it is my recommendation that the study be scheduled for the duration of the school year to allow for a larger sample size, a stronger sample design, and adequate time to collect sufficient data worthy of additional statistical analysis.

Implications for Practice

The findings of this dissertation study are from one site over a period of a few weeks. While there are some limitations to this study, there are also some valuable insights. Following are some strategies that may promote the integration of technology in the classroom that enhances multiliteracies:

(a) changing attitudes and beliefs,

(b) sharing a vision and technology integration plan,

(c) conducting quality professional development,

(d) providing sufficient and accessible equipment,

(e) recognizing technical and instructional support,

(f) introducing technology integration with CCSS, and

(g) scheduling time for training, practice, and integration.

Changing attitudes and beliefs. Teachers' beliefs and perspectives toward technology affect technology integration in the classroom, thus affecting multiliteracies enhanced by technology. According to Hew and Brush (2007), to facilitate change in teachers' attitudes and beliefs four factors should be considered: "teachers' knowledge and skills, subject culture, assessment, and institutional support" (p. 237).

Institutional support typically comes in (a) encouragement for teachers (b) shared vision and a technology integration plan, (c) sufficient and accessible resources, and (d) ongoing professional development for teachers (Hew & Brush, 2007, p. 237). Encouragement and support for teachers is important to changing teachers' attitudes and beliefs. As described by the teachers of this dissertation study, teachers experience vast emotions when trying new pedagogical approaches—especially with technology integration. Change requires some level of experimentation and risk. Teachers need to know they will be given time to develop skills and will not be immediately reprimanded for mistakes when trying new technology integrated activities in the classroom—however, accountability should develop as skill levels advance.

Sharing a vision and technology integration plan. Technology integration plans help administrators and teachers have a common avenue to effectively communicate technology integration in the classroom—goals and guidelines to technology integration that enhances multiliteracies in the classroom. According to Staples, Pugach, and Himes (2005; as cited in Hew & Brush, 2007), "the most important issue to consider when formulating a shared vision regarding technology integration is to address the specific relationship between technology and particular curriculum content areas because a commitment to the curriculum is a critical scaffold for technology integration" (p. 234). The primary focus of technology integration should be on student learning of the subject content—scaffolding technology into the curriculum opens

opportunities to enhanced student learning. Teachers are more apt to support the vision and technology integration if they are encouraged to participate in the decision-making process—especially if it affects the teachers' curriculum and their pedagogy. Once the vision and the technology integration plan are developed, it is essential to communicate the vision and plan to all administrators, teachers, staff, and technical personnel. Effective communication leads to potential success, whereas ineffective communication leads to potential failure.

Conducting quality professional development. Professional development can influence teachers' perspectives toward technology integration in the classroom. Professional development can also provide the knowledge, skills, and practice needed for teachers to integrate technology in the classroom. According to Hew and Brush (2007):

> Effective professional development related to technology integration: (a) focuses on content (e. g., technology knowledge and skills, technology-supported pedagogy knowledge and skills, and technology-related classroom management knowledge and skills), (b) gives teachers opportunities for "hands-on" work, and (c) is highly consistent with teachers' needs. (p. 238)

Effective professional development focuses on teachers' knowledge and skills related to technology. Teachers do not recognize the need for technology integration in the classroom until they feel comfortable with the basic knowledge and skills of technology integration. Additional knowledge and skills development are needed to obtain a level of proficiency to integrate technology successfully and effectively in the classroom.

Effective professional development focuses on technology-supported pedagogy. Teachers need knowledge and skills to integrate a technology-supported pedagogy. An important link in technology-supported pedagogy is the relationship between content and the

technology being used in the classroom. When teachers recognize the value technology brings to the subject content, teachers are more likely to integrate technology in the classroom.

Effective professional development focuses on technology-related classroom management knowledge and skills. Integrating technology in the classroom requires established clear rules and procedures for technology usage. Hew and Brush (2007) suggested "(a) no unauthorized installation of programs and (b) no unauthorized change to the features of the control panel" (p. 238) as rules to consider when integrating technology in the classroom. Another guideline to follow is the school's Acceptable Use Policy. This policy outlines the acceptable uses of computers while at school, and the consequences for failure to follow the policy as outlined. Teachers of this dissertation study suggested additional procedures for technology integration in the classroom that included (a) indexing computers and assigning each student a specific computer, (b) classroom arrangement to facilitate movement when retrieving and returning the computers, (c) pairing students with stronger technology skills with students of lesser technology skills, and (d) establishing guidelines for students working collaboratively on the computers.

Effective professional development provides teachers with opportunities for active learning. Teachers need to participate in hands-on learning that is subject content specific for the teacher. Allowing teachers to participate in professional development that is applicable to their subject content and develops technology-supported activities will be viewed as valued quality professional development by the teachers. Developing hands-on skills that teachers will integrate into the classroom will benefit the teachers and the students in the learning experiences.

Effective professional development focuses on teachers' needs. Schrum (1999; as cited in Hew & Brush, 2007) indicated that "just-in-time" professional development gains greater

teacher acceptance because it addresses the teachers' concerns at the time it is most needed by the teachers, as opposed to the "just-in-case" professional development that addresses skills or knowledge that may or may not be relevant to the teacher (p. 239).

Providing sufficient and accessible equipment. There are several ways to address the issue of sufficient equipment: purchase additional equipment, lease equipment, or bring and use personal equipment. Purchasing or leasing equipment requires budget action from the school districts—an issue this dissertation study does not address. Student leases of equipment or students bringing and using their own equipment would circumvent the budget issue; however, specific policies, practices, and consequences would need to be developed and communicated to administrators, teachers, staff, students, and parents.

Accessibility to equipment is a key to technology integration in the classroom. Placing computers in a classroom instead of centralized locations facilitates technology integration in the curriculum. According to Becker (2000; as cited in Hew & Brush, 2007):

> Secondary subject teachers who have five to eight computers in their classroom were twice as likely to give students frequent computer experiences during class as their counterparts whose classes used computers in a shared location. . . . Scheduling whole classes to use computers as in the case of centralized or shared locations makes it nearly impossible for technology to be integrated as research, analytic, and communicative tools in the context of the work of an academic class. (p. 236)

Portable computer carts can also minimize the inconvenience of scheduling class time in a computer lab, and class time to "travel" to the computer lab. Portable computer carts can keep the students in their familiar classroom environment, thus avoiding distractions of a new environment. Students may experience a 1:1 student-to-computer ratio where available. If this

is not the case, students may work in groups to access computers, or the computers may be set up as stations for students' accessibility in the classrooms. Frequent availability and access to technology is an integral part of technology integration in the classroom.

Recognizing technical and instructional support. Teachers and students experience technical difficulties when working with technology. To minimize problems and the high volume of work orders for professional technical personnel, teachers and students could be trained to handle simple and frequent problems that occur with hardware and software programs. By training teachers and students to handle the "simple" problems, technicians are available to address the more complex issues of technology integration, thus being more cost effective by not employing additional professional technicians to handle the "simple" problems.

Another way to address hardware and software problems may be to engage a student-helper. A student-helper is an effective way to provide a real-life experience for a student while providing technical support to the teacher. The student-helper tends to the technical issues related to technology-integrated lessons while the teachers tend to the content and the instructional activities.

Introducing technology integration with CCSS. As previously discussed, technology integration to enhance multiliteracies in the classroom is driven by Common Core State Standards and assessments by PARCC and Smarter Balanced Assessments. Teachers must become knowledgeable of the CCSS standards and integrate technology-supported curricula that enhance the multiliteracies presented in CCSS. Professional development and teacher collaboration are supportive avenues to promote knowledge of CCSS. The more familiar teachers are of CCSS, the more effective teachers will be in meeting the literacy (multiliteracies) expectations of CCSS.

Scheduling time for training, practice, and integration. Finding additional time in a school day is like finding the center of the earth—you know it is there, but it is difficult to get to it. Teachers can find time for training, practice, and integration by addressing class loads, curriculum, and collaboration. Class loads can be minimized by teaching the same content and grade level several periods in the day. Reducing class loads for teachers can free up school time spent on multiple contents and grade levels and allow teachers time to familiarize themselves with various technologies to develop appropriate technology-integrated curriculum.

Another way to address class load is to address the curriculum. With the adoption of CCSS, the emphasis is on depth not breadth of the curriculum—teachers may now focus on fewer works in depth instead of multiple works by survey. Minimizing the number of works will allow teachers additional time to integrate technology activities into the curriculum. Teachers should be encouraged to collaborate to develop technology-integrated curriculum. Teachers working together to develop lessons and materials will "find" time in the school day that would otherwise be "lost" by working alone.

Finally, finding time in the day may require a change in scheduling. According to Becker (2000; as cited in Hew & Brush, 2007), "secondary school teachers who work in schools with schedules involving longer blocks of time (e. g., 90-120 min classes) were more likely to report frequent use of technology during class compared to teachers who taught in the traditional 50-minute periods" (p. 236). Time is a precious commodity for teachers—they are always on the lookout for more time.

Considerations for Future Research

There is ample room for future research in the integration of technology that enhances multiliteracies in the classroom.

This dissertation study presented a brief overview of several literacies (multiliteracies). A thorough review and discussion of multiliteracies would bring greater depth and understanding to those who are integrating technology that enhances multiliteracies in the classroom.

This dissertation study described teachers' beliefs toward technology integration, technology skill levels associated with multiliteracies, and perceived barriers to technology integration in the classroom. How do teachers' beliefs, skill levels, and perceived barriers affect the integration of technology? To what degree do teachers' and students' beliefs, skill levels, and perceived barriers to technology integration differ? Are there any cause and effect relationships among the variables?

This dissertation study explored "best practices" of technology integration that enhances multiliteracies in the classroom. How does the integration of technology that enhances multiliteracies in the classroom affect teachers' pedagogy? What are "best practices" of technology integration that enhance multiliteracies in the classroom?

This dissertation study reviewed the literacy (multiliteracies) expectations of the Common Core State Standards. What effect on proficiency in literacy does the integration of technology that enhances multiliteracies in the classroom have on students' college and career readiness? Will students become proficient in the multiliteracies with CCSS?

This dissertation study addressed teachers' and students' interaction with multiliteracies in the classroom; it did not address teachers' and students' interaction with multiliteracies out of the classroom. Is there a difference between in-school interaction with multiliteracies and out-of-school interaction with multiliteracies? Are out-of-school interactions with multiliteracies appropriate for in-school interactions with multiliteracies? If so, how are theses interactions with multiliteracies recognized, rewarded, and integrated into the curriculum?

This dissertation study recognized several perceived barriers to technology integration in the classroom. One barrier identified by teachers was the need for quality professional development. What effect does quality professional development and time for practice and implementation have on the quality of instruction?

This dissertation study reviewed assessment objectives as outlined by PARCC. What effect will PARCC assessments have on the integration of technology that enhances multiliteracies in the classroom? How does the PARCC assessment guide classroom instruction and the integration of technology that enhances multiliteracies in the classroom?

This dissertation study focused on teachers' and students' perspectives from one site over a period of a few weeks. How would the results differ for a like study with multiple case studies over the period of one school year or longer? Would there be a change in teachers' and students' perspectives over time toward the integration of technology that enhances multiliteracies in the classroom?

Summary

The purpose of this dissertation study was to describe and explain the teachers' and students' perspectives of technology integration that enhances multiliteracies in the classroom. Using the mixed methods design in this dissertation study significantly enhanced the findings and results. The qualitative data of the written responses, interviews, and classroom observations provided deeper understanding and clarity to the quantitative data collected from the surveys. Without the mixed methods research approach, this deeper understanding and clarity of teachers' and students' perspectives toward the integration of technology to enhance multiliteracies in the classroom would not have been acknowledged. Teachers and students contributed their time and responses to describe and explain their perspectives of the integration of technology that

enhances multiliteracies in the classroom. Teachers and students indicated a strong belief in the integration of technology in the classroom. Teachers and students identified multiliteracies associated with skill levels, and the differences in perspectives between teachers and students. These differences were representative of the digital "gap" between the digital immigrants (aka: teachers) and the digital natives (aka: students). Teachers and students identified several barriers to the integration of technology that enhances multiliteracies in the classroom. Many of these barriers were the very same barriers identified in the literature review.

