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# A multiple case study analysis of middle grades social studies teachers' instructional use of digital technology with academically talented students at three high-performing middle schools

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# A Multiple Case Study Analysis of Middle Grades Social Studies Teachers' Instructional Use of Digital Technology with Academically Talented Students at Three High-Performing Middle Schools

by

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## ABSTRACT

Appropriate education for academically talented students incorporates the use of complex thinking skills, and encourages the development of interpersonal and leadership skills. One potential tool to achieve these goals is the use of instructional technology. Siegle (2004a, 2005) suggests that it is particularly appropriate to utilize technology with the highly-able because they often possess skills that are effective when using today's technology, specifically abstract thinking and rapid processing.

This mixed methods multiple case study explored middle school social studies teachers' instructional use of digital technology to teach highly-able students. The participant teachers were from three high-performing schools, as identified by each school's performance on the state standardized test, and in the school's achievement of AYP. The participants at each school were asked to complete the Internet Use Survey, modified from VanFossen's survey (1999, 2005) and participate in a group interview to gather related information not addressed in the survey. From this larger group of teachers, ten teachers were asked to participate in further study. These ten teachers

participated in an interview, submitted instructional-related documents for one month, and were observed in a self-identified, typical technology integration lesson.

Findings from this study indicate that the participant teachers viewed technology integration as being beneficial to the education of the academically talented student. However, their practice did not reflect this importance. The participant teachers largely used available classroom technology for teacher-centered activities, including information gathering and presentation. Students were rarely engaged in higher-order thinking tasks using the available technology. The participant teachers identified a number of barriers to their technology integration, primarily equipment functionality and availability.

Despite the widespread equipment concerns, one teacher utilized the school's available technology to engage academically talented students in student-centered instructional activities. The Technological Pedagogical and Content Knowledge (TPACK) conceptual framework can be used to examine why this one teacher used technology differently than the other participant teachers. Additionally, using this teacher's example and the TPACK framework, suggestions for teacher professional development are provided.

# Chapter One

## Introduction

### *Statement of the Problem*

Academically talented students typically are underserved in the middle school environment (Swiatek & Luplowski-Shoplik, 2003). This deficiency is rooted in a number of areas. First, the current standards-based reform movement ignores the needs of the gifted, or academically talented, child in its effort to develop minimum competencies for all students (Davidson, Davidson, & Vanderkam, 2004; Stanley & Baines, 2002; Tomlinson, 2002). In January 2002, President George W. Bush signed into law federal legislation entitled No Child Left Behind (NCLB), a standards-based initiative, designed to require accountability in educational achievement. NCLB policies call for educational proficiency for all students (U.S. Department of Education, 2004). This legislation may have, as many advocates for academically talented students believe, a negative impact on the education of the nation's brightest students. Tomlinson (2002), an advocate for gifted students, suggests that academically talented students will be adversely affected by the No Child Left Behind initiative through benign neglect. Her concern is the impact on the students who have already reached proficiency. Tomlinson questions whether their needs will be ignored in a class where the teacher must focus on raising the proficiency of the lowest performing students. Indeed, as schools and teachers shift their focus to basic skills and test preparation, curricula designed to emphasize depth of knowledge, develop

higher-order thinking, and the integration of disciplines are all but abandoned. This shift toward test preparation has created a situation in which teachers are either unwilling or unable to utilize the methods known to benefit the academically talented student (Moon, Brighton, & Callahan, 2003; Rakow, 2007).

Second, beliefs intrinsic in middle school education, such as heterogeneous grouping, may have a negative effect on academically talented students--causing a delay in achievement (Tomlinson, 1994). Homogeneous grouping of academically talented students is a much-debated topic especially in the middle schools (Rakow, 2005; Rosselli & Irvin, 2001). The middle school concept clearly outlines that heterogeneous grouping of students is necessary. Indeed, the National Council of Social Studies (NCSS) expressly states that social studies classes should be heterogonous to promote democratic ideals (1991). Tomlinson (1994) refers to academically talented learners as the "boomerang kids of middle school" (p. 177) as the middle school concept in its practiced form is not ideally suited for the gifted student, especially in heterogeneous classes. She uses the term "boomerang" to indicate that the gifted child's self-concept and achievement is affected adversely by the heterogeneous groupings of the middle school model, as any educational and emotional gains achieved in the elementary schools often are lost in the middle schools. Gifted specialists strongly advocate for opportunities for academically talented students to share and work with other individuals who process on a similar level (Clark, 1997). In a meta-analysis investigation, Kulik and Kulik (2004) determined that academically talented students grouped into homogenous or nearly homogeneous groupings experienced statistically significant "positive effects." The debate regarding

heterogeneous versus homogenous grouping in the middle grades continues and is one of the contributing factors in the lack of services provided to academically talented middle grades students. Finally, teachers are either unwilling or unable to modify instruction for gifted students, due either to a perceived lack of time or a lack of comfort integrating or incorporating gifted modifications (Moon, Brighton, & Callahan, 2003; Swiatek & Luplowski-Shoplik, 2003).

Academically talented students require an environment that necessitates the use of complex thinking skills--one that includes problem solving and higher-order thinking, enhances creativity and research skills, and encourages the development of interpersonal and leadership skills. Appropriate education for academically talented students requires modification of curricula in the form of content, process, and product (Winebrenner, 2001). In addition, it should include curricular enrichment and acceleration that incorporates student interest and inquiry-based learning. Renzulli (1977) suggests that the incorporation of student interests will stimulate the student's intrinsic motivation to seek intellectual challenge.

Adolescents are interested in and utilize digital technology. Recent Pew Internet & American Life studies indicate that 93% of teens use technology, and that 88% of teens see the Internet and digital devices such as MP3 players, digital cameras, and cell phones as making their lives easier (Lenhart, Madden, Macgill, & Smith, 2007; Macgill, 2007). This positive attitude toward technology would indicate that appropriate education for the academically talented student, as suggested by Renzulli (1977), would incorporate technology. Siegle (2004a, 2005), calls for the use of technology with the academically

talented, not only because of their interest in and attitude toward technology, but also because academically talented students typically possess skills that are particularly effective when using today's technology, specifically abstract thinking and rapid processing.

The National Council for the Social Studies has also weighed in on the importance of including technology within the curriculum. In the organization's 2006 position statement regarding the use of technology in the social studies classroom, it states that as social studies educators, "We need to capitalize on many students' ubiquitous, yet social, use of technology and demonstrate the technology's power as a tool for learning" (p.2). Indeed, technology is an essential component in the social studies curriculum, whether it is an analysis of the socioeconomic impact of new technology, or utilizing digital primary sources. Technology should be contextually integrated into the social studies curriculum as a reflection of its impact on the modern world (National Council for the Social Studies, 2006).

Much has been written on the importance of integrating technology in the social studies (Berson & Bolick, 2007; Berson, Lee, & Stuckart, 2001; Friedman & Hicks, 2006; Martorella, 1997; Whitworth & Berson, 2003). In their 2006 analysis of the trends in research related to technology integration in the social studies, Friedman and Hicks (2006) note that the field has begun to move away from discussions on the potential of technology integration and toward a discussion of how "technology-enhanced instructional strategies can scaffold student learning"(p. 248). In their analysis of the

needs of the field, they called for continued dialogue in a number of areas, two of which are of particular interest to this study:

> … examine how the contextual constraints and realities of school serve to influence how teachers and students are using technology in the classroom; and develop, describe, and carefully research products and process that use technology-enhanced instructional strategies to support teacher needs and scaffolds student learning within and across the social studies disciplines (p. 252).

This study attempts to accomplish these tasks: to examine how middle school social studies teachers integrate technology in their instructional decisions, and to determine the factors that influence these decisions.

*Purpose of the Study*

The purpose of this study was to determine the ways in which social studies teachers of academically talented students in high-performing western Florida middle schools use digital technology in their classrooms, and the factors that influence this use. As this study examined the type of technology used, the frequency of technology use, and the factors that impacted the teachers' use of technology, a mixed methods approach (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 1998) was deemed most appropriate. For this study the qualitative data provided illumination and clarification to the information gathered in a survey, analyzed using quantitative methods, a process that Onwuegbuzie and Leech (2005) call pragmatic research.

This study utilized constructs from both the pragmatic and constructivist research paradigms (Paul, 2005). Pragmatic educational research is concerned with applying

research into practice. This study is concerned with teaching practices and the factors that influence that practice. Additionally, Tashakkori and Teddlie (1998) argue that pragmatism is the theoretical paradigm to which the mixed methods approach to research is best ascribed. The constructivist paradigm assumes that individual's understanding of the world is dependent upon his or her experience and perspectives (von Glaserfeld, 2005). It was assumed in this study that a teacher's teaching philosophy, experiences, and attitude would influence their use of instructional technology; which clearly is in line with constructivism.

The schools chosen for this study were identified by the state of Florida as being among the most successful middle schools in the state, as determined by performance on the state standardized test. This suggests that these schools are successfully educating all populations within the school, including academically talented students. Additionally, with the schools' success on the standardized test, they met the performance mandates of NCLB and the pressure from the potential penalties was lessened. It was assumed that by selecting high-performing schools, that the standardized testing would not be a significant factor in instructional practice.

*Research Questions*

The use of digital technology within the social studies is gaining interest as on-line materials are more accessible and the hardware and software are becoming more affordable. Additionally, the use of technology with academically talented students is of increasing interest as technology becomes ubiquitous in today's society and students are more accustomed to using technology. This study bridged these two foci, academically

talented students and the teaching of social studies, an area that has received scant attention. This investigation addressed the following research questions:

1. To what degree do social studies teachers in high-performing middle schools utilize technology in teaching academically talented students?
2. How do social studies teachers in high-performing middle schools use digital technology to support higher order thinking?
3. What factors influence social studies teachers in high-performing middle schools inclusion of digital technology in their teaching of academically talented students?

*Definition of Terms*

Academically talented students: students enrolled in honors social studies classes, including students identified as academically talented, as evidenced by their scores on the state-mandated standardized test, and those students identified as gifted by the county's established parameters.

High-performing middle schools: schools identified in 2006 by the Florida Department of Education (FDOE) as being among the top 75 middle schools in the state, determined by school performance on the state-mandated standardized test, that also made Adequate Yearly Progress (AYP) according to the NCLB guidelines in 2007.

FCAT: Florida Comprehensive Assessment Test. This annual high-stakes assessment is administered to students in grades 3-11. Students in grades 3-10 are

assessed in reading and mathematics. Writing is assessed in grades 4, 8, and 10. Student knowledge in science is assessed in grades 5, 8, and 11.

*Resources*

Data were collected using four different instruments: a survey, a group interview protocol, an individual interview protocol, and an observation protocol. The survey instrument, Internet Use Survey (Appendix A), was modified from a survey conducted by VanFossen in 2005. The group interview (Appendix B) was a semi-structure interview (Merriam, 1998) designed to capture information about technology use in the three schools not accessible through the survey. The initial interview question protocol (Appendix C) included demographic items, questions from Franklin and Molebash's (2007) survey distributed to elementary teachers, and questions derived from concepts highlighted in Judson (2006) related to teacher philosophy and technology integration. The observation protocol (Appendix D) was derived from two observations forms found in Reed and Bergman (2005). The two original forms, "Anecdotal Teacher-Student Interaction Form" and "Form for Types and Uses of Media/Technology in the Classroom or Lab," have been blended and combined with demographic questions and a classroom map. SAS statistical software was used for quantitative analysis, and the Atlas.ti program was used to manage qualitative data.

*Remaining Chapters*

The remaining chapters include a review of the relevant literature, a discussion of methodology, a presentation of study results, a discussion of the findings, and recommendations for future research. Chapter 2 outlines the literature related to student

use of technology, the concept of 21st century literacy, the use of technology in the education of academically talented students, technology in the social studies, and teacher's use of technology. Chapter 3 discusses the research methods used in this study including participants, instruments, and methods of analysis. Chapter 4 presents the results of the study that pertain to the research questions. Finally, in Chapter 5, the study findings are discussed in context of the research questions and suggestions for further research are presented.