Through the course of this dissertation study, discussions occurred with teachers and students regarding the definition of literacy and multiliteracies. Through those discussions, teachers and students became aware of multiliteracies in the classroom and how those multiliteracies may be enhanced with technology. Discussions with teachers regarding the literacy (multiliteracies) expectations of the Common Core State Standards augmented an awareness in the teachers of the need for knowledge, preparation, and implementation with the adoption of CCSS. Teachers' interviews and classroom observations identified best practices in the integration of technology that enhances multiliteracies in the classroom. The teachers also identified perceived barriers to the integration of technology, which included time for quality professional development. Through written responses and discussions, teachers and students identified multiple literacy skills that continue to impact students' college and career readiness. Although technology appeared to be incorporated into the curriculum, it was not readily integrated into the curriculum to enhance multiliteracies in the classroom.

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APPENDICES

List of Appendices Page

Appendix A

Letter: Request for Permission to Conduct Research

March 9, 2012

Mr. [redacted], Principal
[redacted] High School
440 East Gary Street
[redacted]

RE: Request for Permission to Conduct Research

Dear [redacted],

I would like to request permission to conduct a research study with the teachers and students of [redacted] High School in the school year 2011-2012. I am a graduate student in the Curriculum and Instruction degree program at the University of [redacted]. The study will explore teachers' and students' perspectives of technology and its use in the secondary literacy classroom. The information gleaned from this study will be invaluable for support in my PhD dissertation. I will be conducting this study under the supervision of my academic advisor, [redacted], and my dissertation committee at the [redacted].

I have enclosed the approval/denial response for your convenience - please complete and return to me at your convenience.

Should you have any questions please feel free to contact me at [redacted] or by email at [redacted].

Respectfully,

[redacted]

Graduate Student
[redacted]

Cc: [redacted], Superintendent

Cc: [redacted], Assistant Superintendent
Curriculum and Professional Development

Appendix B

Response to the Request for Permission to Conduct Research

[redacted]
Graduate Student
[redacted]

Research Title: *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology.*

Participants: Teachers and students of [redacted] High School

Time period: School year 2011-2012

This response serves to indicate approval/denial to conduct research with the teachers and students of [redacted] High School during the school year 2011-2012. (Please mark the appropriate response.)

◯ **Approval to conduct research** with the teachers and students of [redacted] High School during the school year 2011-2012.

Comments:_____
_____
_____
_____

◯ **Denial to conduct research** with the teachers and students of [redacted] High School during the school year 2011-2012.

Comments:_____
_____
_____
_____

Signed: _____ Date:_____
[redacted], Principal [redacted]

Appendix C

Teacher Participant Introduction Letter

April 1, 2012

Dear Teacher Participant:

I would like to enlist your help. I am a graduate student at the University of [redacted], and I am conducting a study as part of the requirements for completion of a doctoral degree in Curriculum and Instruction. The study is *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. The information gleaned from this study will be invaluable for support in my Ph.D. dissertation.

I am requesting your participation in this study with an initial survey that depicts the teachers' perspectives of technology integration in the classroom. The survey will be administered through Qualtrics, an online survey system sponsored by the University. You will be notified of the web link via your school email. Please complete this survey no later than April 23, 2012.

The survey should take approximately 10-15 minutes of your time. Your answers are anonymous. All answers will be kept confidential. Only group results will be presented or documented, not individual answers. You do not have to answer any questions you do not want to answer. Completing the survey will indicate your consent to use your anonymous answers as part of my research. Your participation in this study is strictly voluntary and is in no way associated with your position or continued employment in the school district.

The second phase of my study involves interviews and classroom observations. This is completely voluntary on your part, and completing the survey does not obligate you to participate in the interview and observation phase, although it would be appreciated. At the end of the survey, you will be asked to supply contact information if you wish to continue to participate in the study. This contact information will be saved separately from your survey responses and used only to contact you to set up interviews and classroom observations.

If you have questions or concerns, please contact me at [redacted], or [redacted]. You may also contact my faculty advisor, [redacted] at [redacted] If you have any questions regarding your rights as a research participant, please contact the University of [redacted] Institutional Review Board, Office of Research Compliance at [redacted] or by email [redacted] .

Thank you for your time and consideration.

Sincerely,

[redacted]

[redacted]
Graduate Student
[redacted]

Appendix D

Student Participant Introduction Letter

April 1, 2012

Dear Student Participant:

I would like to enlist your help. I am a graduate student at the University of [redacted], and I am conducting a study as part of the requirements for completion of a doctoral degree in Curriculum and Instruction. The study is *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. The information gleaned from this study will be invaluable for support in my Ph.D. dissertation.

You will be asked to complete an online survey that will take about 10-15 minutes. Your name will be collected on the survey only to verify that I have permission from your parent/guardian to use your survey data in my research; once your survey has been matched up with a signed consent form, your name will be removed from your answers so the records will be anonymous and no one can identify your responses. You may also be asked to participate in a short interview. Choosing to complete the survey does not mean you have to participate in the interview – you can choose to agree to an interview or not, although your participation would be appreciated. Your participation in this study is strictly voluntary and is in no way associated with your academic position or records in the school district.

The survey will be administered through Qualtrics, an online survey system sponsored by the University. You will be notified of the web link via handouts in your participating class. Please complete this survey no later than April 23, 2012. Selected participants will be interviewed after completion of the survey; all interviews will be conducted at the [redacted] campus during school hours.

If you have questions or concerns, please contact me at [redacted], or [redacted]. You may also contact my faculty advisor, [redacted] at [redacted]. If you have any questions regarding your rights as a research participant, please contact the University of [redacted] Institutional Review Board, Office of Research Compliance at [redacted] or by email at [redacted] .

Thank you for your time and consideration.

Sincerely,

[redacted]

[redacted]
Graduate Student
[redacted]

Appendix E

Parent/Guardian of Student Participant Introduction Letter

April 1, 2012

Dear Parent/Guardian of Student Participant:

I would like to enlist the help of your child. I am a graduate student at the University of [redacted], and I am conducting a study as part of the requirements for completion of a doctoral degree in Curriculum and Instruction. The study is *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. The information gleaned from this study will be invaluable for support in my Ph.D. dissertation.

Your child will be asked to complete an online survey that will take about 10-15 minutes. His or her name will be collected on the survey only to verify that he or she has permission from his or her parent/guardian to use the survey data in my research. Once the survey has been matched up with a signed consent form, your child's name will be removed from the answers so my records are anonymous and no one can identify your child's responses. Your child may also be asked to participate in a short interview. Choosing to complete the survey does not mean your child will participate in the interview – your child can choose to agree to an interview or not, although his or her participation would be appreciated. The survey will be administered through Qualtrics, an online survey system sponsored by the University. Your child will be notified of the web link via handouts in his or her participating class. The survey will be completed during school hours using school equipment. Selected participants will be interviewed after completion of the survey; all interviews will be conducted at the [redacted] campus during school hours.

The survey should take approximately 10-15 minutes of your child's time. Your child's answers will be anonymous and all answers will be kept confidential. Only group results will be presented or documented, not individual answers. Your child does not have to answer any questions he or she does not want to answer. Your child's participation in this study is strictly voluntary and is in no way associated with your child's academic position or records in the school district.

If you have questions or concerns, please contact me at [redacted], or [redacted]. You may also contact my faculty advisor, [redacted] at [redacted]. If you have any questions regarding your rights as a research participant, please contact the University of [redacted] Institutional Review Board, Office of Research Compliance at [redacted] or by email at [redacted] .

Thank you for your time and consideration.

Sincerely,

[redacted]

[redacted]
Graduate Student
[redacted]

Appendix F

Teacher Participant Consent Form for Interview and Classroom Observation

April 1, 2012

Dear Teacher Participant:

Thank you for participating in the survey portion of *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. The purpose of this study is to describe and explain teachers' and students' perspectives of the integration of technology as it pertains to and enhances multiliteracies in the classroom. You may withdraw from this study at any time.

The second portion of my study involves interviews and classroom observations. This is completely voluntary on your part, and completing the survey does not obligate you to participate in the interview and observation phase of the study, although it would be appreciated. The interviews and classroom observations are designed to explore, clarify, and explain teachers' perspectives about integrating technology in the classroom and how technology may be used to enhance multiliteracies in the classroom. You and I will discuss your integration of technology in the classroom, your perceived skill level of using technology, and any perceived barriers you may have to integrating technology in the classroom. We will further discuss your definition of literacy and multiliteracies.

The interview will last approximately 20 minutes and can end at any time you choose. You may also skip any question(s) you choose not to answer. The classroom observations will be scheduled according to your convenience and will last the duration of the class period or may end at any time you so choose. The interview and classroom observation data collected from this study will be reported anonymously. All information collected will be kept confidential to the extent allowed by law and University policy.

There are no risks associated with participating in this study. You will not receive any personal or financial benefits aside from sharing personal perspectives and classroom experiences with other teachers and students. The findings from this study will further the research discussions of multiliteracies, integration of technology in the classroom, and mixed methods research approaches. For your participation, a donation to *Relay for Life* will be made in your honor.

If you have questions or concerns, please contact me at [redacted], or [redacted]. You may also contact my faculty advisor, [redacted] at [redacted]. If you have any questions regarding your rights as a research participant, please contact the University of [redacted] Institutional Review Board, Office of Research Compliance at [redacted] or by email at [redacted].

You will receive a copy of this signed consent form to keep for your records.

Print participant name:_____

Participant signature:_____

Date:_____

Primary Researcher: [redacted]

Appendix G

Student Participant Consent Form for Survey and Interview

April 1, 2012

Dear Parent/Guardian:

Your child is being asked to participate in the study *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. The purpose of this study is to describe and explain teachers' and students' perspectives of the integration of technology as it pertains to and enhances multiliteracies in the classroom. Your child may withdraw from this study at any time.

There are no risks associated with participating in this study. Your child will not receive any personal or financial benefits aside from sharing personal perspectives and classroom experiences with other teachers and students. The findings from this study will further the research discussions of multiliteracies, integration of technology in the classroom, and mixed methods research approaches. For your child's participation, a donation to *Relay for Life* will be made in your child's honor.

Your child will be asked to complete an online survey that will take about 10-15 minutes. The survey will be completed during school hours using school equipment. His or her name will be collected on the survey only to verify that he or she has permission from his or her parent/guardian to use the survey data in my research; once the survey has been matched up with a signed consent form, your child's name will be removed from the answers so my records are anonymous and no one can identify your child's responses. Your child may also be asked to participate in a short interview. Choosing to complete the survey does not mean your child will participate in the interview – your child can choose to agree to an interview or not, though his or her participation would be appreciated. The survey will be administered through Qualtrics, an online survey system sponsored by the University. The interview will last approximately 15 minutes and will be conducted at the [redacted] campus during school hours.

The survey and interview data collected from this study will be reported anonymously. All information collected will be kept confidential to the extent allowed by law and University policy.

If you have questions or concerns, please contact me at [redacted], or [redacted]. You may also contact my faculty advisor, [redacted] at [redacted]. If you have any questions regarding your rights as a research participant, please contact the University of [redacted] Institutional Review Board, Office of Research Compliance at [redacted] or by email at [redacted] .

You will receive a copy of this signed consent form to keep for your records.

Print student participant name:_____

Parent/Guardian signature:_____

Date:_____

Primary Researcher: [redacted]

I have discussed this study with my parent/guardian and I agree to participate. I understand that I can change my mind at any time, and I can choose to stop participation at any point during the study.

Student participant signature:_____

Appendix H

SURVEY: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom

The questions and statements below are aligned to assess your perspectives of technology to enhance multiliteracies in the classroom. Your responses will be held in strict confidence and will be used in the study *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. Your participation in this study is strictly voluntary, and it should only take approximately 10-15 minutes to complete. By completing and submitting this questionnaire, you are agreeing to participate in this study. On behalf of your participation, a donation will be made in your honor to *Relay for Life*. Your cooperation and participation are greatly appreciated.

Instructions: Respond to all multiple choice questions and statements, and write a brief, but complete, response to each of the open-ended questions.

1. Gender:

- o Male
- o Female

2. Subject you currently teach:

- o English language arts
- o Math
- o Social Studies
- o Science
- o Technical and/or Vocational course
- o Other

Appendix H. Survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

3. Age:

- 19-24
- 25-34
- 35-55
- 56-older

4. Race:

- White, non-Hispanic
- African American
- Asian
- Hispanic/Latino
- Native American
- Alaska Native
- Native Hawaiian
- Pacific Islander
- Other

Use the following choices to respond to statements 5-18 regarding your belief(s) in using technology in the classroom.

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree(3)
- Agree (4)
- Strongly Agree (5)

Appendix H. Survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

5. I support the use of technology in the classroom.

6. A variety of technologies are important for student learning.

7. Incorporating technology into my instruction helps students learn.

8. Content knowledge should take priority over learning technology skills.

9. Most of my students have so many other needs that technology use is a low priority in my classroom.

10. My motivation to teach increases when technology is integrated into the curriculum.

11. Teaching teachers and students how to use technology isn't my responsibility.

12. Technology takes time to incorporate into the curriculum; time that may be used to develop other instructional strategies.

13. Technology helps teachers and students do things in class that they would not be able to do without technology.

14. Knowledge about technology will improve my teaching.

15. Technology limits the social/face-to-face interactions with my students.

16. Technology facilitates the use of a wide variety of instructional strategies designed to maximize student learning.

17. Technology helps students to make real-life meaning in classroom situations.

18. Technology helps students to solve simple and complex problems, and to predict changes in real-life situations.

Use the following choices to respond to questions 19-42 pertaining to your skill level in using technology.

- I cannot do this (1)
- I can do this with some assistance (2)
- I can do this independently (3)
- I can teach others how to do this (4)

How would you describe your proficiency in …

Appendix H. Survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

19. using a word-processing, spreadsheet, or presentation program?

20. using web-based tools: word-processor, spreadsheet, presentation, form applications (Google Docs, iWork, Microsoft Office Live Wordspace, Adobe Buzzword, etc.)?

21. communicating with others using technology (email, gmail, etc.)?

22. using instant communication tools (IM, text messages, blogs, Twitter, etc.)?

23. using social networking websites (Facebook, MySpace, LinkedIn, etc.) and social bookmarking/tagging (Delicious, Digg, etc.)?

24. using web authoring tools (Storybird, Dreamweaver, WYSIWYG editors, etc.)?

25. using a desktop publishing software to create a newsletter, pamphlet, or award certificates?

26. creating e-portfolios?

27. using e-books or e-textbooks?

28. using textbook publisher resource websites (Pearson, PrenticeHall, McGraw-Hill, etc.)?

29. using audio-creation software (Audacity, GarageBand, etc.)?

30. using video-creation software (MovieMaker, iMovie, etc.), and creating videos to video-sharing websites (YouTube, TeacherTube, etc.) ?

31. creating and modifying a multimedia product?

32. using online multi-user computer games?

33. using online virtual worlds (virtual tours, Second Life, etc.)?

34. using voice over internet protocol (VoIP) from your computer (Skype, etc.)?

35. using podcasts, webinars, video streaming?

36. using photo-sharing websites (Flickr, Snapfish, Picasa, etc.)?

37. creating wikis (Wikipedia, Curriki, etc.)?

38. using a search tool to perform keyword/subject searches in an electronic database?

39. using a search engine such as Google, Bing, or Yahoo to search for information on the web?

40. using citation/bibliography tools (Word, EasyBib, Bibme, Citation machine, etc.)?

Appendix H. Survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

41. evaluating the reliability and credibility of online sources of information?

42. understanding the ethical/legal issues surrounding the access to and use of digital information?

Use the following choices to complete the following statements 43-52 regarding your perceived barriers to integrating technology in the classroom.

- is not a barrier (1)
- is a minor barrier (2)
- is a major barrier (3)

43. The lack of or limited access to computers in my school….

44. The availability of software in my school….

45. The quality of accessible technology in my classroom….

46. The level of access to internet sites while on campus…

47. My level of knowledge about technology as a teacher….

48. My level of knowledge about ways to integrate technology into the curriculum….

49. As a teacher, the use of technology to promote engaged learning in my classroom….

50. As a teacher, the time needed to implement a technology integrated curriculum….

51. The different skill levels of my students….

52. The lack of technical support at my school….

Appendix H. Survey: Teachers' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

Written Responses: Write a brief, but complete, response to each of the open-ended questions.

53. What is the role of technology in the classroom?

54. What new literacy skills must be learned by any 21st century student in order to prepare for college and career?

55. What are the steps you as a teacher need to take to prepare yourself for the literacy (multiliteracies) expectations of the Common Core State Standards?

56. What suggestions or comments would you, as a teacher, make about

(a) integration of technology that promotes multiple forms of literacy in the classroom,
(b) integration of technology that supports learning and the assessment of learning, and/or
(c) integration of technology that enhances teacher instruction and student learning?

Additional information: Your continued participation in this study is appreciated. Any identifying information will be used only to contact you for further participation in this study. Your survey responses will be saved separately and anonymously.

1. I would like to continue being a participant in this study by participating in (select all that are applicable):

- face-to-face interview (15-20 minute interviews)
- classroom observation (20-40 minute classroom observations)

2. Please provide your name and email address where you may be contacted.

Name: Email:

Thank you for your participation in the study *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. A donation in your honor has been made to *Relay for Life*.

Appendix I

SURVEY: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom

The questions and statements below are aligned to assess your perspectives of technology to enhance multiliteracies in the classroom. Your responses will be held in strict confidence and will be used in the study *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. Your participation in this study is strictly voluntary, and it should only take approximately 10-15 minutes to complete. By completing and submitting this questionnaire, you are agreeing to participate in this study. On behalf of your participation, a donation will be made in your honor to *Relay for Life*. Your cooperation and participation are greatly appreciated.

Instructions: Respond to all multiple choice questions and statements, and write a brief, but complete, response to each of the open-ended questions.

1. Gender:

- o Male
- o Female

2. Classification:

- o Sophomore
- o Junior
- o Senior

3. Race:

- o White, non-Hispanic
- o African American
- o Asian
- o Hispanic/Latino
- o Native American
- o Alaska Native
- o Native Hawaiian
- o Pacific Islande
- o Other

Appendix I. Survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

4. Indicate all the classes for which you used computers this school year (2011-2012).

- English/Language Arts
- History/Social Studies
- Music/Art
- Science
- Business Education
- English as a Second Language
- Physical Education/Health
- Exceptional Education Programs (SPED/GT)
- Math
- Other

Appendix I. Survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

Use the following choices to respond to statements 5-17 regarding your belief(s) in using technology in the classroom.

- Strongly Disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly Agree (5)

5. I support the use of technology in the classroom.

6. A variety of technologies are important for my learning.

7. Incorporating technology into instruction helps me learn.

8. Content knowledge should take priority over learning technology skills in the classroom.

9. I have so many other educational needs that technology use is a low priority.

10. My motivation to learn increases when technology is integrated into the curriculum.

11. Teaching teachers and students how to use technology isn't my responsibility.

12. Technology helps me do things in class that I would not be able to do without technology.

13. A teacher's knowledge about technology will improve a teacher's teaching.

14. Technology limits the social/face-to-face interactions between me and my teacher.

15. Technology allows for different teaching strategies to help maximize my learning.

16. Technology helps me make real-life meaning in classroom situations.

17. Technology helps me to solve simple and complex problems, and to predict changes in real-life situations.

Appendix I. Survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

Use the following choices to respond to questions 18-41 pertaining to your skill level in using technology.

- I cannot do this (1)
- I can do this with some assistance (2)
- I can do this independently (3)
- I can teach others how to do this (4)

How would you describe your proficiency in …

18. using a word-processing, spreadsheet, or presentation program?
19. using web-based tools: word-processor, spreadsheet, presentation, form applications (Google Docs, iWork, Microsoft Office Live Wordspace, Adobe Buzzword, etc.)?
20. communicating with others using technology (email, gmail, etc.)?
21. using instant communication tools (IM, text messages, blogs, Twitter, etc.)?
22. using social networking websites (Facebook, MySpace, LinkedIn, etc.) and social bookmarking/tagging (Delicious, Digg, etc.)?
23. using web authoring tools (Storybird, Dreamweaver, WYSIWYG editors, etc.)?
24. using a desktop publishing software to create a newsletter, pamphlet, or award certificates?
25. creating e-portfolios?
26. using e-books or e-textbooks?
27. using textbook publisher resource websites (Pearson, PrenticeHall, McGraw-Hill, etc.)?
28. using audio-creation software (Audacity, GarageBand, etc.)?
29. using video-creation software (MovieMaker, iMovie, etc.), and creating videos to video-sharing websites (YouTube, TeacherTube, etc.) ?
30. creating and modifying a multimedia product?
31. using online multi-user computer games?
32. using online virtual worlds (virtual tours, Second Life, etc.)?

Appendix I. Survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

33. using voice over internet protocol (VoIP) from your computer (Skype, etc.)?

34. using podcasts, webinars, video streaming?

35. using photo-sharing websites (Flickr, Snapfish, Picasa, etc.)?

36. creating wikis (Wikipedia, Curriki, etc.)?

37. using a search tool to perform keyword/subject searches in an electronic database?

38. using a search engine such as Google, Bing, or Yahoo to search for information on the web?

39. using citation/bibliography tools (Word, EasyBib, Bibme, Citation machine, etc.)?

40. evaluating the reliability and credibility of online sources of information?

41. understanding the ethical/legal issues surrounding the access to and use of digital information?

Use the following choices to complete the following statements 42-49 regarding your perceived barriers to using technology in the classroom.

- is not a barrier (1)
- is a minor barrier (2)
- is a major barrier (3)

42. The lack of or limited access to computers in my school….

43. The availability of software in my school….

44. The quality of accessible technology in my classroom….

45. The level of access to internet sites while on campus…

46. My level of knowledge about technology as a student….

47. As a student, the use of technology to promote engaged learning in my classroom….

48. The lack of technical support in my school….

49. The level of teacher technology skills….

Appendix I. Survey: Students' Perspectives toward Integration of Technology to Enhance Multiliteracies in the Classroom (continued)

Written Responses: Write a brief, but complete, response to each of the open-ended questions.

50. What is the role of technology in my classroom?

51. What new literacy skills must be learned by any 21st century student in order to prepare for college and career?

52. What suggestions would you make about integrating technology that promotes multiple forms of literacy* in the classroom?

    (a) How can the integration of technology support learning and the assessment of learning?

    (b) How can technology be used to enhance teacher instruction and student learning?

    (literacy – reading, writing, audio, visual, digital, multimedia, cultural, social, etc.)

Additional information: Your name and identifying information will be used only to verify that I have received a parental/guardian consent form for your participation in this study. Otherwise, I will not be able to use your answers in my research. Once the consent has been verified, your survey responses will be saved separately from your name and be recorded anonymously.

I would like to continue being a participant in this study by participating in a face-to-face interview (one 10-15 minute interview).

- o Yes
- o No

Please provide your name, teacher, and class period in which you are participating in this study:

Name:
Teacher:
Class period:

Thank you for your participation in the study *Multiliteracies in the classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*. A donation in your honor has been made to *Relay for Life*.

Appendix J

Protocol: Teacher Semi-structured Interview

The interview process will follow the collection and analysis of the survey data. The purpose of the interview sessions is to explore, explain, and clarify the responses obtained from the survey data. For the interview process, the researcher will use several prompts to initialize the conversation as well as to keep the interview focused on the research topic of multiliteracies in the classroom and the integration of technology. The researcher will exercise discretion and research ethics in exploring subjects that may come up in the participants' responses. The researcher will only explore additional topics outside of the prompt if it concerns the research topic. All personal inquiries and possible harmful questioning will be avoided especially when conducting interviews with students. Teacher interviews will last approximately 15-20 minutes and student interviews will last approximately 10-15 minutes. The researcher reserves the right to request additional time for interviewing if it deems appropriate and profitable.