# Chapter Two

## Review of the Literature

This study is an examination of how social studies teachers in three high-performing middle schools integrate technology in their instruction of academically talented students. To contextualize this study, the following topics are examined in the review of the literature: middle grades education, adolescents and technology, higher-order thinking, technology and higher-order thinking, technology and the academically talented student, technology and the social studies, and teacher's use of technology.

### *Middle Grades Education*

Middle schools are systematically different from their junior high school predecessors. Although students in both middle schools and junior high schools are typically between the ages of 10 and 14 years, the similarities end there (Williams-Boyd, 2003). The junior high school concept emerged in 1918 as a response to overcrowding in the elementary and secondary schools following World War I; and, were organized with the purpose of preparing students for high school. Teachers in the junior high school were either elementary teachers moved up in grade levels, or high school teachers moved to lower grade levels; and, were not necessarily trained in the cognitive and affective needs of the early adolescent (Williams-Boyd, 2003).

In 1975, the National Middle School Association (NMSA) published *The Middle School We Need*, which highlighted the organization's recommendations for reorganizing

education in the middle grades to focus on the developmental characteristics and needs of the young adolescent (Harbron & Williams-Boyd, 2003). The 1985 publication by the National Association of Secondary School Principal's (NASSP) *An Agenda for Excellence at the Middle Level* supported the call for developmentally responsive schools as described in the NMSA's publication (Williams-Boyd, 2003). Addition influential documents in middle grades education include the NMSA position paper *This We Believe*, initially published in 1982 (National Middle School Association, 2003); and, *Turning Points*, initially published in 1989 by the Carnegie Corporation (Jackson & Davis, 2000). Both documents outline the characteristics of the middle school concept; however, of the two, *Turning Points* had the most widespread impact on middle grades education. Williams-Boyd (2003) suggests that the positive reception of *Turning Points* was due to its non-education origins.

In the years following their original publishing, both documents have undergone revisions and re-distribution. Figure 1 outlines the middle school characteristic and goals identified in both *This We Believe* and *Turning Points 2000* (Jackson & Davis, 2000), the most recent version of the Carnegie publication. In a side-by-side comparison, it is evident that both publications have a core belief in a middle grades education dedicated to a developmentally appropriate, yet challenging curriculum, delivered in a democratically governed school by a faculty expert in the needs of young adolescents. Indeed, in *Turning Points 2000*, Jackson and Davis (2000) make the following statement regarding the goals of middle school education.

The main purpose of middle grades education is to promote young adolescents'

> intellectual development. It is to enable every student to think creatively, to identify and solve meaningful problems, to communicate and work well with others, and to develop the base of factual knowledge and skills that is the essential foundation for these "higher order" capacities. As they meet these capacities, every young adolescent should be able to meet or exceed high academic standards (pp.10-11).

The realization of the beliefs is seen in the grouping of students into heterogeneously organized interdisciplinary teams. Within these teams, teachers are expected to utilize pedagogical methods appropriate of the young adolescent's developmental needs and abilities (Erb, 2001).

The dedication to the heterogeneous grouping of students has been the origin of a long-standing rift between advocates for the middle school concept and advocates for gifted education (Rakow, 2005). Kulik and Kulik (2004) found through their meta-analytic research that academically talented students placed in homogenous or nearly homogenous groupings experienced statistically significant "positive effects." These findings suggest that broad-based heterogeneous groupings are not beneficial for academically talented students. Indeed, Renzulli and Reis (1997) reported that parents of academically talented students perceive heterogeneous grouping in the middle grades as being detrimental to their children, as their students are under-challenged in this environment. The concerns of these parents are echoed by Tomlinson (1994), who suggested that academically talented students are negatively impacted by the heterogeneous grouping in the middle grades.

*Figure 1: Turning Points 2000* and *This We Believe* Middle School Characteristics from Erb (2001, p. 3).

| **Turning Points 2000** | **This We Believe** |
|---|---|
| 1. Teach a curriculum grounded in standards, relevant to adolescents' concerns, and based on how students learn best; and use a mix of assessment methods. | 1. Curriculum that is challenging integrative, and exploratory. |
| | 2. Assessment and evaluation that promote learning. |
| 2. Use instructional methods that prepare all students to achieve high standards . | 3. Varied teaching and learning approaches. |
| 3. Organize relationships for learning. | 4. Flexible organizational structures. |
| | 5. An adult advocate for every student. |
| | 6. Comprehensive guidance and support services. |
| 4. Govern democratically, involving all school staff members. | 7. A shared vision. |
| | 8. High expectations for all. |
| | 9. Positive school climate. |
| 5. Staff middle grades schools with teachers who are expert at teaching young adolescents, and engage teachers in ongoing professional development. | 10. Educators committed to young adolescents. |
| 6. Provide a safe and healthy school environment. | 11. Programs and policies that foster Health, wellness, and safety. |
| 7. Involve parents and communities in supporting student learning and healthy development. | 12. Family and community partnerships. |

In 2004, NMSA and the National Association for Gifted Children (NAGC) published a joint position statement pertaining to the needs of academically talented students in the middle grades. Although in the publication, the students were referred to

as high-ability or high-potential learners; which Rakow (2005) views as an attempt to avoid the politics of the term "gifted." In this joint position statement, NMSA and NAGC call for appropriate identification, assessment, and curriculum and instruction for the academically talented student. Included in this discussion was a concession to the grouping needs of the academically talented student. Districts and schools are challenged to ensure a continuum of services, among which were advanced classes. In a discussion of the 2004 position statement, Schneider (2008) states that middle schools "may wish to group faster learners together so they develop relationships and challenge each other's thinking" (pg. 35). She quickly qualifies this statement with the following comment. "Grouping practices intended by the NMSA/NAGC joint position statement are not tracking practices but rather encompass flexible grouping approaches for instructional purposes" (p. 35). Although semantic, the arguments made in Schneider's article suggests that the rift between middle school advocates and advocates for the gifted is beginning to bridge.

*Adolescents and Technology*

Studies of technology usage indicate that adolescents actively use media in all forms. For example, a Pew Internet & American Life Project Study (Lenhart, Madden & Hitlin, 2005) indicates that 87% of children, aged 12-17, self-report using the Internet; of this group, 51% go on-line daily. A subsequent Pew study investigating teen utilization of social media determined that 93% of teens use the Internet, a 6% increase from their previously reported amount. Of these on-line teens, 64% have utilized one of the wide-ranging online content-creating activities (Lenhart, Madden, Macgill, & Smith, 2007).

The Kaiser Foundation's (Roberts, Foehr & Rideout, 2005) study on media usage in 8-18 year olds revealed that 26% of all 11-14 year olds use the computer more than one hour daily. The same study determined that adolescents aged 11-14 spend approximately 30% of their day interacting with media in its various forms. Approximately 25% of this time was spent multi-tasking, using multiple media formats simultaneously (e.g., listening to music, instant messaging [IM] and surfing the Internet.) These studies demonstrate that today's middle grade student is accustomed to using technology in a variety of formats, often simultaneously.

Indeed, the time spent in concert with various media suggests that adolescents not only are comfortable using technology, but also enjoy the interaction. The incorporation of student interests is considered integral to gifted education. It follows that if a majority of students in the 11-14 age bracket are engaged with technology, and appear to be intrinsically motivated to work with technology outside of the academic realm, then incorporating technology needs to be a part of the education for the academically talented student. Also, although today's adolescents may enjoy using technology and be comfortable with a variety of formats, they do not necessarily know the most effective ways to use technology as a student and a thinker. It is incumbent upon today's educator to provide opportunities for students not only to use technology but also know how to learn with it.

Burkhardt et al. (2003) identify a need for developing 21st century literacy in today's students. To be literate in a digitally complex world, students need to think creatively and critically to solve problems and process voluminous information. They

also need to possess flexibility and confidence in the use of technology and be able to adjust to new technologies that will inevitably be part of their future lives. Burkhardt et al. (2003) identify four key components to 21st century literacy: digital-age literacy, inventive thinking, effective communication, and high productivity (Figure 2). Each of these four components includes facets that are already imbedded within gifted education (Siegle, 2004a, 2005). Digital-age literacy refers not only to the basic literacy of reading and writing, but also includes an understanding of scientific principles, economics, and global issues, as well as an ability to use technology and analyze information. Inventive thinking incorporates the cognitive skills necessary to grapple with the volume of information available with today's technology, including higher-order thinking, flexibility, curiosity, and creativity. For effective communication, Burkhart et al. (2003) include the ability to collaborate and utilize interpersonal skills, knowledge of civic and personal responsibility, as well as the ability to communicate ideas effectively. Finally, in the highly productive component, a literate individual is identified as having the ability to plan, prioritize, and execute ideas using the appropriate tools and knowledge.

The National Center on Education and the Economy (NCEE) in their 2007 document, *Tough Choices or Tough Times*, outlined a future economic landscape different from the 20th century model. NCEE noted a shift in global economic trends that rewards employees who possess the 21st century literacy skills outlined in Burkhardt et al. (2003). This new economic world is captured in the following quotation.

> It is a world in which comfort with ideas and abstraction is the passport to a good job, in which creativity and innovation ar the key to the good life, in which high levels of education—a very different kind of education tan most of us have has—are going to the only security there is (National Center on Education and the Economy, 2007, pp. 6-7).

It would appear that registered voters in the United States agree with NCEE and Burkhardt et al. In 2007, the Partnership for 21st Century Skills published the findings from a nation-wide poll asking voters about the importance of 21st skills for the nation's future economic growth. Nearly 99% of voters polled indicated that it was important to the country's economic future to teach students 21st century literacy skills, such as those outlined in Figure 2.

*Figure 2*: 21st century literacy skills from Burkhardt et al. (2003).

**21st Century Literacy Skills**

**Digital-Age Literary:**
- Basic literacy – including scientific, economic and technical
- Visual and information literacy
- Multicultural and global literacy

**Inventive Thinking:**
- Flexibility, grappling with complexity, and self-direction
- Creativity, curiosity, and risk-taking
- Higher-order thinking – including critical thinking and problem solving

**Effective Communication:**
- Collaboration and interpersonal skills
- Interactive communication
- Civic responsibility

**High Productivity:**
- Prioritize, plan, and execute for results
- Effective use of tools
- Ability to produce high-quality products

An ability to use diverse technologies obviously is crucial in this digital age. As has been previously stated, most adolescents are comfortable using much of the technology that surrounds them. The key to literacy in this new era is the ability to research, hypothesize, analyze, synthesize, and be a problem solver (Wallis & Steptoe, 2006). In other words, today's literate individual is proficient in skills best identified as higher-order thinking.

*Defining Higher-Order Thinking*

Higher-order thinking is a broad term used to describe complex thinking skills, such as critical thinking and problem solving (Lewis & Smith, 1993). What is considered to be higher-order thinking varies by individual. The construct of higher-order thinking and its subordinate constructs of critical thinking and problem solving are nestled within the context of an individual's prior knowledge. What would be classified as critical thinking or problem solving for one individual, for whom the knowledge is new, is prior knowledge for others (Newmann, 1990). Although higher-order thinking can vary among individuals, there are skills that can be addressed and that can be developed through a curricular model (Fisher, 2001).

Higher-order thinking inherently falls within the constructivist theoretical framework. Constructivism can be viewed as confusing due to the diverse uses of the term. It is used to describe an epistemology, a cognitive theory, a philosophy of teaching, and a form of pedagogy (Molebash, 2002). But in each manifestation of constructivism, the theory is rooted on the premise that knowledge and understanding is individually

derived, as opposed to universally defined (Land & Hannafin, 2000). With each of the tasks embedded within higher-order thinking (i.e., problem solving, critical thinking, value analysis, and hypothesis testing), it is incumbent upon the learner to construct his/her own understanding of the problem or information and to make decisions accordingly.