1. How would you define literacy?
2. How would you define multiliteracies?
3. How would you describe your thoughts on integration of technology in the classroom?
4. How does integration of technology in the classroom actually work for you?
5. How would you describe the effectiveness of technology integration in your classes?
6. How would you describe your skill level with using technology in the classroom?
7. How would you describe your teachers' or students' skill level of using technology in the classroom?
8. How do you use technology in the classroom?
9. In your opinion, does technology enhance literacy? Multiliteracies?
10. What are some of the technologies you use to enhance multiliteracies?
11. What are some of the perceived barriers to integrating technology in the classroom?
12. What suggestions do you have about integrating technology to enhance multiliteracies in the classroom?
13. *Development of other questions as directed by the survey data.*

Appendix K

Protocol: Student Semi-structured Interview

The interview process will follow the collection and analysis of the survey data. The purpose of the interview sessions is to explore, explain, and clarify the responses obtained from the survey data. For the interview process, the researcher will use several prompts to initialize the conversation as well as to keep the interview focused on the research topic of multiliteracies in the classroom and the integration of technology. The researcher will exercise discretion and research ethics in exploring subjects that may come up in the participants' responses. The researcher will only explore additional topics outside of the prompt if it concerns the research topic. All personal inquiries and possible harmful questioning will be avoided especially when conducting interviews with students. Student interviews will last approximately 10-15 minutes. The researcher reserves the right to request additional time for interviewing if it deems appropriate and profitable.

1. What is the role of technology in your classroom?

   (a) Do you use technology in this class? In other classes?

   (b) Is technology used effectively in your classes?

   (c) How do you use technology in this class? In other classes?

   (d) Does technology help you learn? If so, what types of technology help you learn? If not, what helps you learn?

   (e) Do you see or have any problems with using technology in the classroom? If so, what are some of the barriers or problems to using technology in your classes?

   (f) Do you feel comfortable using technology in the classroom? If so, how would you describe your skill level? How would you describe your teachers' skill levels? How would you describe your peers' skill levels?

2. What new literacy skills must be learned by any 21st century student in order to prepare for college and career?

   (a) What do you want to do when you finish high school? What do you need to know to do that?

   (b) What skills do you need to know to be ready for college? To be ready for a career?

   (c) How would you define literacy?

   (d) Are you familiar with multiliteracies? What do you think is included in multiliteracies?

   (e) How are multiliteracies used in your classes?

Appendix K. Protocol: Student Semi-structured Interview (continued)

(a) Do you use graphic novels in your classes? If so, how do these help you learn?

(b) Do you view video clips? If so, how do these help you learn?

(c) Do you ever listen to audio recordings in class? If so, what do you listen to? Does it help you to learn when you hear the audio recording?

(d) Do you read digital text? If so, what types of digital texts do you read? Do you prefer digital or paper text? Why?

(e) Do you create multimedia presentations in your class? Describe one of the multimedia projects you have created this year.

(f) Do you use web-based tools to work with other students? If so, tell me about a time when you used these tools.

(g) Do you use social networking tools to communicate with other students? If so, when do you use these tools? Are these tools used in the classroom? If so, how are they used in the classroom? How do you think they could be used?

(h) Do you ever have to critically examine a "work"? If so, what did you do?

(i) Do you ever have to research a topic in your class? If so, how did you do that?

3. What suggestions would you make about integrating technology that promotes multiple forms of literacy* in the classroom?

(a) How would you describe a typical day in your class?

(b) How can the integration of technology support your learning?

(c) How can the integration of technology support assessment of your learning?

(d) How can the integration of technology be used to enhance your teachers' instruction?

(e) How can the integration of technology enhance overall student learning?

(literacy – reading, writing, audio, visual, digital, multimedia, cultural, social, etc.)

Appendix L

Survey Question Matrix

Survey item	BATT	TSBBS	BTCEI	STS-PAEC	SITHE 2010	UA
I support the use of technology in the classroom.		x				x
A variety of technologies are important for student learning.		x				x
Incorporating technology into my instruction helps students learn.		x				x
Content knowledge should take priority over learning technology skills.		x				x
Most of my students have so many other needs that technology use is a low priority in my classroom.		x				x
My motivation to teach increases when technology is integrated into the curriculum.		x				x
Teaching teachers and students how to use technology isn't my responsibility.		x				x
Technology takes time to incorporate into the curriculum; time that may be used to develop other instructional strategies.		x				x
Technology helps teachers and students do things in class that they would not be able to do without technology.		x				x
Knowledge about technology will improve my teaching.		x				x
Technology limits the social/face-to-face interactions with my students.		x				x

Appendix L. Survey Question Matrix (continued)

Survey item	BATT	TSBBS	BTCEI	STS-PAEC	SITHE 2010	UA
Technology facilitates the use of a wide variety of instructional strategies designed to maximize student learning.		x				x
Technology helps students to make real-life meaning in classroom situations.				x		
Technology helps students to solve simple and complex problems, and to predict changes in real-life situations.				x		
How would you describe your proficiency in using a word-processing, spreadsheet, or presentation program?			x	x	x	
How would you describe your proficiency in using web-based tools: word-processor, spreadsheet, presentation, form applications (Google Docs, iWork, Microsoft Office Live Wordspace, Adobe Buzzword, etc.)?					x	
How would you describe your proficiency in communicating with others using technology (email, gmail, etc.)?			x	x		x
How would you describe your proficiency in using instant communication tools (IM, text messages, blogs, Twitter, etc.)?				x	x	
How would you describe your proficiency in using social networking websites (Facebook, MySpace, LinkedIn, etc.) and social bookmarking/tagging (Delicious, Digg, etc.)?					x	x

Appendix L. Survey Question Matrix (continued)

Survey item	BATT	TSBBS	BTCEI	STS-PAEC	SITHE 2010	UA
How would you describe your proficiency in using web authoring tools (Storybird, Dreamweaver, WYSIWYG editors, etc.)?		x		x		x
How would you describe your proficiency in using a desktop publishing software to create a newsletter, pamphlet, or award certificates?		x				x
How would you describe your proficiency in creating e-portfolios?					x	
How would you describe your proficiency in using e-books or e-textbooks?					x	
How would you describe your proficiency in using textbook publisher resource websites (Pearson, PrenticeHall, McGraw-Hill, etc.)?				x	x	
How would you describe your proficiency in using audio-creation software (Audacity, GarageBand, etc.)?					x	
How would you describe your proficiency in using video-creation software (MovieMaker, iMovie, etc.), and creating videos to video-sharing websites (YouTube, TeacherTube, etc.) ?					x	
How would you describe your proficiency in creating and modifying a multimedia product?		x	x	x		x
How would you describe your proficiency in using online multi-user computer games?					x	

Appendix L. Survey Question Matrix (continued)

Survey item	BATT	TSBBS	BTCEI	STS-PAEC	SITHE 2010	UA
How would you describe your proficiency in using online virtual worlds (virtual tours, Second Life, etc.)?					x	
How would you describe your proficiency in using voice over internet protocol (VoIP) from your computer (Skype, etc.)?					x	
How would you describe your proficiency in using podcasts, webinars, video streaming?					x	
How would you describe your proficiency in using photo-sharing websites (Flickr, Snapfish, Picasa, etc.)?		x			x	x
How would you describe your proficiency in creating wikis (Wikipedia, Curriki, etc.)?					x	x
How would you describe your proficiency in using a search tool to perform keyword/subject searches in an electronic database?		x		x	x	x
How would you describe your proficiency in using a search engine such as Google, Bing, or Yahoo to search for information on the web?		x	x	x	x	x
How would you describe your proficiency in using citation/bibliography tools (Word, EasyBib, Bibme, Citation machine, etc.)?					x	
How would you describe your proficiency in evaluating the reliability and credibility of online sources of information?					x	

Appendix L. Survey Question Matrix (continued)

Survey item	BATT	TSBBS	BTCEI	STS-PAEC	SITHE 2010	UA
How would you describe your proficiency in understanding the ethical/legal issues surrounding the access to and use of digital information?			x		x	
The lack of or limited access to computers in my school is not a barrier/a minor barrier/a major barrier.	x	x				x
The availability of software in my school is not a barrier/a minor barrier/a major barrier.	x	x				x
The quality of accessible technology in my classroom is not a barrier/a minor barrier/a major barrier.	x	x				x
My level of knowledge about technology as a teacher is not a barrier/a minor barrier/a major barrier.		x				x
My level of knowledge about ways to integrate technology into the curriculum is not a barrier/a minor barrier/a major barrier.		x				x
As a teacher, the time needed to implement a technology integrated curriculum is not a barrier/a minor barrier/a major barrier.	x	x				x
The lack of technical support at my school is not a barrier/a minor barrier/a major barrier.	x					

Appendix M

Protocol: Classroom Observation Matrix

How does the teacher integrate a variety of instructional technologies to enhance multiliteracies in the classroom?

Literacies	Observations
Textual	The written language in print and digital
Digital	The ability to locate, organize, understand, evaluate, and analyze information using digital technology; how to find, use, summarize, evaluate, create, and communicate information while using digital technologies
Visual	The ability to decode, interpret, and communicate using a combination of traditional print and digital imagery, graphics, charts, and videos; ability to interpret, negotiate and make meaning from information presented in the form of an image: photos, drawings, computer generated images, television, websites, videos, logos, symbols, charts, fine art, graphic organizers, musical notations, manuscripts, maps, and graphs
Critical	Text used to question the social construction of self; critical perspectives toward text; analysis of texts; ability to read texts in an active, reflective manner in order to better understand power, inequality, and injustice in human relationships
Cultural	Knowledge of history, contributions, and perspectives of different cultural groups including one's own group, necessary for understanding of reading, writing, and other media; the ability to converse fluently in the idioms, allusions and informal content which creates and constitutes a culture
Social	The ability for an individual to successfully and deliberately mediate his/her world of family members, workers, citizens which contributes to one's life-long learning; person's ability to interact, maintain and build relationship with other people; work collaboratively; use of technology to communicate via social networks
Information	The competency to find, evaluate, and use off-line and online information appropriately within legal, ethical, and social guidelines; the ability to locate, organize, understand, evaluate, and analyze information; how to find, use, summarize, evaluate, create, and communicate information
Multimedia	The ability to interpret, understand, design, and create content that uses traditional and digital images, photographs, video, animation, music, sound, texts, and typography; the use of computers to present and create text, graphics, video, animation, interactivity, and sound in an integrated way
Multimodal	Visual literacy, verbal literacy; ability to decode and engage with multiple modes of literacy: linguistic, gestural, spatial, visual, audio forms of communication; having more than one mode, modality, or maxima

Appendix N

Survey Domain Contents

Survey question	Domain	Content
RQ: What are the teachers' and students' perspectives toward technology integration that enhances multiliteracies in the classroom?		
I support the use of technology in the classroom.	Core beliefs	Support of technology
A variety of technologies are important for student learning.	Core beliefs	Student learning
Incorporating technology into my instruction helps students learn.	Core beliefs	Pedagogical instruction
Content knowledge should take priority over learning technology skills.	Core beliefs	Content knowledge as a priority
Most of my students have so many other needs that technology use is a low priority in my classroom.	Core beliefs	Student needs
My motivation to teach (to learn) increases when technology is integrated into the curriculum	Core beliefs	Motivational tool
Teaching teachers and students how to use technology isn't my responsibility.	Core beliefs	Responsibility to teach others
Technology takes time to incorporate into the curriculum; time that may be used to develop other instructional strategies.	Core beliefs	Technology takes time
Technology helps teachers and students do things in class that they would not be able to do without technology.	Core beliefs	Technology enhances learning

Appendix N. Survey Domain Contents (continued)

Survey question	Domain	Content
Knowledge about technology will improve my teaching (my learning)	Core beliefs	Technology enhances learning and pedagogical instruction
Technology limits the social/face-to-face interactions with the students.	Core beliefs	Technology limits interaction
Technology facilitates the use of a wide variety of instructional strategies designed to maximize student learning.	Core beliefs	Pedagogical instruction
Technology helps students to make real-life meaning in classroom situations.	Core beliefs	Technology enhances learning
Technology helps students to solve simple and complex problems, and to predict changes in real-life situations.	Core beliefs	Technology enhances learning
RQ: What are the teachers' and students' perceived levels of proficiency in integrating technology in the classroom?		
How would you describe your proficiency in using a word-processing, spreadsheet, or presentation program?	Skill level	Technology literacy
How would you describe your proficiency in using web-based tools; word-Processor, spreadsheet, presentation, form applications?	Skill level	Technology literacy
How would you describe your proficiency in communicating with others using technology?	Skill level	Social literacy
How would you describe your proficiency in using instant communication tools?	Skill level	Social literacy

Appendix N. Survey Domain Contents (continued)

Survey question	Domain	Content
How would you describe your proficiency in using social networking websites and social bookmarking/tagging?	Skill level	Social literacy
How would you describe your proficiency in using web-authoring tools?	Skill level	Digital literacy
How would you describe your proficiency in using a desktop publishing software to create a newsletter, pamphlet, or awards certificate?	Skill level	Digital literacy
How would you describe your proficiency in creating e-portfolios?	Skill level	Digital literacy
How would you describe your proficiency in using e-books or e-textbooks?	Skill level	Digital literacy
How would you describe your proficiency in using textbook publisher resources websites?	Skill level	Digital literacy
How would you describe your proficiency in using audio-creation software?	Skill level	Multimedia literacy
How would you describe your proficiency in using video-creation software and creating videos to video-sharing website?	Skill level	Multimedia literacy
How would you describe your proficiency in creating and modifying a multimedia product?	Skill level	Multimedia literacy
How would you describe your proficiency in using online multi-user computer games?	Skill level	Social literacy

Appendix N. Survey Domain Contents (continued)

Survey question	Domain	Content
How would you describe your proficiency in using online virtual worlds?	Skill level	Multimedia literacy
How would you describe your proficiency in using voice over internet protocol (VoIP) from your computer?	Skill level	Social literacy
How would you describe your proficiency in using podcasts, webinars, video streaming?	Skill level	Multimedia literacy
How would you describe your proficiency in using photo-sharing websites?	Skill level	Visual literacy
How would you describe your proficiency in creating wikis?	Skill level	Information literacy Social literacy
How would you describe your proficiency in using a search tool to perform keyword/subject searches in an electronic database?	Skill level	Information literacy
How would you describe your proficiency in using a search engine such as Google, Bing, or Yahoo to search for information on the web?	Skill level	Information literacy
How would you describe your proficiency in using citation/bibliography tools?	Skill level	Information literacy
How would you describe your proficiency in evaluating the reliability and credibility of online sources of information?	Skill level	Information literacy
How would you describe your proficiency in understanding the ethical/legal issues surrounding the access to and use of digital information?	Skill level	Information literacy

Appendix N. Survey Domain Contents (continued)

Survey question	Domain	Content
RQ: What are the teachers' and students' perceived barriers to integrating technology in the classroom? • …is not a barrier to integrating technology in the classroom • …is a minor barrier to integrating technology in the classroom • …is a major barrier to integrating technology in the classroom		
The lack of or limited access to computers in my school…	Barrier	Access to technology
The availability of software in my school…	Barrier	Availability of technology
The quality of accessible technology in my classroom…	Barrier	Access to technology
The level of access to internet sites while on campus…	Barrier	Access to technology
My level of knowledge about technology as a teacher (as a student)…	Barrier	Level of knowledge about technology
My level of knowledge about ways to integrate technology into the curriculum…	Barrier	Technology as engagement to learning
As a teacher, the use of technology to promote engaged learning in my classroom…	Barrier	Technology as engagement to learning
As a teacher, the time needed to implement a technology integrated curriculum…	Barrier	Time
The different skill levels of my students (of my teachers)…	Barrier	Skill levels
The lack of technical support at my school…	Barrier	Support of equipment and resources

Appendix O

Institutional Review Board Approval

April 9, 2012

MEMORANDUM

TO: [redacted]

FROM: [redacted]
IRB Coordinator

RE: New Protocol Approval

IRB Protocol #: 12-03-616

Protocol Title: *Multiliteracies in the Classroom: An explanatory sequential mixed methods approach to teachers' and students' perspectives toward integration of technology*

Review Type: ☐ EXEMPT ☒ EXPEDITED ☐ FULL IRB

Approved Project Period: Start Date: 04/06/2012 Expiration Date: 04/05/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 150 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

TABLES

Table 1. Cronbach's Alpha for Survey Items

Category	*a* Teacher	*a* Student	*A* Composite
Beliefs to integration of technology	.384	.438	.467
Skill levels associated with multiliteracies	.966	.952	.956
Barriers to integration of technology	.677	.658	.678

Table 2. Response Distribution: Participants' Beliefs toward the Integration of Technology

Survey Item	Participant	% Strongly Disagree	% Disagree	% Neither agree nor disagree	% Agree	% Strongly Agree
I support the use of technology in the classroom.	Teacher	4	0	4	28	64
I support the use of technology in the classroom.	Student	0	1	0	21	78
A variety of technologies are important for student learning.	Teacher	4	0	8	36	52
A variety of technologies are important for my learning.	Student	0	2	7	42	49
Incorporating technology into my instruction helps students learn.	Teacher	0	4	12	36	48
Incorporating technology into instruction helps me learn.	Student	0	2	13	45	40
Content knowledge should take priority over learning technology skills.	Teacher	0	0	36	56	8
Content knowledge should take priority over learning technology skills in the classroom.	Student	2	13	35	34	16

Table 2. Response Distribution: Participants' Beliefs toward the Integration of Technology (continued)

Survey Item	Participant	% Strongly Disagree	% Disagree	% Neither agree nor disagree	% Agree	% Strongly Agree
Most of my students have so many other needs that technology use is a low priority in my classroom.	Teacher	20	56	12	12	0
I have so many other educational needs that technology use is a low priority.	Student	23	49	16	11	1
My motivation to teach increases when technology is integrated into the curriculum.	Teacher	0	12	28	36	24
My motivation to learn increases when technology is integrated into the curriculum.	Student	0	8	13	49	30
Teaching teachers and students how to use technology isn't my responsibility.	Teacher	28	32	24	12	4
Teaching teachers and students how to use technology isn't my responsibility.	Student	3	25	40	28	3

Table 2. Response Distribution: Participants' Beliefs toward the Integration of Technology (continued)

Survey Item	Participant	% Strongly Disagree	% Disagree	% Neither agree nor disagree	% Agree	% Strongly Agree
Technology helps teachers and students do things in class that they would not be able to do without technology.	Teacher	0	0	0	60	40
Technology helps me do things in class that I would not be able to do without technology.	Student	0	4	4	45	47
Knowledge about technology will improve my teaching.	Teacher	0	0	8	64	28
A teacher's knowledge about technology will improve a teacher's teaching.	Student	2	1	11	45	41
Technology limits the social/face-to-face interactions with my students.	Teacher	12	52	32	4	0
Technology limits the social/face-to-face interactions between me and my teacher.	Student	9	45	29	10	8

Table 2. Response Distribution: Participants' Beliefs toward the Integration of Technology (continued)

Survey Item	Participant	% Strongly Disagree	% Disagree	% Neither agree nor disagree	% Agree	% Strongly Agree
Technology facilitates the use of a wide variety of instructional strategies designed to maximize student learning.	Teacher	0	0	8	60	32
Technology allows for different teaching strategies to help maximize my learning.	Student	1	1	7	43	48
Technology helps students to make real-life meaning in classroom situations.	Teacher	0	8	4	68	20
Technology helps me make real-life meaning in classroom situations.	Student	1	5	33	41	20
Technology helps students to solve simple and complex problems, and to predict changes in real-life situations.	Teacher	0	4	16	60	20
Technology helps me to solve simple and complex problems, and to predict changes in real-life situations.	Student	0	9	13	52	26
Technology takes time to incorporate into the curriculum.	Teacher	4	44	16	36	0

Table 3. Response Distribution: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies

Survey Item How would you describe your proficiency in….	Participant	% I cannot do this	% I can do this with some assistance	% I can do this indepen-dently	% I can teach others how to do this
Using a word-processing, spreadsheet, or presentation program	Teacher	4	24	24	48
	Student	0	27	34	39
Using web-based tools: word-processor, spreadsheet, presentation, for applications	Teacher	12	40	16	32
	Student	1	36	43	20
Communicating with others using technology	Teacher	0	8	40	52
	Student	1	3	20	76
Using instant communication tools	Teacher	16	16	24	44
	Student	1	2	13	85
Using social networking websites	Teacher	20	12	28	40
	Student	1	3	27	68
Using web-authoring tools	Teacher	44	28	28	0
	Student	25	45	20	11
Using a desktop publishing software to create a newsletter, pamphlet, or awards certificates	Teacher	4	28	36	32
	Student	4	37	30	28

Table 3. Response Distribution: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Survey Item How would you describe your proficiency in….	Participant	% I cannot do this	% I can do this with some assistance	% I can do this indepen-dently	% I can teach others how to do this
Creating e-portfolios	Teacher	28	44	16	12
	Student	33	51	14	2
Using e-books or e-textbooks	Teacher	8	25	29	38
	Student	22	21	40	17
Using textbook publisher resource websites	Teacher	4	20	52	24
	Student	5	34	48	13
Using audio-creation software	Teacher	48	28	4	20
	Student	16	41	21	22
Using video-creation software	Teacher	20	32	24	24
	Student	2	29	33	36
Creating and modifying a multimedia product	Teacher	16	44	12	28
	Student	5	37	33	24
Using online multi-user computer games	Teacher	28	32	24	16
	Student	9	16	38	37
Using online virtual worlds	Teacher	32	36	16	16
	Student	20	30	36	14

Table 3. Response Distribution: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Survey Item How would you describe your proficiency in….	Participant	% I cannot do this	% I can do this with some assistance	% I can do this indepen-dently	% I can teach others how to do this
Using voice over internet protocol (VoIP) from a computer	Teacher	28	28	24	20
	Student	7	22	36	36
Using podcasts, webinars, video streaming	Teacher	29	29	38	4
	Student	15	31	37	16
Using photo-sharing websites	Teacher	33	25	21	21
	Student	14	26	26	34
Creating wikis	Teacher	40	32	20	8
	Student	2	10	38	50
Using a search tool to perform keyword/subject searches in an electronic database	Teacher	0	12	28	60
	Student	2	11	38	49
Using a search engine such as Google, Bing, or Yahoo to search for information on the web	Teacher	0	4	32	64
	Student	0	1	14	85
Using citation or bibliography tools	Teacher	21	21	29	29
	Student	10	29	38	23

Table 3. Response Distribution: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Survey Item How would you describe your proficiency in….	Participant	% I cannot do this	% I can do this with some assistance	% I can do this indepen-dently	% I can teach others how to do this
Evaluating the reliability and credibility of online sources of information	Teacher	8	24	44	24
	Student	5	38	36	21
Understanding the ethical, legal issues surrounding the access to and use of digital information	Teacher	12	20	52	16
	Student	14	30	38	18

Table 4. Response Distribution: Participants' Perspectives of Barriers to Integrating Technology that Enhances Multiliteracies in the Classroom

Survey Item	Participant	% Is not a barrier	% Is a minor barrier	% Is a major barrier
The lack of or limited access to computers in my school	Teacher	44	32	24
	Student	40	36	24
The availability of software in my school	Teacher	48	28	24
	Student	55	41	3
The quality of accessible technology in my classroom	Teacher	42	42	17
	Student	50	39	11
The level of access to internet sites while on campus	Teacher	8	68	24
	Student	15	30	54
My level of knowledge about technology as a teacher	Teacher	44	40	16
My level of know about technology as a student	Student	65	29	5
As a teacher, the use of technology to promote engaged learning in my classroom	Teacher	56	44	0
As a student, the use of technology to promote engaged learning in my classroom	Student	68	29	3
The different skill levels of my students	Teacher	24	68	8
The level of teacher technology skills	Student	25	58	17

Table 4. Response Distribution: Participants' Perspectives of Barriers to Integrating Technology that Enhances Multiliteracies in the Classroom (continued)

Survey Item	Participant	% Is not a barrier	% Is a minor barrier	% Is a major barrier
The lack of technical support at my school	Teacher	52	36	12
	Student	42	48	10
My level of knowledge about ways to integrate technology into the curriculum	Teacher	40	40	20
As a teacher, the time needed to implement a technology integrated curriculum	Teacher	16	32	52

Table 5. Descriptive Statistics: Participants' Beliefs toward the Integration of Technology