Cognitive psychologists use the term "problem solving" to refer to a number of higher-level cognitive processes that include decision making, value analysis, and hypothesis testing (Bruning, Schraw, Norby, & Ronning, 2003; Van Sickle & Hoge, 1991). These skills are essential for students to master as they wade through the volume of information available on the Internet. These problem solving skills are needed to evaluate and to synthesize such vast amounts of information.

Critical thinking has long been discussed in educational research. Dewey (1933) referred to critical thinking as "reflective thinking," which is "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions" (Dewey, 1933, p. 9). Since Dewey there have been a number of other definitions of critical thinking that offer slight modifications of one another (Fisher, 2001). Definitions of critical thinking from Glaser (1941), Ennis (1993), Paul, Binker, and Weil (1990), and Fisher and Scriven (1997) all include reflective thinking, analysis and meta-cognition, or knowing what you know, what you think, and knowing how you came to that understanding. For the purposes of this study, critical thinking will be defined as the "skilled and active interpretation of observations and communications, information and argumentation" (Fisher & Scriven,

1997, p. 21). This definition is deemed most appropriate for the study because it includes all aspects of thinking necessary for working with technology in the 21st century.

Figure 3 lists 12 critical thinking skills, derived from Glaser (1941) and Fisher and Scriven (1997), necessary for working in today's digital age. Evaluation, interpretation, and synthesis are essential in order to draw meaning from the array of information available online. Such higher-order thinking is an integral component in gifted education (Renzulli, 1977; Tomlinson, 1996). Indeed, in this digital world, with ever-changing technology, the ability to reason critically and solve problems is more important than just the ability to use a specific type of technology (Siegle, 2004a).

*Figure 3*: Identified critical thinking skills as adapted from Glaser (1941) and Fisher & Scriven (1997).

**Critical Thinking Skills**

| | |
|---|---|
| problem recognition | identification of problem solution |
| gather pertinent information | recognize & evaluate assumptions |
| comprehend and use language | interpret data |
| evaluate data and information | recognize logical relationships |
| draw warranted conclusions | test conclusions |
| ability to reconstruct ones' beliefs | produce and defend arguments |

*Technology and Higher-order Thinking*

Over the last 25 years, the use of computers in schools has evolved from electronic worksheets to interactive multimedia formats (Jonassen, 2000; Siegle, 2004a). In the 1980s computers were typically used as drill-and-practice tutorials. In essence,

computers were utilized as electronic worksheets, requiring little in the way of higher-order thinking. In the 1990s, computer usage began to evolve. As the Internet became available in more classrooms, computers were used as tools to gather and present information. Students then were required to analyze, synthesize, and communicate information--characteristics of critical thinking. Today, as technology becomes ubiquitous in the nation's classroom, computers have begun to be incorporated in a dynamic fashion. The available technology enables students to utilize a variety of skills and formats toward a single purpose, such as digital storytelling (Porter, 2006). It should be noted that the presence of dynamic technology in a classroom is insufficient to encourage higher-order thinking. Oliver and Hannafin (2000) found that students incorporated higher-order thinking in technology-driven tasks only after instruction in critical thinking skills.

Siegle and Foster (2001) reported that students do benefit from the open access to technology through the use of laptop computers, appropriate software, and constructivist activities as compared with peers who did not have open access to technology. The study was inconclusive as to the attributing factor in student achievement. The factors influencing achievement were confounding and no indices could be identified as specifically influential. It is likely that student achievement was a result of the combination of open access to technology, the different perspectives offered through software, and the construction of knowledge through presentation activities requiring research and analysis.

Constructivist theory particularly is appropriate for the discussion of the use of technology to develop higher-order thinking. Jonassen (2000) uses the term "mindtool" to describe the use of computers and other technology to construct knowledge. The term mindtool is synonymous with cognitive tool, which is a mental or computational device that extends and supports the thinking process (Liu & Bera, 2005). Jonassen (2000) specifically defines mindtool as "computer-based tools and learning environments that have been adapted or developed to function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher-order learning (p. 9)." He suggests that the computer, when used as a mindtool, aids in scaffolding information and maintaining student engagement with the information. Computers, when utilized as mindtools, aid in the thinking process and assist students in extending beyond their zone of proximal development, or the zone between the learner's existing and potential characteristics (Jonassen, 2000). Jonassen suggests that this cognitive expansion is due in a large part to the nature of the today's technology when used as a mindtool. It is also possible that student interest in technology also may permit students to lower their inhibitions with new knowledge and stretch into new realms.

Constructivist pedagogy embraces authentic learning environments--which are student-centered and goal-directed (Land & Hannafin, 2000). Geoffrey Scheurman (1998) describes the two theoretical origins of constructivist pedagogy: Piaget's cognitive constructivism and Vygotsky's social constructivism. Cognitive constructivism emphasizes how one assimilates newly acquired information into already existing schema, and how schema is modified to accommodate new information that is

incongruent with existing schema. In social constructivism, the emphasis is placed on the social and cultural contexts that influence an individual's understanding of information and events. Teachers who utilize constructivist pedagogy, whether cognitive or social in emphasis, will likely use student-centered learning that incorporates open-ended inquiry and creative problem solving. In other words, in constructivist classrooms, the teacher acts a facilitator to or collaborator in the learning process (Scheurman, 1998).

Molebash (2002) describes a holistic form of constructivist pedagogy as particularly appropriate for technology integration in the social studies. In this form of pedagogy students work independently on authentic tasks, and the teacher circulates as a facilitator, as described by Schuerman (1998). Although, it should be noted that more teacher-centered pedagogical styles can be viewed as constructivist, if the instruction meets the philosophical goals associated with constructivism (Molebash, 2002). Academically talented students thrive in such an environment (Siegle, 2005).

An example of a technology-oriented, student-centered task is the creation of multimedia presentations, such as digital documentary films (Siegle & Foster, 2001). Movie making software, such as Apple's iMovie or Microsoft's MovieMaker, is rapidly becoming available in classrooms nationwide. Using movie-making software, students are able to combine film and photographs, sounds and music, and text and transitions to create an original product. Non-linear in nature, digital filmmaking provides students an opportunity to collect materials and information and edit them in such a way as to best develop the story or line of reasoning. The availability of primary source material on the Internet and in digital archives provides students with previously unfathomable access to

a variety of sources. Creating a documentary requires students to access these sources, gather available information, determine relevancy, and structure the material in a meaningful way. The selection of sounds and images requires students to analyze information critically and judge the appropriateness and significance of each. Siegel (2004b) identifies four modes of learning associated with technology: acquiring, retrieving, constructing, and presenting information. Digital video production uses all four modes. Students use technology to research information, capture images and sound from the Internet, construct meaning from the information they have acquired, and present it through the filmmaking process.

In addition to the creation of digital products, technology can be integrated in the classroom in a number of other ways. Marcus (2008) described how he used iPods to encourage his middle school students to analyze song lyrics, and to make connections with literature. The activity not only piqued the students' interest by incorporating their daily technology, but encouraged sense of classroom community through students sharing of their selected songs. Digital technology can also be used to create a portfolio of student work (Siegle, 2005). Electronic portfolios, maintained on either flash drives or net servers, enable students to reflect and analyze their previous work and progress. Reflecting on their development enables student to recognize what they know and how they have evolved, thereby enhancing metacognition, a key component in higher-order thinking.

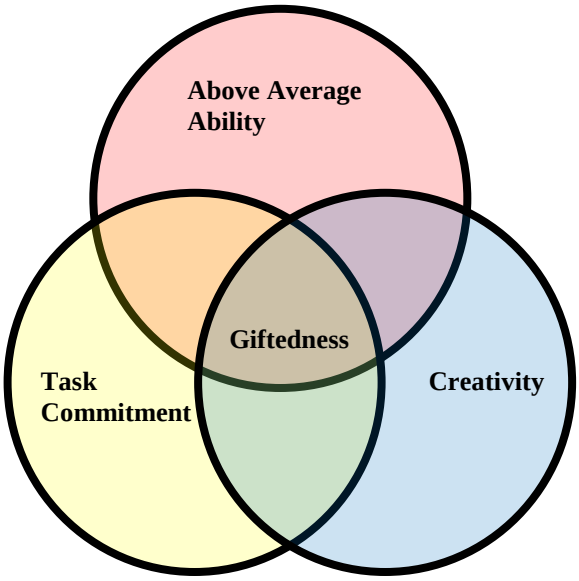
*Technology and the Academically Talented Student*

Technology should be an integral component of the academically talented adolescent student's education for three reasons. First, technology is a part of the adolescent's daily life. They are able to integrate technology seamlessly within their daily interactions (Lenhart, et al., 2005; Roberts, et al., 2005). To ignore the presence of technology and the student's interest in technology would be negligent. Second, educators must prepare students for the world of tomorrow's technology (Burkhardt, et al., 2003). We do not know what innovations are on the horizon. However, we can ensure that students are able to utilize technology to develop higher-order thinking and collaboration--both goals of gifted education and keys to 21st century literacy. And third, academically talented students typically possess skills that are particularly effective when using today's technology, specifically abstract thinking and rapid processing (Siegle, 2004a, 2005).

Renzulli (1977) defines giftedness as the intersection of the potential for above-average ability, creativity, and task commitment (Figure 4). Students who demonstrate their giftedness in the technology or those students whose ability, creativity, and task commitment fall within the technological fields, are categorized as either programmers or interfacers (O'Brien, Friedman-Nimz, Lacey, & Denson, 2005; Siegle, 2004b, 2005). Programmers typically prefer to work alone with a computer, creating programs and developing web sites. Interfacers typically enjoy assisting teachers and other students with trouble-shooting, working with software applications, and improving out-dated technology. Although students can be specifically talented in the technical fields, all

gifted students benefit from opportunities associated with today's ever-changing technology. Indeed, talents typical of many academically talented students lend themselves to successful inclusion of technology in gifted education.

*Figure 4*: Renzulli's (1977) three-ring conception of giftedness




There are three characteristics found in many academically talented students that are beneficial when working with technology: the ability to process information quickly, the ability to transfer knowledge, and creativity (Siegle, 2004a, 2005). Academically talented students are adept at processing large quantities of information rapidly. This skill, the ability to evaluate and synthesize information quickly, is essential when exploring the Internet with its plethora of information. To use effectively the information on the Internet, it is necessary to make decisions about which information is relevant,

useful, and valid. One must be able to decide quickly whether an information search is effective or whether a new search should be initiated; whether hyperlinks are related and worth following or if they are extraneous and should be ignored. These decisions, and many others, require quick analysis and critical thinking--skills found in many academically talented students.

To use effectively the multimedia format of current technology, it is necessary to combine information from a variety of sources to construct meaning. Information on the Internet can be seen as a series of puzzle pieces. It is the task of the user to put these individual pieces together to create a whole picture. Academically talented students are able to transfer knowledge from one venue to another, which enables them to see the larger picture. This skill is particularly effective when utilizing multimedia formats like the digital filmmaking software, which requires the integration of music, text, and images to tell a story. Technology provides opportunities for creation limited only by an individual's skill and creativity. A blank screen is a blank canvas awaiting text, images, color, transitions, sounds, and more.

Academically talented students benefit from the use of technology. Today's adolescent is engulfed in a world filled with information and media. These students, whether or not they are talented in technology-specific fields, possess skills that enable them to maximize the use of today's technology. Incorporation of instruction that uses the computer and other technology as a mindtool is essential in gifted education. Requiring students to construct their own meaning through on-line research; analyze, evaluate, and

synthesize information; and then present it via a multimedia platform is the embodiment of the curricular goals of gifted education (Renzulli, 1977).

*Technology and the Social Studies*

A great deal of attention has been paid to the use of technology in the social studies classroom, both as a pedagogical tool and as a subject of discussion in the classroom (Berson & Bolick, 2007; Berson, Lee, & Stuckart, 2001; Martorella, 1997; Whitworth & Berson, 2003). The benefits of using technology are generally agreed upon and seemingly obvious. The Internet provides unprecedented access to information and archives. Digital access to the archives of museums, presidential library, organizations, the National Archives, and perhaps most significantly, the Library of Congress enables students to act as novice historians in ways previous generations could hardly imagine (Singleton & Giese, 1999; Van Hoover, Swan, & Berson, 2004). What once required travel and special access now can be accessed with the click of a mouse.

Access to digital archives is only one of the benefits of using technology in the social studies. Multimedia presentations, such as documentary filmmaking, encourage leadership, research, and collaboration (Steelman, 2005). Blogging, email, and social networking permit people from distant locations to communicate with incredible ease and speed, which can encourage global awareness--one of the stated goals of the National Council for the Social Studies (2001).

The impact of technology on our global world is also a topic worthy of discussion in the social studies classroom. Our world is rapidly changing as a result of technology. The impact of these changes in environment, international relations, public policy, and

history are valid discussion topics in a social studies class. Even if the technology itself is not utilized as an instructional tool, it should minimally be a topic of discussion.

In 2006 the National Council for the Social Studies published a position statement and a series of guidelines for the use of technology in social studies education. The guidelines outlined in this 2006 position statement were adopted from the guidelines for using technology to prepare social studies teachers (Mason, Berson, Diem, Hicks, Lee, & Dralle, 2000). These five guidelines are listed below.

1. Extend learning beyond what could be done without technology.
2. Introduce technology in context.
3. Include opportunities for students to study relationships among science, technology, and society.
4. Foster the development of the skill, knowledge, and participation as good citizens in a democratic society.
5. Contribute to the research and evaluation of social studies and technology (p. 107).

In addition to these five general guidelines, the position statement outlines additional specific guidelines for effective use of instructional technology. Of particular interest with regard to this study is the statement, that social studies educators should "apply technology to develop students' higher order skills and creativity" (p.4).

*Teacher's Use of Technology*

VanFossen (1999, 2001) analyzed the use of the Internet by secondary social studies teachers in a state-wide survey of Indiana teachers. The Internet Use Survey, created by VanFossen, was distributed to 350 randomly selected secondary teachers. A total of 186 surveys were returned, resulting in a 53.1% return rate. The survey was divided into three sections. The first section asked general questions related to computer access and computer use. In the second section respondents were asked questions related

to personal, professional, and pedagogical use of the Internet, as well as any perceived barriers to pedagogical Internet use. The final section of the survey asked for feedback and general background information.

VanFossen (1999, 2001) found that although Indiana teachers had access to the Internet, few teachers actually used the Internet in their teaching to engage students in activities that require complex thinking. In an effort to understand this lack of use, VanFossen examined teacher comfort with technology. He found that although many were uncomfortable using various computer applications, most were comfortable with using the Internet. VanFossen argues that the lack of pedagogical Internet use may be linked with professional development that is ineffective in demonstrating how to use this resource in the social studies class.

Friedman (2006) examined the use of digital primary sources by six high school social studies teachers in Virginia. This multiple case study (Yin, 2003) began with a survey of 34 social studies teachers in five high schools that reflected the economic variability in the region. From this group of 34, he selected six teachers for further study. These individuals were selected based on their self-reported use of technology. Three high-frequency users, two low-frequency users, and one mid-level user were selected. The selection of different numbers of representatives from each sub-group is curious. It would seem logical to have the same number of representatives from each category--ideally three, as suggested by Creswell (1998). Friedman found that although most teachers expressed a positive reaction to the use of digital primary documents, their usage of this resource was largely dependent upon access to equipment, specifically an LCD

projector. He also determined that technology training alone did not affect the rate with which digital documents were used but rather how they were used. Teachers with access to equipment but lacking training tended to use digital primary sources as "show and tell" artifacts. Teachers who had training but lacked access to equipment did not use digital documents. Those teachers who had both access to equipment and training typically used the digital documents in student-centered learning situations, or in a more constructivist manner.

Judson (2006) surveyed and observed 32 classroom teachers in an effort to determine if there is a connection between a teacher's technology-related instructional practices and stated teaching philosophy. Judson stated that from his analysis of the available literature, he expected to see a connection between constructivist teaching philosophies and the use of technology. The 32 teachers selected for this study represented a cross-section of grade levels and disciplines. The selection criteria for this study were access to technology and participation in at least one university course on technology inclusion. It should be noted that Judson categorized access to technology as the availability on the school campus to multimedia equipment and/or a computer laboratory. Friedman (2006) found that campus availability of equipment and the presence of a computer laboratory did not equate to ease of access. Indeed, Friedman discovered that many teachers described the protocols associated with accessing campus-wide equipment cumbersome and a deterrent to regular technology use.

Judson observed all 32 participants for either one or two lessons, reported as being at least 30 minutes in length. This is not a sufficient amount of time inside a

classroom to determine a teacher's typical technology usage. Yet, Judson used these short observations as evidence within his study. This sampling decision is an apparent weakness in the research design, and ultimately in the conclusions. Judson determined from his research that there appeared to be no relationship between a teacher's stated philosophy and technology-related instructional practices. It is possible that a different conclusion could have been reached if he had chosen a smaller number of participants and spent longer periods of time in their classrooms. Indeed, it is possible that he would have uncovered patterns of difficulty in accessing equipment as described by Friedman (2006).

In a 2005 review of literature, Shaunessy determined that in K-12 education a teacher's beliefs, or teaching philosophy, do influence teaching strategies, including technology integration. Also, she described teacher attitude toward the technology itself as a significant factor influencing the inclusion of instructional technology. If teachers are uncomfortable using technology, it logically follows that they will not incorporate available technology into their instructional practices. Training can influence teacher attitudes toward technology. However, the one-size-fits-all model often employed by school districts is ineffective. Teachers should receive training based upon their level of need, identified by experience and discipline (Shaunessy, 2005).

In 2006, Mishra and Koehler offered the construct of Technological Pedagogical Content Knowledge (TPCK) as a new theoretical perspective through which teacher utilization of instructional technology could be viewed. Mishra and Koehler recognized that the literature in the use of instructional technology lacked a theoretical framework,

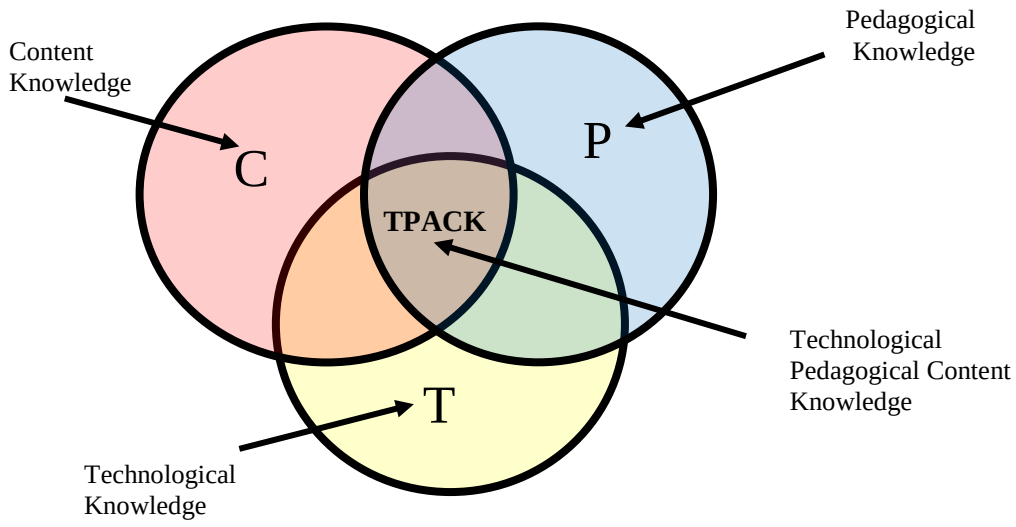
and without one, attempts to capture the "big picture" of technology integration would be unsuccessful. Their TPCK construct builds upon existing concept of Pedagogical Content Knowledge (PCK), or "the ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986, p. 9). In Mishra and Koehler's construct, a teacher's understanding of how to use technology within the parameters of both teaching and content is key to how instructional technology is actually integrated. TPCK, in other words, is the intersection of a teacher's technological knowledge, pedagogical knowledge, and content knowledge. They have utilized a Venn Diagram to illustrate this intersection (see Figure 5).

In 2007, Thompson and Mishra published a modification to the acronym used for Technological Pedagogical Content Knowledge. It is now referred to as TPACK. The acronym modification accomplished three things: 1) TPACK is easier to say as it is less consonant-heavy; 2) TPACK emphasizes that there are actually three sets of knowledge working in concert for effective technology integration—technology, pedagogy, and content knowledge, with the "A" representing the often-forgotten "and;" 3) The acronym TPACK captures, according to Thompson and Mishra, the complexity of the knowledge necessary to effectively integrate instructional technology. Indeed, these three forms of knowledge should not be looked at in isolation, but as an integrated whole.

Manfra and Hammond (2007) utilized Mishra and Koehler's (2006) TPACK construct in their case study of two social studies teachers' instructional choices with student-created digital documentaries using an on-line University of Virginia-sponsored program, Primary Access. Over the course of the case study, Manfra and Hammond

found that the teacher's pedagogical beliefs influenced the technology-related planned and enacted curriculum, more so than did either content or technology knowledge. The teachers' pedagogical leanings, one a manager of student learner and the other a facilitator of student learning, were not altered by the inclusion of instructional technology. Rather, the digital documentaries were incorporated in either class in ways that reinforced the teacher's attitude toward student learning. This finding validates Mishra and Koehler's (2006) premise that it is the interaction of technology, content, and pedagogy that influences effective integration of instructional technology.

*Figure 5*: Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge Model (TPACK).



*Summary of the Literature*

Today's student lives in a world of instant communication, infinite information, and ever-changing technology. It is crucial that schools prepare their students for a 21st century literacy that goes beyond reading and writing text; students need to be able to utilize higher-order thinking. Critical thinking and problem solving, the two key components of higher-order thinking, are essential in gifted education (Siegle, 2005) and are thought to be positively influenced by the use of digital technology in a constructivist, student-centered, learning environment (Jonassen, 2000).

Over the past decade, the issue of technology in the social studies classroom has continued to gain momentum in the literature (Whitworth & Berson, 2003). Access to digital archival documents has opened a world of opportunities for students to engage in authentic inquiry as novice historians. Additionally, the ease of today's communication through digital media encourages the development of global awareness, an NCSS stated goal.

The benefits of the use of instructional technology are plentiful. Yet, teachers are not readily utilizing instructional technology. In an analysis of the use of digital primary source documents, Friedman (2006) determined that the effective use of technology is associated with the availability of equipment and training. Shaunessy (2005) suggested that teacher attitudes, both philosophy and comfort level, influences the incorporation of instructional technology. Judson (2006) did not identify a relationship between teacher philosophy and technology-related instructional practices; although, this may be an artifact of his research design. Incorporating student-centered technology instruction can

be beneficial to gifted students. What needs to be addressed is how to encourage teachers to use instructional technology to develop gifted students' higher-order thinking skills. This study is an attempt to gather information that can be used to answer how to achieve this goal.

Shaunessy (2005) notes that literature discussing how to use technology with gifted students is becoming increasingly prevalent. What is lacking, however, is empirical investigations related to technology and gifted education. This study is an attempt to fill part of this void in knowledge. Additionally, previous research examining teachers' uses of technology in the social studies classroom have focused on largely high school populations (Friedman, 2006). This study examines the use of technology in the middle schools, which has generally not yet been investigated.