Beliefs	Participant	N	Mean	*SD*	Std. Error Mean
I support the use of technology in the classroom	Teacher	25	4.48	0.918	.184
	Student	92	4.76	0.500	.052
A variety of technologies are important for student learning	Teacher	25	4.32	0.945	.189
	Student	92	4.38	0.709	.074
Incorporating technology into instruction helps the students learn	Teacher	25	4.28	0.843	.169
	Student	92	4.23	0.757	.079
Content knowledge should take priority over learning technology skills in the classroom	Teacher	25	3.72	0.614	.123
	Student	92	3.49	0.989	.103
Most of the students have so many other educational needs that technology use is a low priority	Teacher	25	2.16	0.898	.180
	Student	92	2.18	0.948	.099
My motivation to teach [my motivation to learn] increases when technology is integrated into the curriculum	Teacher	25	3.72	0.980	.196
	Student	92	4.02	0.864	.090
Teaching teachers and students how to use technology isn't my responsibility	Teacher	25	2.32	1.145	.229
	Student	92	3.03	0.895	.093
Technology helps me [teachers and students] do things in class that I [they] would not be able to do without technology	Teacher	25	4.40	0.500	.100
	Student	92	4.34	0.760	.079

Table 5. Descriptive Statistics: Participants' Beliefs toward the Integration of Technology (continued)

Beliefs	Participant	N	Mean	*SD*	Std. Error Mean
A teacher's knowledge about technology will improve the teacher's teaching	Teacher	25	4.20	0.577	.115
	Student	92	4.16	0.952	.099
Technology limits the social/face-to-face interactions between students and teachers	Teacher	25	2.28	0.737	.147
	Student	92	2.63	1.035	.108
Technology allows for different teaching strategies to help maximize student learning; technology facilitates the use of a wide variety of instructional strategies designed to maximize student learning	Teacher	25	4.24	0.597	.119
	Student	92	4.36	0.750	.078
Technology helps students make real-life meaning in classroom situations	Teacher	25	4.00	0.764	.153
	Student	92	3.73	0.878	.092
Technology helps students to solve simple and complex problems, and to predict changes in real-life situations	Teacher	25	3.96	0.735	.147
	Student	92	3.91	0.957	.100
Technology takes time to incorporate into the curriculum; time that may be used to develop other instructional strategies	Teacher	25	2.84	0.087	.107

Table 6. Descriptive Statistics: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies

Skill Level and Literacy	Participant	N	Mean	*SD*	Std. Error Mean
ASK – technology	Teacher	25	3.16	0.943	.189
	Student	92	3.12	0.810	.084
BSK – technology	Teacher	25	2.68	1.069	.214
	Student	92	2.82	0.755	.079
CSK – social	Teacher	25	3.44	0.651	.130
	Student	92	3.71	0.584	.061
DSK – social	Teacher	25	2.96	1.136	.227
	Student	92	3.79	0.525	.055
ESK – social	Teacher	25	2.88	1.166	.233
	Student	92	3.63	0.606	.063
FSK – digital	Teacher	25	1.84	0.850	.170
	Student	92	2.16	0.929	.097
GSK – digital	Teacher	25	2.96	0.889	.178
	Student	92	2.83	0.897	.094
HSK – digital	Teacher	25	2.12	0.971	.194
	Student	92	1.86	0.735	.077
ISK – digital	Teacher	25	2.84	1.143	.229
	Student	92	2.53	1.021	.106
JSK – digital	Teacher	25	2.96	0.790	.158
	Student	92	2.68	0.769	.080

Table 6. Descriptive Statistics: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Skill Level and Literacy	Participant	N	Mean	*SD*	Std. Error Mean
KSK – multimedia	Teacher	25	1.96	1.172	.234
	Student	92	2.48	1.011	.105
LSK – multimedia	Teacher	25	2.52	1.085	.217
	Student	92	3.02	0.864	.090
MSK – multimedia	Teacher	25	2.52	1.085	.217
	Student	92	2.73	0.927	.097
NSK – social	Teacher	25	2.28	1.061	.212
	Student	92	3.03	0.943	.098
OSK – multimedia	Teacher	25	2.16	1.068	.214
	Student	92	2.42	0.997	.104
PSK – social	Teacher	25	2.36	1.114	.223
	Student	92	3.01	0.920	.096
QSK – multimedia	Teacher	25	2.08	0.997	.199
	Student	92	2.52	0.978	.102
RSK – visual	Teacher	25	2.20	1.225	.245
	Student	92	2.79	1.064	.111
SSK – information/social	Teacher	25	1.96	0.978	.196
	Student	92	3.36	0.750	.078
TSK – information	Teacher	25	3.48	0.714	.143
	Student	92	3.34	0.760	.079

Table 6. Descriptive Statistics: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Skill Level and Literacy	Participant	N	Mean	*SD*	Std. Error Mean
USK – information	Teacher	25	3.60	0.577	.115
	Student	92	3.84	0.400	.042
VSK – information	Teacher	25	2.56	1.227	.245
	Student	92	2.74	0.924	.096
WSK - information	Teacher	25	2.84	0.898	.180
	Student	92	2.72	0.856	.089
XSK – information	Teacher	25	2.72	0.891	.178
	Student	92	2.62	0.936	.098

Table 7. Descriptive Statistics: Participants' Perspectives of Barriers to Integrating Technology that Enhances Multiliteracies in the Classroom

Barrier	Participant	N	Mean	*SD*	Std. Error Mean
Access	Teacher	25	1.80	0.816	.163
	Student	92	1.84	0.788	.082
Software	Teacher	25	1.76	0.831	.166
	Student	92	1.48	0.564	.059
Equipment	Teacher	25	1.68	0.802	.160
	Student	92	1.61	0.679	.071
Internet	Teacher	25	2.16	0.554	.111
	Student	92	2.39	0.741	.077
Knowledge	Teacher	25	1.72	0.737	.147
	Student	92	1.40	0.594	.062
Technology	Teacher	25	1.44	0.507	.101
	Student	92	1.36	0.546	.057
Technical support	Teacher	25	1.60	0.707	.141
	Student	92	1.66	0.668	.070
Skill level	Teacher	25	1.84	0.554	.111
	Student	92	1.92	0.650	.068
Teacher knowledge	Teacher	25	1.80	0.764	.153
Time	Teacher	25	2.36	0.757	.151

Table 8. Comparison of Means: Participants' Beliefs toward the Integration of Technology

Beliefs	Participants		*t*	*df*	*p*	Cohen's *d*
	Teacher	Student				
I support the use of technology in the classroom	4.48 (0.918)	4.76 (0.500)	-1.471	115	.152	-0.379
A variety of technologies are important for student learning	4.32 (0.945)	4.38 (0.709)	-0.351	115	.726	-0.718
Incorporating technology into instruction helps the students learn	4.28 (0.843)	4.23 (0.757)	0.296	115	.768	0.624
Content knowledge should take priority over learning technology skills in the classroom	3.72 (0.614)	3.49 (0.989)	1.440	115	.155	0.279
Most of the students have so many other educational needs that technology use is a low priority	2.16 (0.898)	2.18 (0.948)	-0.117	115	.907	-0.022
My motivation to teach [my motivation to learn] increases when technology is integrated into the curriculum	3.72 (0.980)	4.02 (0.864)	-1.504	115	.135	-0.325
Teaching teachers and students how to use technology isn't my responsibility	2.32 (1.145)	3.03 (0.895)	-2.883	115	.007	-0.691

Table 8. Comparison of Means: Participants' Beliefs toward the Integration of Technology (continued)

Beliefs	Participants		*t*	*df*	*p*	Cohen's *d*
	Teacher	Student				
Technology helps me [teachers and students] do things in class that I [they] would not be able to do without technology	4.40 (0.500)	4.34 (0.760)	0.392	115	.696	0.093
A teacher's knowledge about technology will improve the teacher's teaching	4.20 (0.577)	4.16 (0.952)	0.185	115	.854	0.051
Technology limits the social/face-to-face interactions between students and teachers	2.28 (0.737)	2.63 (1.035)	-1.585	115	.116	-0.390
Technology allows for different teaching strategies to help maximize student learning	4.24 (0.597)	4.36 (0.750)	-0.730	115	.467	-0.177
Technology helps students make real-life meaning in classroom situations	4.00 (0.764)	3.73 (0.878)	1.526	115	.134	0.328
Technology helps students to solve simple and complex problems, and to predict changes in real-life situations	3.96 (0.735)	3.91 (0.957)	0.228	115	.820	0.059

Note: $p < .05$

Table 9. Comparison of Means: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies

Skill Levels and Literacy	Participants		*t*	*df*	*p*	Cohen's *d*
	Teacher	Student				
ASK – technology	3.16 (0.943)	3.12 (0.810)	0.214	115	.831	0.046
BSK – technology	2.68 (1.069)	2.82 (0.755)	-0.593	115	.557	-0.151
CSK – social	3.44 (0.651)	3.71 (0.584)	-1.973	115	.051	-0.437
DSK - social	2.96 (1.136)	3.79 (0.525)	-3.567	115	.001	-0.938
ESK – social	2.88 (1.166)	3.63 (0.606)	-3.105	115	.004	-0.807
FSK – digital	1.84 (0.850)	2.16 (0.929)	-1.568	115	.120	-0.359
GSK – digital	2.96 (0.889)	2.83 (0.897)	0.663	115	.509	0.146
HSK – digital	2.12 (0.971)	1.86 (0.735)	1.466	115	.145	0.302
ISK – digital	2.84 (1.143)	2.53 (1.021)	1.301	115	.196	0.286
JSK – digital	2.96 (0.790)	2.68 (0.769)	1.577	115	.117	0.359
KSK – multimedia	1.96 (1.172)	2.48 (1.011)	-2.196	115	.030	-0.475
LSK – multimedia	2.52 (1.085)	3.02 (0.864)	-2.136	115	.040	-0.510

Table 9. Comparison of Means: Participants' Perspectives of Technology Skill Levels Associated with Multiliteracies (continued)

Skill Levels and Literacy	Participants		*t*	*df*	*p*	Cohen's *d*
	Teacher	Student				
MSK – multimedia	2.52 (1.085)	2.73 (0.927)	-0.960	115	.339	-0.208
NSK – social	2.28 (1.061)	3.03 (0.943)	-3.444	115	.001	-0.747
OSK – multimedia	2.16 (1.068)	2.42 (0.997)	-1.156	115	.250	-0.252
PSK – social	2.36 (1.114)	3.01 (0.920)	-2.995	115	.003	-0.636
QSK - multimedi	2.08 (0.997)	2.52 (0.978)	-1.995	115	.048	-0.446
RSK – visual	2.20 (1.225)	2.79 (1.064)	-2.393	115	.018	-0.514
SSK – information/social	1.96 (0.978)	3.36 (0.750)	-7.724	115	.000	-1.606
TSK – information	3.48 (0.714)	3.34 (0.760)	0.845	115	.400	0.190
USK – information	3.60 (0.577)	3.84 (0.400)	-1.930	115	.063	-0.483
VSK – information	2.56 (1.227)	2.74 (0.924)	-0.679	115	.502	-0.166
WSK - information	2.84 (0.898)	2.72 (0.856)	0.629	115	.531	0.137
XSK – information	2.72 (0.891)	2.62 (0.936)	0.481	115	.632	0.109

Note: $p < .05$

Table 10. Comparison of Means: Participants' Perspectives of Barriers to Integrating Technology that Enhances Multiliteracies in the Classroom

Barriers	Participants		*t*	*df*	*p*	Cohen's *d*
	Teacher	Student				
Access	1.80 (0.816)	1.84 (0.788)	-0.206	115	.837	-0.050
Software	1.76 (0.831)	1.48 (0.564)	1.599	115	.120	0.394
Equipment	1.68 (0.802)	1.61 (0.679)	0.488	115	.655	0.094
Internet	2.16 (0.554)	2.39 (0.741)	-1.713	115	.093	-0.352
Knowledge	1.72 (0.737)	1.40 (0.594)	2.249	115	.026	0.479
Technology	1.44 (0.507)	1.36 (0.546)	0.670	115	.504	0.152
Technical support	1.60 (0.707)	1.66 (0.668)	-0.413	115	.680	-0.087
Skill level	1.84 (0.554)	1.92 (0.650)	-0.589	115	.557	-0.132

Note: $p < .05$

Table 11. Thematic Coding: Teachers' Responses to "What is the role of technology in the classroom?"

Significant Statement	Formulated Meaning	Theme
To support not replace [the teacher] To accentuate the materials collected over the years To access online curriculum To allow teachers to do a better job	Technology used as a tool to facilitate administrative duties	Administrative tasks
To offer variety To involve To engage students To keep students who are computer savvy tuned in To provide methods of keeping students attention	Technology used as a tool to obtain/maintain student attention in the learning environment; to enhance attention in the classroom	Attention
Short computers in the classroom Limited internet access	Technology seen as a barrier to learning in the classroom	Barrier
To help students learn to operate and function in a technology society To help students to use technology that is being used in colleges To produce professional projects and work To provide opportunities to participate in real world projects	Technology used as a tool to facilitate and promote students' college and career readiness	College/Career Readiness

Table 11. Thematic Coding: Teachers' Responses to "What is the role of technology in the classroom?" (continued)

Significant Statement	Formulated Meaning	Theme
Tool for learning To enhance and facilitate student success To engage in learning and instructional process To enhance students' learning opportunities/experiences To facilitate teaching core concepts To help teachers help students to learn Visual, hands-on technology to encourage learning	Technology used as a tool to enhance/facilitate/ promote students' cognitive learning experiences	Cognitive
Way of daily life That is all they know today	Technology used to enhance cultural literacy in the classroom	Cultural Literacy
To replace outdated information Used to obtain information	Technology used to enhance information literacy in the classroom	Information Literacy
A tool, not a replacement of content Tool for instruction To enhance coursework	Technology used to enhance instructional pedagogy in the classroom	Instruction

Table 12. Axial Coding: Teachers' Responses to "What is the role of technology in the classroom?"

Theme	Frequency	Percentage
Cognitive	13	34%
Attention	6	16%
Administrative tasks	5	13%
College/Career Readiness	5	13%
Instruction	3	9%
Barrier	2	5%
Cultural Literacy	2	5%
Information Literacy	2	5%

Table 13. Thematic Coding: Teachers' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?"

Significant Statement	Formulated Meaning	Theme
Ability to learn	Students should develop the habits of a life-long learner	Cognitive
To evaluate the credibility of an author and a piece Ability to discern bias and fallacy in web text Critical thinking; problem solving	Students should develop critical skills that help to discern credibility, reliability, and validity in informational sources	Critical Literacy
Learn core content	Students should develop a foundation of core knowledge of their culture and other cultures	Cultural Literacy
Understanding plagiarism Discernment in using internet sources Checking bias How to research	Students should develop effective research skills	Information Literacy
Learn to write a paper and use grammar correctly Read a text with full comprehension Be able to respond to a text and make connections	Students should be proficient in the traditional literacy skills of reading and writing	Literacy
Self starter Be innovative Ability to be an independent learner	Students should develop skills that promote independence and initiative	Motivation

Table 13. Thematic Coding: Teachers' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?" (continued)

Significant Statement	Formulated Meaning	Theme
Responsible social networking To be able to express yourself in written and spoken language Ability to interact face-to-face	Students should develop social networking skills	Social Literacy
Fluent in technology To be able to use different [computer] programs Ability to perform basic computer operations Navigate websites	Students should develop computer skills that will promote success in their daily lives – college and career	Technology Literacy

Table 14. Axial Coding: Teachers' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?"

Theme	Frequency	Percentage
Technology Literacy	10	25%
Literacy (reading & writing)	7	18%
Social Literacy	7	18%
Critical Literacy	6	15%
Information Literacy	5	13%
Motivation	3	7%
Cognitive	1	2%
Cultural Literacy	1	2%

Table 15. Thematic Coding: Teachers' Responses to "What are the steps you as a teacher need to take to prepare yourself for the literacy (multiliteracies) expectations of the Common Core State Standards?"

Significant Statement	Formulated Meaning	Theme
I don't know enough about CCSS Not familiar with CCSS I need to know what the expectations are Specific standards have not been produced Hope that administration will take a lead in providing guidance and instruction	Teachers identified their level of familiarity and understanding of the literacy expectations of the Common Core State Standards; many teachers are unfamiliar and lack the understanding to fully implement the literacy expectation of CCSS	Knowledge of Common Core State Standards
Time to dissect CCSS I must cultivate time from my schedule to practice To learn new technologies To acquire source people to help me learn how to use technology more effectively To learn to relax and not stress over accountability issues of using technology To be a life-long learner Learn how to help students explore and learn using their strengths Training that is relevant to what is happening in the classroom Going through standards bit by bit to see what can apply to my classroom	Teachers identified personal needs to prepare for the implementation of the literacy expectations of CCSS	Preparation

Table 15. Thematic Coding: Teachers' Responses to "What are the steps you as a teacher need to take to prepare yourself for the literacy (multiliteracies) expectations of the Common Core State Standards?" (continued)

Significant Statement	Formulated Meaning	Theme
I need to expose my students to multiple platforms for learning I need to create an engaged learning environment I need to learn to be a facilitator I need to do more hands-on learning I need to teach students how to read deeper	Teachers identified changes they are making in their pedagogical approach to student learning in the classroom	Implementation

Table 16. Axial Coding: Teachers' Responses to "What are the steps you as a teacher need to take to prepare yourself for the literacy (multiliteracies) expectations of the Common Core State Standards?"

Theme	Frequency	Percentage
Preparation	14	49%
Knowledge of CCSS	10	34%
Implementation	5	17%

Table 17. Thematic Coding: Teachers' Suggestions or Comments about the Integration of Technology

Significant Statement	Formulated Meaning	Theme
Learn by doing Activities that aren't directly aligned to assessment are still just busy work, regardless of the technology used	The integration of technology in the classroom for assessment of learning was not readily supported by the teachers	Assessment
Relate the content knowledge to their everyday lives Incorporate technology for kids to understand in today's world	The integration of technology in the classroom needed to be relevant, real-life, and real-time	Authenticity
Integral part of education Get students involved in using computers and programs	The integration of technology in the classroom to enhance students' college and career readiness was supported by the teachers	College/Career Readiness
Exciting, overwhelming, scary Mass of confusion Ignorance of sources Uncertainty, apprehension Fear of failure Don't be scared of technology Need for confidence for positive results Sometimes teachers incorporate technology only for technology's sake	The integration of technology in the classroom created a plethora of emotional responses by the teachers; technology brings about change for the teachers, and change stimulates anxieties toward the unknown	Emotional characteristics

Table 17. Thematic Coding: Teachers' Suggestions or Comments about the Integration of Technology (continued)

Significant Statement	Formulated Meaning	Theme
$$ needs to be spent on equipment and training	The integration of technology in the classroom created an awareness of the lack of equipment in the classroom and the economical requirements in acquiring the needed equipment	Equipment
Use the internet I have not bought into the multiliteracies concept Anything that takes away from being able to read and write is a distraction Students don't need any additional time watching videos I'm all about multiple forms of literacy – one is good, but five forms are better…find one that works [for the students]	The integration of technology to enhance multiliteracies in the classroom generated conflicting opinions by the teachers; some teachers embraced the diversity of the multiliteracies, while others did not	Multiliteracies
More time to set up lessons using technology Practice…practice the content	The integration of technology prompted preparation needs identified by the teachers: time and practice	Preparation
Specific training needed Willing to be the student as long as the teacher is willing to use a wide variety of techniques to teach me	The integration of technology in the classroom identified teachers' need for training	Training

Table 18. Axial Coding: Teachers' Suggestions or Comments about the Integration of Technology

Theme	Frequency	Percentage
Emotional characteristics	13	42%
Multiliteracies	5	17%
Training	3	10%
Assessment	2	7%
Authenticity	2	7%
College/Career Readiness	2	7%
Preparation	2	7%
Equipment	1	3%

Table 19. Thematic Coding: Students' Responses to "What is the role of technology in the classroom?"

Significant Statement	Formulated Meaning	Theme
To type or print papers and reports To replace books To submit assignments online To make the students work better and more time efficient To make things easier for the teacher	Technology used as a tool to facilitate various administrative tasks that are performed in the classroom	Administrative tasks
To gain further knowledge and understanding about things in the world that are harder to see using books that might be out of date To broaden my [student] knowledge and strengthen my ability to apply what I know through technology To allow students a free range of how to do their work and how long to take to do their work To allow the freedom to learn what they want to learn Books can only get you as far as their publication date; with technology we can have up to date information on practically any subject Technology should be used sparingly in the classroom because Aristotle, Plato, Newton, etc. It was a journey and the hardships that they had to pass in which led them to a greater knowledge, not an abundant of new age technology	Technology used as a tool to enhance cognitive learning experiences in the classroom	Cognitive

Table 19. Thematic Coding: Students' Responses to "What is the role of technology in the classroom?" (continued)

Significant Statement	Formulated Meaning	Theme
To find more resources To do research To help us gain information for classroom projects, research, and studies To expose students to outside information that teachers can't provide for us in a textbook	Technology used as a tool to research various topics of interest	Information Literacy
To add variety to the different ways of teaching and learning To provide a more clear and interesting way to teach and present lessons To provide the students with other ways of learning and presenting projects To better educate us [students] in multiple different subjects	Technology used as a tool to enhance instructional pedagogy in the classroom	Instruction
To read online To take notes To write essays To access online books and stories To access e-books	Technology used as a tool to enhance traditional literacy skills of reading and writing	Literacy
To do projects To do virtual tours online To use online flashcards To allow students to have an interactive study through Edline links To enhance the visual learning environment	Technology used as a tool to enhance multiliteracies in the classroom	Multiliteracies

Table 20. Axial Coding: Students' Responses to "What is the role of technology in my classroom?"

Theme	Frequency	Percentage
Information Literacy	54	28%
Cognitive	53	26%
Multiliteracies	39	19%
Administrative tasks	23	11%
Literacy (Reading and Writing)	18	9%
Instruction	14	7%

Table 21. Thematic Coding: Students' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?"

Significant Statement	Formulated Meaning	Theme
Know how to type papers electronically Know how to turn in an assignment online Know how to check grades online	Students should develop administrative skills such as typing and organization	Administrative tasks
Learn more than one language To know how to learn Learn how to comprehend what you are reading faster Listen New ways of studying	Students should maintain habits exemplary to life-long learners	Cognitive
Be able to put thoughts together in an orderly fashion Think through problems efficiently and effectively Problem solving	Students should develop and maintain critical thinking and problem solving skills	Critical Literacy
Know how to research Learn to search the Internet with appropriate use of a search engine How to look up reliable information New ways of researching	Students should develop and maintain appropriate research skills that support credible, reliable, and valid information	Information Literacy
Know how to write, read, and research with ease Read proficiently	Students should maintain proficient reading and writing skills	Literacy (Reading and Writing)

Table 21. Thematic Coding: Students' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?" (continued)

Significant Statement	Formulated Meaning	Theme
Know how to create a presentation using PowerPoint Know how to make extended/edited videos Know how to use Photoshop, Audacity, Adobe Premier Know how to use audio sites that read books to you	Students should know how to use various technologies to enhance multiliteracies	Multiliteracies
Know how to interact with social media sites How to communicate with social networking sites New ways of leadership Learn to communicate well with others Communicate using email or Skype	Students should know how to communicate responsibly using social media/social networking sites	Social Literacy
Know basic knowledge of using a computer Know basic skills of surfing the web Know how to navigate websites Know a variety of programs and software skills How to work the Microsoft Office programs Know basic programs – Microsoft Word, PowerPoint, Publisher, Excel Technology literacy skills – computers/laptops, smartboards, online schedules and notes, study materials	Students should know basic technology literacy skills such as computer operations, navigation of the Internet, and the dominant computer software programs	Technology Literacy

Table 22. Axial Coding: Students' Responses to "What new literacy skills must be learned by any 21st century student in order to prepare for college and career?"