# Chapter Three

## Research Methods

This multiple, or comparative, case study (Yin, 2003) was designed to examine social studies teachers' use of digital technology in the instruction of academically talented students at high-performing middle schools. The data for this study were collected using a mixed-methods paradigm (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 1998); and conducted in two phases. The first phase involved administration of a survey to all teachers who met the parameters of the population descriptor and a group interview of the participating teachers at each of the schools studied. The second phase included a series of ten case-studies of volunteer teachers. Each case study involved an individual interview, a classroom observation, and an analysis of teacher-provided documentary evidence.

To ensure participant safety and ethical treatment, applications were made to the Institutional Review Boards (IRB) of both the researcher's affiliated university and the participating school district. This study was determined to be exempt by the Institutional Review Board due to the nature of the study and research participants.

### *Participants*

The participants for this study are social studies teachers on the faculty of three high-performing middle schools in a large metropolitan school district in western Florida. The schools were identified as a high performing middle school based on reports issued

by the FDOE. The three schools selected were among seven district middle schools ranked in the top seventy-five middle schools in the state of Florida, as indicated from performance on the state's standardized assessment, the 2005 Florida Comprehensive Achievement Test (FCAT) (FDOE, 2006). From this group of seven, five middle school achieved AYP as described in the NCLB legislation for the 2006-2007 academic year (FDOE, 2007). The three schools selected for this study are from this smaller group of five high-performing middle schools.

Each school's demographic statistics, as identified by the district website, are found in Table 1. The schools selected for this study are identified as School A, School B, and School C. All three of the schools are located in relatively prosperous suburban areas of the district; none are identified as a Title I school. School B, which has the largest number of non-White ethnic groups and the highest percentage of Limited English Proficiency students, did report that 36.69% of its student population was economically disadvantaged, as evidenced by the receipt of free or reduced lunch (School District of Hillsborough County, 2008). Each of the three selected schools has a student population of 1100 or more.

Although School D met the test-performance requirement for inclusion in the study, it was excluded for sampling reasons. School D, which has the largest student population of the five schools, utilized heterogeneous student distribution in social studies classes. This study is focused on teacher practices with academically talented students. This research focus could not be addressed in heterogeneous social studies classes. School E, which also met the test-performance criteria, was contacted on three

occasions via email and phone. The principal did not respond to research inquiries; therefore, School E could not be included in the study. The three schools selected for the study meet the testing-related criteria, provide courses in which teaching with academically talented students can be studied, and agreed to participate in this study.

Table 1

*Demographic Information for the High-Performing Middle Schools*

| | | Percent of Students | | | | |
|---|---|---|---|---|---|---|
| School | School Size | Free or Reduced Lunch | Limited English Proficiency | Students with Disabilities | White (Non-Hispanic) | Other Ethnic Groups |
| School A | 1555 | 15.82 | 2.06 | 9.13 | 74.34 | 25.66 |
| School B | 1142 | 36.69 | 7.09 | 12.61 | 51.58 | 48.42 |
| School C | 1082 | 13.59 | 2.40 | 8.32 | 68.95 | 31.05 |
| School D | 1520 | 23.22 | 2.24 | 10.92 | 70.59 | 29.41 |
| School E | 607 | 24.71 | 3.79 | 9.88 | 61.61 | 38.39 |

The selection of high-performing schools upon which to focus this study was purposeful. If it is assumed that the NCLB legislation is designed so that no child's education is neglected, then it would follow that academically talented students are also to receive appropriate modifications and accommodations. Success within the NCLB parameters suggests that these schools provide appropriate educational experiences for all members of their student bodies, including academically talented students. Additionally, as these schools have met, and continue to meet, the performance expectations of the

federal mandate, the pressures of the potential penalties outlined in NCLB are less of an issue for these schools than for other schools in the district; and, therefore thought not to be a significant factor in instructional practices in these schools.

The participant teachers are teachers of middle grades social studies, teaching academically talented students in an honors class setting. For the purposes of this study, academically talented students are those students enrolled in honors social studies classes. Honors classes in this district are comprised of students identified as academically talented, as evidenced by their scores on the FCAT, the state-mandated standardized test, and those students identified as gifted by the county's established parameters (School District of Hillsborough County, 2007). All teachers who teach at least one section of honors social studies were included in phase one of the study. The phase two participants were limited to teachers teaching only social studies, and included teachers who instruct at the $6^{th}$, $7^{th}$, or $8^{th}$ grade level. The participant teachers' age, ethnicity, and gender were not factored into the selection criteria.

A total of 27 teachers participated in phase one of this study: 11 from School A, 10 from School B, and six from School C. Of the eleven participating teachers from School A, 10 were female, and one was male; ranging in age from 25 to 59 years. Six teachers hold a bachelor's degree, four hold a master's degree, and one has an educational specialist degree. Their teaching experience ranged from 3 years to 31 years of teaching experience, with a mean of 9.72 years. Three teachers taught 6th grade geography, five taught 7th grade geography, and three taught 8th grade United States history. At School B, six of the 10 participating teachers were female, and four were

male; ranging in age from 25 to over 60 years. Four teachers hold a bachelor's degree and six hold a master's degree. The teachers at School B had between 3 and 38 years of teaching experience, with a mean of 15.8 years. Four teachers taught 6th grade geography, two taught 7th grade geography, three taught 8th grade United States history, and one taught both 7th and 8th grades. The six participating teachers from School C were evenly distributed, three male and three female; ranging in age from 25 to 59 years. Two of the teachers hold a bachelor's degree, and four hold a master's degree. The School C teachers have between 3 and 31 years of teaching experience, with a mean of 13.2 years. Three of the teachers taught 7th grade geography, and three taught 8th grade history.

The last question of the survey asks the respondent if he or she wished to participate in additional portions of the study. Of the 27 teachers who completed a survey, 18 offered to participate in the second phase of the study: 7 from School A, 8 from School B, and 3 from School C. The teachers selected taught only social studies, one of which was an honors class. Unfortunately, the three volunteers from School C could not be included in the second phase of the study due to time constraints of the impending close of the academic year. The remaining eight volunteers either taught additional subject areas, or asked to be removed from the study shortly after volunteering to participate.

The group of ten participant teachers included eight women and two men, each provided a pseudonym. The five phase two participants from School A were all female; one taught 6th grade geography (Ms. Cooper), three taught 7th grade geography (Ms. Edge, Mrs. Roberts, and Ms. Hill), and one taught 8th grade geography (Ms. Alexander).

The five participants from School B included three women and two men. Of the three women, one taught 6th grade geography (Ms. Buckley), one taught 7th grade geography (Ms. Smith), and one taught a section each of 7th grade geography and 8th grade history (Ms. Norris). Both men taught 8th grade history (Mr. Adams, and Mr. Stephens).

This study relied heavily on the participant teachers' willingness to spend the time and effort necessary to collect sufficient information in order to answer the research questions. Teachers were asked to spend no less than two before-school department meetings completing a survey and participating in a group interview. In an effort to compensate the teachers for their before school planning time, breakfast was supplied on each day of the whole-department data collection. The ten teachers who volunteered for the second phase of the study agreed to spend a significant amount of time on this study collecting documents, interviewing, and being observed. To compensate these teachers for their time, gift certificates to Blockbuster and the Coffee Beanery were provided to each teacher. By offering these items of compensation, the researcher accomplished two things: 1) maintained a positive relationship with the participant; and 2) demonstrated an appreciation for their time and effort devoted to this process.

*Instruments*

Data were collected using four different instruments: a survey, a group interview protocol, an individual interview protocol, and an observation protocol. Each instrument is described below.

Internet Use Survey

In the initial phase of the study, all participant teachers were administered a survey using a modification of VanFossen's Internet Use Survey (2005). This survey (Appendix A) provided information regarding Internet usage, participant teacher's attitude toward Internet use in the classroom, and the teacher's perception of environmental influences in their use of the Internet. The instrument has been utilized by VanFossen in two assessments of Internet use by secondary social studies teachers in Indiana. Initially used in a 1999 state-wide assessment of Indiana secondary social studies teacher's use of the Internet, the instrument was revised and the study redone in 2005.

The instrument was modified for this study to gather additional demographic information and to address the third research question, which addresses the factors influencing technology integration. Questions 14 through 20 are additions to the survey deemed necessary to differentiate between the teacher's comfort level with a type of software and the frequency with which the teacher uses the software. Additional changes include question 22, which asks the teacher to self-report his or her Internet use; and, questions pertaining to courses and grade levels taught.

The survey is divided into three sections. Section 1 consists of questions (1-8) which pertain to the availability of the Internet and equipment in the classroom and at the teacher's home. Section 2, items 9-27, addresses technology and Internet use—including the frequency of use, type of use, and barriers to use that might exist. Section 3 includes items 28-36, in which respondents provided demographic information, including age,

teaching assignment, highest degree earned, and hours of technology-related professional development.

Content validity evidence for the survey was obtained through a review by social studies experts in the Indiana Department of Education, and through a review by 15 experts in the integration of technology in the social studies (VanFossen, personal communication, November 12, 2007). Instrument reliability was not available in previously published uses of the survey. In a personal communication with the instrument's developer, he reported a Cronbach's Alpha of 0.857 for the Internet use questions (question 9A-9P) (VanFossen, personal communication, November 12, 2007). The reliability of scores for questions 9A-9P for this survey was a Cronbach's Alpha of 0.856.

The reliability estimates for the modified survey used in this study were tested using a test-retest measure. Six social studies teachers at a suburban middle school, not included in the study due to its recent opening and lack of test data, were given the survey on two separate occasions. Their responses to the survey questions were analyzed for consistency by determining the percentage of agreement between the test and retest responses for each subscale on the instrument. The percent agreement observed in their responses to survey items ranged from 57.38% to 83.60% between the test and the retest; the mean percent agreement for the test re-tests was 70%.

Group Interview Protocol

Semi-structured (Merriam, 1998) group interviews with the participating teachers were conducted at each of the three school sites during before-school department

meetings. The purpose of the group interview was to gather information not addressed in the Internet Use Survey. This included the use of technology other than the Internet, specific information regarding barriers to use, examples of technology integration, and the participating teachers' attitude toward technology integration. The group interview protocol is provided in Appendix B. As this was a semi-structured interview, questions were modified during the course of the interview to capture additional information.

Individual Interview Protocol

Ten teachers volunteered to participate in Phase 2 of this study. They participated in an individual interview, collected classroom documents, and were observed using instructional technology. The interviews were formal and semi-structured in organization (Merriam, 1998). The initial interview question protocol is shown in Appendix C. In addition to demographic items, questions for this instrument are taken from Franklin and Molebash's (2007) survey distributed to elementary teachers, and are derived from concepts highlighted in Judson (2006) related to teacher philosophy and technology integration. Additional questions in the interview were designed to illuminate how the teacher actually uses technology in his/her social studies classroom.

Classroom Observation Protocol

The observation protocol (see Appendix D) is derived from two observation forms found in Reed and Bergman (2005). The two original forms, "Anecdotal Teacher-Student Interaction Form" and "Form for Types and Uses of Media/Technology in the Classroom or Lab," have been blended and combined with demographic questions and a classroom map. The blended instrument used in this study has three sections. Section 1

captures the classroom environment; including student demographics, time of day, and the physical organization of the room. Section 2 is an open field notes table, which includes teacher and student behaviors and interactions. Section 3 is a series of questions to be answered upon the conclusion of the classroom observations. The questions were used as a form of reflection on and process of the observations recorded in Section 2 of the instrument.

Classroom observations were conducted during a class period in which the teacher is using technology in a self-defined "typical" manner. The data collected from these observations were intended to show how these nine observed teachers integrate technology in the classroom. The data were triangulated with information from the document analysis and interviews. It should be noted that nine of the ten teachers were observed, as one teacher moved to a different Florida school district for the 2008-2009 academic year.

*Procedures*

Phase I: School-level Data Collection

Following approval of the research proposal, on February 25, 2008, an application was submitted to the university's IRB, which required authorization from the district and the individual schools' principals. An IRB exemption was granted on April 1, 2008, as this study explores normal educational practices in an established educational setting. Upon receipt of the IRB exemption, the three participating schools' department chairs were contacted to arrange dates and times for eligible teachers to complete the Internet Use Survey.