Theme	Frequency	Percentage
Literacy (Reading and Writing)	44	20%
Technology Literacy (basic skills and equipment)	38	18%
Technology Literacy (software programs)	33	15%
Information Literacy	28	13%
Administrative Tasks	21	10%
Social Literacy	18	8%
Multiliteracies	17	8%
Critical Literacy	11	5%
Cognitive	6	3%

Table 23. Thematic Coding: Students' Suggestions or Comments about the Integration of Technology in the Classroom

Significant Statement	Formulated Meaning	Theme
To make teachers' work much simpler Teachers can quickly access documents Technology used to distribute information by teachers more easily, and more efficiently	Technology used as a tool to facilitate various administrative tasks that are performed in the classroom	Administrative tasks
It [technology] helps students engage more into learning Supports learning by making kids want to pay attention Makes learning more fun Using technology can greatly increase the motivation of students	Technology used as a tool to obtain/maintain student attention in the learning environment; to enhance attention in the classroom	Attention
By providing students with the proper preparation into learning the software they need to excel in their lives in the 21st century By helping the student research the topic and help them with facing technology in a college setting Gives students the things they need to learn about which will affect their adult life I believe that technology is becoming the world and if we don't jump on it fast and teach the students and use what we have we will be behind others going to college or even looking for our first job	Technology used as a tool to facilitate and promote students' college and career readiness	CCR

Table 23. Thematic Coding: Students' Suggestions or Comments about the Integration of Technology in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
If we are taught something on the computer we are learning two things at once…and reinforcing the literacy we are learning Helps student understand things from many different views Technology helps students learn through visual, oral, and other varieties of communication I personally learn better through technology than anything else – it will make it quicker and easier to learn	Technology used as a tool to enhance cognitive learning experiences in the classroom	Cognitive
Students that are growing up in today's world are so used to technology Supports learning by making the students more up to date with the world we live in today The integration of technology into a classroom will promote a better environment for a 21st century student whose life is now based around the gadgets in their hand and at home The new generation of students are more connected with technology than with a book Technology isn't just a term that people can associate with a "nerd" – it is a term that people need to associate with their lives because it is engulfing us and surrounding us as people every day	Technology used as a tool to enhance cultural literacy in the classroom	Cultural Literacy

Table 23. Thematic Coding: Students' Suggestions or Comments about the Integration of Technology in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
When I need an answer right away, I know where to find it with technology; easier to find information Able to explore a situation more by going online and using different search engines New literacy such as informational websites allow students to quickly access information for many things like for a research paper or a project	Technology used as a tool to research various topics of interest	Information Literacy
Technology can enhance teacher instruction and student learning by teaching the teacher new and improved ways to teach their students; it relates to us more than just using an average book While the teacher is teaching the lesson he/she can simply click on a link he/she puts on his/her lesson that will show us a video or some kind of visual aide to help with what we are learning A teacher's way of teaching their students is only limited to the amount of material they have; with technology being infused into their curriculum they will have up to date information to then explain to their students If a teacher can learn how to use technology properly they can use it in the classroom to support their lessons…and gage skill level in the given area of study	Technology used as a tool to enhance instructional pedagogy in the classroom	Instruction

Table 23. Thematic Coding: Students' Suggestions or Comments about the Integration of Technology in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
Recording of a person reading the story…makes it easier to understand the story and to keep up with it Visualizations, animations, videos To help create projects	Technology used as a tool to view, listen to, and create multimedia	Multimedia
In today's society, technology plays a key role in everything we do To give students more access to learning tools Textbooks should be gotten rid of and replaced by online books which students can access using laptops, iPads, and Kindles	Technology as a tool to meet the needs of the students	Technology Literacy
The poem was easier to understand once we were shown a video that was based on the poem Gives the students a visual aide, and shows them what they are suppose to do Helps students see pictures of anything they would not have been able to see otherwise	Technology as a tool to enhance visual literacy and support cognitive functions	Visual Literacy

Table 24. Axial Coding: Students' Suggestions or Comments about the Integration of Technology in the Classroom

Theme	Frequency	Percentage
Cognitive	58	20%
Instruction	42	15%
Attention	34	12%
Technology Literacy	26	9%
Information Literacy	23	8%
Administrative tasks	22	8%
Multimedia	20	7%
Visual Literacy	20	7%
College and Career Readiness	19	7%
Cultural Literacy	19	7%

Table 25. Thematic Coding: Teachers' Interviews – Technology to Enhance Multiliteracies in the Classroom

Significant Statement	Formulated Meaning	Theme
Students work in groups and complete problem solving activities Students get frustrated when they are limited in their choices Words that were on the page were just words on a page…but when they associated the music video that didn't have any words they could make sense of the mood/tone of the poem a lot better than having just read it Students create comparative video where the compared two topics or a change in continuity over time Students make arguments and counter arguments about different prompts	Technology enhances critical literacy experiences	Critical Literacy
Used a T.V. clip from "Family Guy" where Holden Caulfield was a character Used the "Simpson's" version of the "Raven" For some it is more natural to look at a screen than it is to turn a page Students lack basic foundation in cultural literacy – their heritage and others heritage	Technology enhances cultural literacy experiences; modern culture and traditional heritage are important aspects of cultural literacy	Cultural Literacy

Table 25. Thematic Coding: Teachers' Interviews – Technology to Enhance Multiliteracies in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
Webquests – students research poets to give biographical information Students use e-readers as opposed to going out and buying the text Textbook is online – not a physical textbook Put a book on the computer and they will read it more than if you put a book in their hand	Technology enhances the exposure to digital literacy; most students respond positively to digital literacy	Digital literacy
Use online resources Need to be more conscious of plagiarism Need to know how to cite sources Students had to research topic and use 5 different sources If there are questions that students don't know, they pull out phone to look them up	Technology enhances the access to information literacy	Information Literacy
Students use cameras to take pictures of projects Images, pictures, text – students are into more of this today than simply textbook reading Students created a sociogram – a symbol to represent the character and relationship to other characters Students create pictures that represent the vocabulary words Integrating art into the social studies	Technology enhances the exposure to visual literacy	Visual Literacy

Table 26. Axial Coding: Teachers' Interviews – Technology to Enhance Multiliteracies in the Classroom

Theme	Frequency	Percentage
Critical Literacy	47	40%
Cultural Literacy	23	20%
Information Literacy	18	16%
Digital Literacy	17	15%
Visual literacy	10	9%

Table 27. Thematic Coding: Teachers' Interviews – Other Uses of Technology

Significant Statement	Formulated Meaning	Theme
Update grades and create links through Edline Students save documents to file and submit electronically A central location for information rather than thumbing through notes	Technology used as a tool for administrative tasks	Administrative tasks
Star Reader Quizlet Standardized tests	Technology used as a tool for assessment	Assessment
It doesn't matter where you are going to work, there are going to be computer skills you absolutely must have in order to succeed If we don't prepare these kids a far as being computer savvy enough to get out there then they are not going to succeed Students need a basic command of the dominant software programs, email, and typing	Technology used as a tool for student college and career preparedness	CCR
Project-based learning Use 3-4 minute videos to introduce new material Students listen to iPods while working Use Lab Bench to explore virtual lab before actually conducting the lab in class	Technology used as a tool to facilitate instruction in the classroom; technology promotes student-centered instruction	Facilitate classroom instruction

Table 27. Thematic Coding: Teachers' Interviews – Other Uses of Technology (continued)

Significant Statement	Formulated Meaning	Theme
Students are so tuned in…they are willing to work with things on a computer that they might refuse to do otherwise I don't have to keep them on task because they are engaged Students who are not normally motivated are motivated if I give them technology Something about putting it on a computer makes it a little "cooler"	Technology used as a tool to obtain/maintain student attention in the learning environment; to enhance attention in the classroom	Student attention

Table 28. Axial Coding: Teachers' Interviews – Other Uses of Technology

Theme	Frequency	Percentage
Administrative tasks	21	28%
CCR	17	22%
Student attention	15	20%
Facilitate classroom instruction	13	17%
Assessment	10	13%

Table 29. Thematic Coding: Teachers' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom

Significant Statement	Formulated Meaning	Theme
Need more access to equipment Moving equipment from room to room	Access to equipment to equipment served as a barrier to integrating technology	Access
Subscriptions to online sources More equipment and materials	Lack of funds/budget to purchase equipment, materials, and subscriptions to technology sources served as a barrier to integrating technology	Budget
Smartboard doesn't work or the projector bulb burns out Computers left unplugged and so they cannot be used by the next student because battery wasn't charged	Various equipment failures served as a barrier to integrating technology	Equipment failures
Have to take time to make sure students understand how to use the technology Students lack the basic computer skills to use dominant programs Students become complacent with the technologies because they become everyday activity; students become disengaged with older technologies	Diverse student skill levels served as a barrier to integrating technology	Student diverse skill levels
Biggest problem is getting students "logged-in" Students forget their password Takes so long to connect to the network	Student login process served as a barrier to integrating technology	Student login process

Table 29. Thematic Coding: Teachers' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
Not time effective with current skills Need time to practice using technology Need to make time for teachers to learn how to use the equipment they have Cautious to make sure it [technology] doesn't waste time [in the classroom] Need time to pull up video clips Lack of time to further develop curriculum	Time for training, practice, curriculum development and integration of technology served as a barrier to integrating technology	Time

Table 30. Axial Coding: Teachers' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom

Theme	Frequency	Percentage
Time – training, practice, integration	25	45%
Access to equipment; lack of equipment	8	14%
Budget for equipment and materials	8	14%
Student login process	6	11%
Equipment failures	5	9%
Student diverse skill levels	4	7%

Table 31. Thematic Coding: Students' Interviews - Technology to Enhance Multiliteracies in the Classroom

Significant Statement	Formulated Meaning	Theme
Project in social studies – art around the world and had to show significance to us, and research the piece on the internet Examine/evaluate Malcolm Glidewell poems in New York Times and identify rhetorical strategies in the text Student created project based on the football championship theme – football field fades into state ring – chose the wind as the sound effect to create the time passing by We ask what is the author trying to say with this picture; why would the author use this picture	Students used technology to enhance critical literacy; emphasis on project-based learning and analysis of images	Critical Literacy
We read digital information and we are suppose to write about it Webquests Our stories are on Edline so we can read them on their and do our homework Our "textbook" is online	Students used technology to enhance digital literacy experiences	Digital Literacy

Table 31. Thematic Coding: Students' Interviews - Technology to Enhance Multiliteracies in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
Favorite project was the brochure because we got to look up all the different facts Research report over current news issue – 3 page typed research paper Technology is easier to use when you are trying to find something, than when you are thumbing through a book Research topics in Google and find a reliable source If it ends in .gov, .net, those are safest; if it has commercials those are not the best and Wikipedia is not that good either because anyone can get on there and change it	Students used technology to enhance information literacy; emphasis on Internet-based research	Information Literacy
Used Animoto to create presentation on Frankenstein theme Uses video clips in class – helps students learn Listen to poems on CD as students read them Listened to music to learn "Onomatopoeia" poem Students could get pictures off phone for the "All About Me" project	Students used technology to enhance multimedia in the classroom; emphasis on video and audio	Multimedia
Student reads graphic [images] novels on her own, but does not use them in the classroom PowerPoint presentations spark visual learning more than the teacher just said	Students used technology to enhance visual literacy in the classroom; emphasis on the use of PowerPoint presentations	Visual Literacy

Table 32. Axial Coding: Students' Interviews – Technology to Enhance Multiliteracies in the Classroom

Theme	Frequency	Percentage
Multimedia – audio, video, ppt projects	64	38%
Information Literacy	43	26%
Critical Literacy	24	14%
Digital Literacy	21	13%
Visual Literacy	15	9%

Table 33. Thematic Coding: Students' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom

Significant Statement	Formulated Meaning	Theme
Students abuse privileges and look up things they shouldn't Students use phone for texting in class	Students perceived the abuses of equipment by other students as a barrier to enhance multiliteracies in the classroom	Abuses of equipment
Diversity in student skill levels, but usually does not cause a problem – student and teacher address the needs	Students did not perceive the diversity in student skills as a barrier to enhancing the multiliteracies in the classroom	Diversity in student skills
Sometimes teachers have a hard time using it when they don't know how to use it	Students perceived the diversity in teachers technology skills as a barrier to enhancing multiliteracies in the classroom	Diversity in teacher skills
Problems with using technology in the classroom is when it fails we don't know what to do without technology Computer freezes Batteries dead; someone forgets to plug in the computer	Students perceived equipment failures as a barrier to enhancing multiliteracies in the classroom	Equipment failures

Table 33. Thematic Coding: Students' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom (continued)

Significant Statement	Formulated Meaning	Theme
Limited types of technology the school allows Students are not allowed to use phones Would like to see more technology in the classrooms	Students perceived the limited types of technology available in the classroom as a barrier to enhancing multiliteracies in the classroom	Limited types of technology
Some websites that you need are blocked	Students perceived the school filter as a barrier to enhance multiliteracies in the classroom	School filter

Table 34. Axial Coding: Students' Interviews – Barriers to Integrating Technology to Enhance Multiliteracies in the Classroom

Theme	Frequency	Percentage
School filter	7	32%
Limited types of technology	5	22%
Abuses of equipment	3	14%
Equipment failures	3	14%
Diversity in teacher skills	2	9%
Diversity in student skills	2	9%