Each of the department chairs arranged two before-school meetings during April and May 2008; the first meeting was to complete the Internet Use Survey and the second was to conduct a group interview. School A completed the survey on April 17, 2008, and the group interview on April 24, 2008; both meetings were held at 8:00am in the department chair's classroom. Eleven teachers at School A completed the Internet Use Survey; of those teachers seven participated in the group interview. School B completed the survey on April 15, 2008, and the group interview on April 23, 2008; both meetings were held at 8:30am in a social studies classroom. Ten teachers at School B completed the Internet Use Survey; seven participated in the group interview. The six teachers at School C completed the Internet Use Survey on April 30, 2008; four of the teachers participated in the group interview on May 30, 2008. Both meetings were held at 8:30am in the department chair's classroom.

During the initial meeting at each school, teachers were provided with an explanation of the study's purpose and procedures. Teachers were offered the option not to participate in the study. All social studies teachers at each of the schools chose to complete the survey. Each of the surveys was administered within a thirty-minute time frame; it took no more than 15 minutes for a respondent to complete the survey. Directions were provided as to how to complete the survey, and the researcher remained available to answer questions.

The second meeting held at each of the three participating schools was to conduct the group interview. These took place in the thirty minutes prior to the beginning of the school day. The interviews were formal and semi-structured (Merriam, 1998). A list of

pre-determined questions was prepared prior to the group interview; however, additional questions, or probes, were asked for clarification purposes during the sessions (see Appendix B). The interviews were recorded using the digital voice recording application of the researcher's personal MP3 player. Each participant was asked to identify herself, or himself, when responding to questions, to ensure accurate transcription of the group interview session. All surveys were collected and group interviews completed prior to the close of the academic year in June 2008.

Phase II: Individual Case Study Data Collection

Ten teachers volunteered to participate in Phase 2 of this study, which included an individual interview, an analysis of classroom documents, and a classroom observation. The ten participants were provided a manila folder to use in document collection. It was at this time that they were asked to begin collecting materials that they use in the classroom and to place these materials in the provided folder. The teachers were requested to collect worksheets, readings, handouts of PowerPoint presentations, lesson plans (if written), class notes, or any other materials used in the class over the course of the last month of the school year. The course documents were collected in an attempt to understand the participant teacher's teaching style, philosophy, and use of technology. Of the ten teachers, nine provided the requested course materials; one, Ms. Cooper did not.

*Individual Interviews*. Interviews of the ten Phase 2 participants took place between May 2008 and October 2008. Ms. Buckley, Ms. Smith, Mr. Adams, and Ms. Norris were interviewed prior to the close of the academic year. Mr. Stephens, Ms.

Roberts, Ms. Alexander, Ms. Hill, and Ms. Edge were all interviewed during the summer break. Ms. Cooper was interviewed in October 2008. The interview instrument asks teachers to report on typical behaviors and practices; therefore, it is unlikely that the date of the interviews influenced the participants' responses. Interviews were conducted at a location of the participant's choosing, which included classroom and local restaurants. The interviews lasted between 30 and 50 minutes. These semi-structure formal interviews (Merriam, 1998) used a pre-determined list of questions; variations from the question list were an effort to gain clarification of comments made by the participants. All interviews were recorded using the researcher's personal MP3 player. The interview recordings were transcribed and emailed to each participant as an attachment. The teachers were asked to review the interview transcript, make necessary changes, and then return the document to the researcher. This exchange served as a member check for the interview, thereby providing the participating teacher an opportunity to clarify his or her statements.

*Classroom Observations.* Each participant teacher was observed in his/her classroom demonstrating a self-identified typical manner. The teachers were asked to identify dates when they would be using technology in a manner typical of their technology use. The teachers were observed for one honors class period on the dates identified by the individual teachers. Four observations were conducted prior to the close of the academic year; Mr. Stephens and Mr. Adams were observed on May 23, 2008; Ms. Edge and Ms. Alexander were observed on May 27. The remaining observations were conducted in the first semester of the 2008-2009 academic year: Ms. Hill and Ms. Norris on September 24, Ms. Smith on September 25, Ms. Buckley on October 6, and Ms.

Cooper on October 8. Nine of the ten participant teachers were observed during phase two; Ms. Roberts moved out of the area prior to being observed. The observations were conducted in an effort to capture a sample of each teacher's use of technology with academically talented students.

This qualitative multi-case study lies in both the pragmatic (Biesta & Burbules, 2003) and constructivist paradigm (Paul, 2005). Pragmatism as a paradigm for educational research is concerned with the application of research into practice (Biesta & Burbules, 2003). As this study is concerned with the teaching practices of classroom teachers and the factors that influence that practice, it embodies the concept of research to practice. Additionally, Onwuegbuzie and Leech (2005) call for a pragmatic shift in educational research, one in which the research questions guide research design and analysis, and embraces mixed methodology. Constructivist inquiry attempts to understand reality based on context and beliefs. It was assumed in this study that a teacher's attitudes and philosophy influence his or her use of instructional technology--clearly a constructivist assumption.

*Legitimation*

Onwuegbuzie and Leech (2007) identify several threats to legitimation in qualitative research, as well as methods to address these threats. In this study, there were several areas where the legitimacy of the data could be questioned. First, there was the possibility that the information gathered via the survey questionnaire was not reflective of reality. It is possible that the responding teachers self-reported behaviors they believe the researcher would want to see. Attempts were made within the context of this study to

minimize such a bias through the use of triangulation data sources and methods in the second phase of the study. The second threat to legitimation was the possibility of inaccurately interpreting the participant teacher's voice. This threat was addressed through member checking interview transcripts. The third threat to legitimation was the possibility of researcher bias. A review of the literature indicates that there are several themes that can be determined *a priori*. The threat to legitimation would occur if a researcher fails to recognize other themes that may emerge during the data analysis process, or if a researcher misinterprets the data. This threat was addressed through the use of inter-coder agreement measures, and the revisions of themes throughout the analysis process.

*Data Analysis Procedures*

As a mixed-methods study, data collected were both quantitative and qualitative. Quantitative data collected in the first phase of the study, through the survey instrument, were analyzed using descriptive statistics. With a sample size of 27 participants (n=27), the information from this study cannot be generalized to a larger population; therefore statistical measures that suggest generalization are inappropriate.

The constant comparison method (Glaser, 1965) was used to analyze the qualitative data gathered in this study. Unlike quantitative-oriented studies in which analysis occurs after data collection, in the constant comparison method, data analysis coincides with data collection and continues until data saturation is reached (Glaser, 1965; Merriam, 1998). In this method of qualitative analysis, data are analyzed through the use of coding and memos. As new data are collected, emerging themes are compared

with previously established themes and information already coded. It is from this process of constantly comparing the data throughout the analysis process that the method receives its name (Glaser, 1965). Several themes were identified *a priori*, derived from a review of the literature. These themes included attitude toward technology, teaching philosophy, environmental influences, and instructional strategies. Themes were added and revised throughout data collection and analysis (Merriam, 1998). Following an initial comprehensive review of the qualitative data (from survey free response questions, group interviews, individual interviews, observations, and course documents), the *a priori* themes were modified to barriers, attitude toward and comfort with technology, and teaching and learning. These three themes were then used in the further analysis of the data.

To ensure reliability in data coding, a second researcher was asked to code multiple sections of the interview transcripts. This second researcher was provided with the revised themes and asked to code the interview sections, identifying codes that would fall within the pre-determined themes. The second researcher's codes were then compared with the codes identified in the initial survey of the data. An agreed list of codes was derived by comparing the two. Using this agreed list of codes, both researchers coded an interview transcription. The two sets of codes were compared to ascertain inter-coder agreement, which was 91.67% agreement between the two researchers' lists.

Data management was conducted using two computer programs. For the quantitative analysis, SAS statistical software was used; and the Atlas.ti program was

used to manage the qualitative data. Specific procedures used to answer each of the research questions are described below.

Research Question 1: To what degree do social studies teachers in high-performing middle schools utilize technology in teaching academically talented students?

This question incorporates both the frequency and type of technology use. The frequency of Internet use was assessed using information gathered from questions 9A-9P of the Internet Use Survey (See Appendix A). The response scale for the frequency of use was in the four of a four-point Likert type scale that solicited information regarding the frequency with which the surveyed teacher used the Internet in the classroom. A mean frequency of use score ($M_{use}$) was computed for each respondent based on the teacher's responses to questions 9A to 9P. Using this mean score, respondent teachers were categorized as a "High-level User," "Mid-level User," or "Low-level User," using the parameters outlined in VanFossen (1999). High-level users are those whose frequency of use mean score ranges from 2.75 to 4.0, mid-level users are those whose frequency of use mean score ranges from 2.0 to 2.74, and low-level users are those whose frequency of use mean score ranges from 1.0 to 1.9. These mean-driven categories ($M_{use}$) were then compared to the teacher's self-reported level of Internet use to determine if the teacher's reported use and self-identification are compatible (See Table 2).

In the 2008, VanFossen and Waterson published their findings from an update of their 1999 study using the 2005 version of the Internet Use survey. In this new analysis, the method for finding frequency of use was modified to incorporate the type of use as determined by an expert-validated Internet Use Scale (IUS) score (Table 2). As is shown

in Table 2, each of the items 9A to 9P is given a rating by an expert panel that reflects the level of Bloom's Taxonomy of Thought reflected in each of the tasks. Using this new method for determining frequency of use, VanFossen and Waterson (2008) multiplied the frequency ratings from the Likert scale by the IUS weight. These weighted scores (IUS total score) were then rank ordered from low to high and then grouped into quartiles to yield categories of use. Respondents in the first quartile had an IUS total score ≤ 59, and were classified as Low-level users; those in the fourth quartile, with an IUS total score ≥ 80, were classified as High-level users; and, respondents with an IUS total score between 60 and 79 were classified as Mid-Level Users. With a small number of participants (n = 27), it was determined that it would not be informative to mimic the use of quartiles to determine groups. The scores of the participants in this study were grouped into High-level, Mid-level, and Low-level users utilizing VanFossen and Waterson's IUS score parameters. These weighted categories were then compared to the mean-driven categories to determine if there was a difference between the frequency of use and the type of use, as indicated by the IUS total score (See Appendix G).

Table 2

*VanFossen and Waterson's (2008) Internet Use Scale (IUS)*

| Type of Internet Use | Expert Group Rating |
|---|---|
| A. Gather background information for lessons you teach | 1.0 |
| B. Gather multimedia for use in lessons you teach | 2.0 |
| C. Encourage students to use the Internet to gather background information | 2.0 |
| D. Encourage students to use e-mail to contact other students or content experts | 2.0 |
| E. Take students on a "virtual fieldtrip" using the Internet | 3.0 |
| F. Develop interactive lessons that requires students to use the Internet to complete some task or assignment | 4.0 |
| G. Encourage students to develop WebPages for an assignment | 3.0 |
| H. Develop WebPages for social studies classes you teach | 3.0 |
| I. Have students complete inquiry-oriented 'WebQuests' | 4.0 |
| J. Access primary source materials for use in your classroom | 3.0 |
| K. Search for lesson plans for particular classes you teach | 1.0 |
| L. Access digital video clips to use in your classroom | 1.0 |
| M. Contact other social studies teachers for professional development or lesson ideas | 2.0 |
| N. Have students complete specific worksheet activities using the Internet as a resource | 1.0 |
| O. Have students analyze webpages for accuracy or bias | 4.0 |
| P. Have students compare/contrast information from websites with different points of view | 4.0 |

Research Question 2: How do social studies teachers in high-performing middle schools use digital technology to support higher order thinking?

This question was addressed using information provided in the Internet Use Survey, the group interviews, and the individual case studies. Questions 9A-9P of the Internet Use Survey asks the teacher to indicate the frequency with which he or she uses the Internet to accomplish a variety of tasks. Of the 16 provided options, six (items 9C, 9F, 9G, 9I, 9O, and 9P) utilize higher-order thinking as described in the literature review, specifically within the context of the critical thinking strategies identified in Figure 2. Those six include: "Encourage students to use the Internet to gather background information," "Develop interactive lesson that require students to use the Internet to complete some task or assignment," "Have students complete inquiry-oriented 'WebQuests,'" "Encourage students to develop their own WebPages for an assignment,"

"Have students analyze webpages for accuracy or bias," and "Have students compare/contrast information from websites with different points-of-view." The frequency with which the teachers use these higher-order thinking tasks were analyzed for consistency with the information obtained through the group interview; specifically, the question that addresses the type of technology use with academically talented students.

It is in answering this research question that the information obtained through the individual cases is particularly relevant, as it provides concrete examples of the way in which teachers are using technology with their academically talented students, and if that use requires higher-order thinking. This information was analyzed using the method previously described.

Research Question 3: What factors influence social studies teachers in high-performing middle schools inclusion of digital technology in their teaching of academically talented students?

This question was assessed using a number of data sources. As indicated through the review of the literature, there are several factors that can influence a teacher's use of technology. Those mitigating factors include access to equipment (Friedman, 2006), teacher comfort with technology (Mishra & Koehler, 2006; VanFossen, 1999), appropriate professional development (Mishra & Koehler, 2006; Shaunessy, 2005; VanFossen 1999), and teaching philosophy (Manfra & Hammond, 2007). In addition to the frequency of use, questions 9A-9P of the Internet Use Survey asks the teacher to evaluate the importance of the fifteen Internet-related teaching activities; the ratings

obtained from this section of the survey instrument were identified as teacher attitude toward the described Internet activities.

Information pertaining to availability of equipment was obtained in the first section of the Internet Use Survey, questions 1 through 7. Frequency analysis of questions 1 through 7 provided information regarding the availability of equipment. Teacher comfort with using technology was assessed using responses to question 21 of the Internet Use Survey. Respondents indicated their comfort level with a variety of software applications using a four-point Likert-type scale ranging from 1 = "Uncomfortable," to 4 = "Very Comfortable." Teacher comfort level was then compared to frequency of application use (items 14 through 20). Correlation analysis, using Spearman's *rho,* was to determine if there was a relationship between comfort and frequency of use for each computer application. Spearman was deemed appropriate due to the nature of the data, comparing ordinal and interval data sets and the non-normality of the frequency distribution (O'Rourke, Hatcher, & Stepanski, 2005). Additionally, each teacher was assigned a comfort mean score, determined by the mean of the teachers responses in item 21, which was compared with the frequency of use mean ($M_{use}$) obtained from question 9. This result provides information as to whether or not teacher comfort with technology influenced their instructional use. Correlation analyses using Spearman's *rho* was run to determine if relationships existed among the factors influencing technology integration (equipment, comfort, attitude, training, teaching experience, age, and degree). Findings from the Internet Use Survey were then compared

with answers from the group interview; and expanded upon with information from the individual case studies.

The amount and type of technology-related professional development and training each teacher has received is addressed on the Internet Use Survey with questions 34 and 35. Additional information regarding amount and type of professional development was accessed through the group interview and individual cases.

Teaching philosophy is a difficult concept to assess quantitatively. Therefore, to obtain this information, teachers were asked during the group interview," How do you think students learn best? Please explain your answer." Their responses to this question were compared to the information gathered in question 9, which assesses how the teachers actually use the Internet, and the group interview questions that ask for typical technology use and their opinion regarding the benefits of technology integration. From these questions, the teacher's teaching philosophy was placed on the continuum identified in Scheurman (1998), from transmitter, a behaviorist-oriented instructional style, to facilitator or collaborator, constructivist-oriented instructional styles, as indicated by the type of teaching strategies used and their verbalized understanding of student learning. Schuerman's matrix of teaching and learning is provided in Appendix E.

*Methods Summary*

This mixed methods multiple case study examined middle school social studies teachers' instructional use of digital technology to teach academically talented students. The participant teachers were from three high-performing schools, as identified by the school's performance on the state standardized test, and in the school's achievement of

AYP. The participant teachers were social studies instructors who taught at least one honors section of social studies. The participants at each school were asked to complete the Internet Use Survey, modified from VanFossen's survey (1999, 2005), and participate in a group interview to gather related information not addressed in the survey. From this larger group of teachers, ten were asked to participate in further study. These ten teachers participated in an interview, collected instructional-related documents for one month, and were observed in a 'typical" technology integration lesson. The quantitative data collected from the survey were analyzed using descriptive statistics. The qualitative data were analyzed using the constant comparison method described by Glaser (1965).

# Chapter 4

# Results

## *Introduction*

Over the past decade, interest in technology integration in the social studies classroom has continued to grow (Whitworth & Berson, 2003). Shaunessy (2005) noted an increase in the literature discussing how to use technology with academically talented students. What was lacking was empirical investigations related to technology and gifted education. This study attempted to fill part of this void. Additionally, much of the previously conducted research examining teachers' uses of technology in the social studies classroom focused on high school populations (Friedman, 2006). This study examined the use of technology in the middle schools, with academically talented students, an area which has not previously been investigated. The study was designed to answer the following research questions.

1. To what degree do social studies teachers in high-performing middle schools utilize technology in teaching academically talented students?
2. How do social studies teachers in high-performing middle schools use digital technology to support higher order thinking?
3. What factors influence social studies teachers in high-performing middle schools inclusion of digital technology in their teaching of academically talented students?

This study utilized a mixed-method research protocol, incorporating both quantitative and qualitative analyses in an effort to answer the three research questions guiding this study (Creswell and Plan, 2007; Onwuegbuzie & Leech, 2005; Tashakkori & Teddlie, 1998). Quantitative data were collected using a survey, modified from VanFossen's 2005 Internet Use Survey, designed to examine classroom teachers' use of the Internet for instructional purposes, and the factors that facilitate or hinder that use. Information obtained through this survey was expanded upon with the data obtained through group interviews at each of the three participant schools. To further illuminate information gathered in the survey and group interview, ten teachers participated in the second phase of this study, which included individual interviews, classroom observations, and document analysis. The use of these various sources of data provided the ability to investigate further information inaccessible through survey analyses alone. Additionally, multiple data sources provided the opportunity to triangulate findings.

Due to the quantity of data collected in this mixed-methods study, and the use of a number of data sources to answer the research questions, data from the Internet use survey, the group interviews, and individual case studies are presented first. A discussion of the results within the parameters of the three research questions follows.

*Description of the Sample*

Twenty-seven teachers (n = 27) at three high-performing middle schools participated in this study from April until October 2008. Each of the teachers was asked to complete a survey based upon the VanFossen's 2005 Internet Use Survey. Table 3 shows a summary of the demographic data of the 27 participating teachers, including

gender, highest degree earned, age group, teaching experience, courses taught, and hours of technology training. Of the teachers participating in this study, eight (29.62%) were male and 19 (70.37%) were female. Twelve participants (44.44%) have earned a bachelor's degree, 14 (51.85%) have earned a master's degree, and one (3.70%) has earned a specialist in education degree. The participants' ages ranged from 25 years to over 60 years. The 18.52% of the participants were in each of the following age ranges: 25-29 years, 35-39 years, and 55-59 years. The average teaching experience was 12.73 years, with a range of 3 to 38 years. Seven (25.93%) of the teachers taught 6th grade World Geography, 10 (37.04) taught 7th grade World Geography, 9 (33.33%) taught 8th grade U.S. History, and 1 teacher (3.70%) taught both 7th grade World Geography and 8$^{th}$ Grade U.S. History. The teachers reported participating in a mean of 6.63 hours of technology-related professional development training, ranging from no training to 20 hours.

Table 3

*Demographic and Professional Characteristics of Participants*

| Characteristic | | Frequency | Percent |
|---|---|---|---|
| Gender | | | |
| | Male | 8 | 29.62 |
| | Female | 19 | 70.37 |
| Degree Earned | | | |
| | Bachelors | 12 | 44.44 |
| | Masters | 14 | 51.85 |
| | Specialist | 1 | 3.70 |
| | Doctorate | 0 | 0 |
| | Other | 0 | 0 |
| Age | | | |
| | 24 years or younger | 0 | 0 |
| | 25-29 years | 5 | 18.52 |
| | 30-34 years | 3 | 11.11 |
| | 35-39 years | 5 | 18.52 |
| | 40-44 years | 4 | 14.81 |
| | 45-49 years | 1 | 3.70 |
| | 50-54 years | 3 | 11.11 |
| | 55-59 years | 5 | 18.52 |
| | 60 years or older | 1 | 3.70 |
| Teaching Experience | | | |
| | 1-10 years | 16 | 61.54 |
| | 11-20 years | 5 | 19.23 |
| | 21-30 years | 1 | 3.85 |
| | 31 years or more | 4 | 15.38 |
| Course(s) Taught | | | |
| | 6th grade Geography | 7 | 25.93 |
| | 7th grade Geography | 10 | 37.04 |
| | 8th grade U.S. History | 9 | 33.33 |
| | 7th grade Geography & 8th grade U.S. History | 1 | 3.70 |
| Technology Training (number of hours) | | | |
| | No training | 5 | 19.23 |
| | 1-5 hours | 8 | 30.77 |
| | 6-10 hours | 10 | 38.46 |
| | 11-15 hours | 2 | 7.69 |
| | 16-20 hours | 2 | 7.69 |

N = 27

*Internet Use Survey*

Technology Availability

As shown in Table 4, 26 of the 27 teachers reported having at least one computer in their classroom. One teacher was a floating teacher without a classroom, and therefore reported not having an available computer in a classroom. Seventeen teachers (62.97%) reported having two or more computers in their classrooms.

Internet access was reported in all but one classroom. After additional discussions with the teacher, it was reported that she did have Internet access for her desktop. She reported a lack of access for student use. Two of the teachers (7.41%) reported a slow Internet connection; however, 24 other teachers (88.89%) at the same schools reported fast Internet speed. The discrepancy lies with the two teachers' interpretation of the question and not with the Internet speed in each school. Indeed, comments made during the survey indicated that teachers felt that the Internet connection was slow, but that according to the survey, it qualified as fast.

All but two teachers (7.41%) reported having access to LCD projectors. Eighteen (66.67%) of the participant teachers had an LCD projector permanently in their rooms. Laptop carts were available for checkout at all three schools. Three teachers (11.54%) reported one laptop cart available for checkout and 23 teachers (88.46%) reported that there were multiple carts available for checkout. One teacher did not answer this question on the survey.

Table 4

*Available Classroom Technology*

| Type of Technology Available | | Frequency | Percent |
|---|---|---|---|
| Number of Computers | | | |
| | None | 1 | 3.70 |
| | 1 computer | 9 | 33.33 |
| | 2-3 computers | 16 | 59.26 |
| | 4 or more computers | 1 | 3.70 |
| Internet Speed | | | |
| | No Internet access | 1 | 3.70 |
| | Slow Internet connection | 2 | 7.41 |
| | Fast Internet connection | 24 | 88.89 |
| LCD projector | | | |
| | Not available | 2 | 7.41 |
| | 1 available for checkout | 0 | 0 |
| | Multiple available for checkout | 7 | 25.93 |
| | LCD in room | 18 | 66.67 |
| Laptop Cart | | | |
| | Not available | 0 | 0 |
| | 1 cart | 2 | 11.54 |
| | Multiple carts | 23 | 88.46 |

## Technology Use and Comfort

*Technology Use.* Participants were asked to report on the amount of time they spent using the computer at school and home. The teachers reported spending an average of 10.56 hours per week using the computer in school, with a range of 2 to 20 hours. Their at home computer use averaged 11.37 hours per week, with a range of 0 to 20 hours. Of the 27 teachers surveyed, all but one reported having home Internet access. The teachers were also asked to report on the frequency (per week) with which they used the Internet and various software programs. The data pertaining to computer use, frequency of Internet use, and the frequency of software use are reported in Table 5.

All participants reported using the Internet for both professional and personal use. Personal Internet use was reported at a higher frequency than was professional use; 17 (62.96%) of the participants reported using the Internet nine or more times per week for personal reasons, as compared to 6 (22.22%) teachers using the Internet at a similar rate for professional reasons.

Participating teachers reported frequent use of word processing software. Twenty-four of the 27 teachers (88.89%) used word processing software five or more times a week, with 13 (48.15%) reporting its use nine or more times a week. Conversely, the teachers reported infrequent use of spreadsheet software with 85.19% (n = 23) using spreadsheets fewer than three times per week. Indeed, 11 (40.74%) reported never using spreadsheet software. Results similar to those of spreadsheet software use were reported for the participants' use of productivity, web publishing, and FTP (file sharing) software. Seventeen teachers (62.96%) reported never using productivity software; 24 (88.89%) reported never using web publishing software; and, 21 (77.78%) reported never using FTP software. Although not as frequently reported as word processing use, 21 (77.77%) did report using presentation software: 12 (44.44%) at 1-2 times weekly, 6 (22.22%) at 3-4 times weekly, 1 (3.70%) at 5-6 times weekly, and 2 (7.41%) reported 9 or more times weekly.

Table 5

*Participant Teacher Technology Use*

| | | Frequency | Percent |
|---|---|---|---|
| Hours of school computer use | | | |
| | No use | 0 | 0 |
| | 1-5 hours per week | 8 | 29.63 |
| | 6-10 hours per week | 7 | 25.93 |
| | 11-15 hours per week | 8 | 29.63 |
| | 16-20 hours per week | 4 | 14.81 |
| Hours of home computer use | | | |
| | No use | 1 | 3.70 |
| | 1-5 hours per week | 6 | 22.22 |
| | 6-10 hours per week | 9 | 33.33 |
| | 11-15 hours per week | 3 | 11.11 |
| | 16-20 hours per week | 8 | 29.63 |
| Frequency of professional Internet use (per week) | | | |
| | Never used | 0 | 0 |
| | 1-2 times | 3 | 11.11 |
| | 3-4 times | 7 | 25.93 |
| | 5-6 times | 6 | 22.22 |
| | 7-8 times | 5 | 18.52 |
| | 9 or more times | 6 | 22.22 |
| Frequency of personal Internet use (per week) | | | |
| | Never used | 0 | 0 |
| | 1-2 times | 3 | 11.11 |
| | 3-4 times | 3 | 11.11 |
| | 5-6 times | 2 | 7.41 |
| | 7-8 times | 2 | 7.41 |
| | 9 or more times | 17 | 62.96 |
| Frequency of word processing software use (per week) | | | |
| | Never used | 0 | 0 |
| | 1-2 times | 2 | 7.41 |
| | 3-4 times | 1 | 3.70 |
| | 5-6 times | 8 | 29.63 |
| | 7-8 times | 3 | 11.11 |
| | 9 or more times | 13 | 48.15 |
| Frequency of spreadsheet software use (per week) | | | |
| | Never used | 11 | 40.74 |
| | 1-2 times | 12 | 44.44 |
| | 3-4 times | 2 | 7.41 |
| | 5-6 times | 1 | 3.70 |
| | 7-8 times | 1 | 3.70 |
| | 9 or more times | 0 | 0 |

Table 5 (Continued)

*Participant Teacher Technology Use*

| | | Frequency | Percent |
|---|---|---|---|
| Frequency of presentation software use (per week) | | | |
| | Never used | 6 | 22.22 |
| | 1-2 times | 12 | 44.44 |
| | 3-4 times | 6 | 22.22 |
| | 5-6 times | 1 | 3.70 |
| | 7-8 times | 0 | 0 |
| | 9 or more times | 2 | 7.41 |
| Frequency of productivity software use (per week) | | | |
| | Never used | 17 | 62.96 |
| | 1-2 times | 5 | 18.52 |
| | 3-4 times | 0 | 0 |
| | 5-6 times | 1 | 3.70 |
| | 7-8 times | 0 | 0 |
| | 9 or more times | 4 | 14.81 |
| Frequency of web publishing software use (per week) | | | |
| | Never used | 24 | 88.89 |
| | 1-2 times | 1 | 3.70 |
| | 3-4 times | 1 | 3.70 |
| | 5-6 times | 0 | 0 |
| | 7-8 times | 0 | 0 |
| | 9 or more times | 1 | 3.70 |
| Frequency of FTP software use (per week) | | | |
| | Never used | 21 | 77.78 |
| | 1-2 times | 1 | 3.70 |
| | 3-4 times | 2 | 7.41 |
| | 5-6 times | 2 | 7.41 |
| | 7-8 times | 0 | 0 |
| | 9 or more times | 1 | 3.70 |

*Comfort with Technology*. To ascertain the participating teachers' comfort with software applications, they were asked to respond to several items using a 4-point Likert scale of 1 = *uncomfortable*, 2 = *somewhat comfortable*, 3 = *moderately comfortable*, and 4 = *very comfortable*. As shown in Table 6, all teachers surveyed reported being *very*

*comfortable* using word processing software (*M* = 4.0). The teachers indicated being *moderately* to *very comfortable* with presentation software (*M* = 3.41), *somewhat* to *moderately comfortable* with spreadsheet software (*M* = 2.93), and *somewhat comfortable* with productivity software (*M* = 2.15). The data indicate that the participants were *uncomfortable* using web publishing software (*M* = 1.85), and FTP software (*M* = 1.85). Frequency distributions of teacher comfort with the listed software applications are provided in Appendix F.

Table 6

*Teacher Comfort with Software Applications*

| Application | *n* | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Word processing | 27 | 4.00 | 0 | 4.00 | 4.00 |
| Spreadsheet | 27 | 2.93 | 1.07 | 1.00 | 4.00 |
| Presentation | 27 | 3.41 | 0.80 | 1.00 | 4.00 |
| Productivity | 26 | 2.15 | 0.97 | 1.00 | 4.00 |
| Web publishing | 26 | 1.85 | 1.08 | 1.00 | 4.00 |
| File Transfer Protocol (FTP) | 26 | 1.85 | 1.16 | 1.00 | 4.00 |

Response scale. 1 = *Uncomfortable*; 2 = S*omewhat Comfortable*; 3 = *Moderately Comfortable*; 4 = *Very Comfortable*

The relationship between teachers' comfort level with software applications and their reported use of the same software were examined using Spearman's *rho* ($r_s$). The results of the correlation analyses are presented in Table 7. Correlation values of .80 or higher are considered a strong correlation, values of .50-.79 are considered moderate

correlation, and values from .20 to .49 are considered weak correlation (O'Rourke, Hatcher, & Stepanski, 2005). A statistically significant but weak correlation was found for spreadsheet software ($r_s$=.390, p<.05) and productivity software ($r_s$ =.464, p<.05). A statistically significant but moderate correlation was found with FTP software ($r_s$ =.564, p<.01). Correlation analyses could not be done for word processing software due to the lack of deviation in teacher comfort with word processing software; all teachers survey indicated that they were *very comfortable* using word processing. It appears from the correlations presented here that there is a relationship between a teacher's comfort with a software application and use.

Table 7

*Correlations of Teacher Comfort and Use of Selected Software Applications*

| Application | *N* | Mean $M_{comfort}$ | Mean $M_{use}$ | Correlation ($r_s$) | p |
|---|---|---|---|---|---|
| Word processing | 27 | 4.0 | 4.89 | -- | -- |
| Spreadsheet | 27 | 2.93 | 1.85 | .390 | .044 |
| Presentation | 27 | 3.41 | 2.37 | .301 | .127 |
| Productivity | 26 | 2.12 | 1.92 | .464 | .017 |
| Web publishing | 26 | 1.85 | 1.35 | .354 | .076 |
| File Transfer Protocol (FTP) | 26 | 1.85 | 1.58 | .564 | .003 |

Classroom Internet Use: Frequency

Question 9 of the Internet Use Survey asks participants to report on the frequency with which they use the Internet in the classroom. The question lists 16 Internet-related activities that have been weighted by experts in the field of technology integration in the social studies to reflect higher-order Internet. The activities were weighted on a scale of 1 (low-order use) to 4 (high-order use). The scale is loosely based on Bloom's Taxonomy (VanFossen & Waterson, 2008). Teachers were asked to rate the frequency of their Internet use for each of the 16 categories using a four-point Likert-type scale (1= *never*, 2= *rarely*, 3= *occasionally*, and 4= *frequently*). The frequency levels were further operationalized in the survey. Rarely was identified as being "several times a year;" occasionally as "several times a month;" and frequently as "once or more a week." Information pertaining to teacher's Internet use is reported in Table 8.

The frequency distribution for each of the 16 Internet-related activities is reported in Table 8. The teachers most frequently used the Internet to gather information, 85.19% of respondents indicated occasional or frequent use of the Internet to gather background information, 81.48% report similar use for gathering multimedia, and 80.77% for encouraging students to gather background information. In contrast, 77.78% of respondents reported never encouraging students to develop WebPages, 62.96% report never having students analyze websites for accuracy bias, 48.15% report never asking students to compare and contrast websites from differing viewpoints, and 55.56% never encourage students to use email to contact content experts or other students.

Table 8

*Classroom Internet Use Frequency Distribution*

| | | Frequency of use (in percentages) | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Internet Use | IUS weight | Never | Rarely | Occasionally | Frequently | Mean | SD |
| A. Gather background information for lessons you teach | 1.0 | 0 | 14.81 | 25.93 | 59.26 | 3.44 | .751 |
| B. Gather multimedia for use in lessons you teach | 2.0 | 0 | 18.52 | 29.63 | 51.85 | 3.33 | .784 |
| C. Encourage students to use the Internet to gather background information | 2.0 | 0 | 19.23 | 42.31 | 38.46 | 3.19 | .749 |
| D. Encourage students to use e-mail to contact other students or content experts | 2.0 | 55.56 | 18.52 | 14.81 | 11.11 | 1.81 | 1.08 |
| E. Take students on a "virtual fieldtrip" using the Internet | 3.0 | 33.33 | 25.96 | 29.63 | 11.11 | 2.19 | 1.04 |
| F. Develop interactive lessons that requires students to use the Internet to complete some take or assignment | 4.0 | 11.11 | 48.15 | 37.04 | 3.70 | 2.33 | .734 |
| G. Encourage students to develop WebPages for an assignment | 3.0 | 77.78 | 14.81 | 7.41 | 0 | 1.30 | .609 |
| H. Develop WebPages for social studies classes you teach | 3.0 | 44.44 | 25.93 | 11.11 | 18.52 | 2.04 | 1.16 |
| I. Have students complete inquiry-oriented 'WebQuests' | 4.0 | 48.15 | 29.63 | 18.52 | 3.70 | 1.78 | .892 |
| J. Access primary source materials for use in your classroom | 3.0 | 7.41 | 25.93 | 29.63 | 11.11 | 2.96 | .980 |
| K. Search for lesson plans for particular classes you teach | 1.0 | 0 | 29.63 | 33.33 | 37.04 | 3.07 | .829 |
| L. Access digital video clips to use in your classroom | 1.0 | 14.81 | 44.44 | 29.63 | 11.11 | 2.37 | .884 |
| M. Contact other social studies teachers for professional development or lesson ideas | 2.0 | 3.70 | 25.93 | 51.85 | 18.52 | 2.85 | .770 |
| N. Have students complete specific worksheet activities use the Internet as a resource | 1.0 | 25.93 | 44.44 | 25.93 | 3.70 | 2.07 | .829 |
| O. Have students analyze webpages for accuracy or bias | 4.0 | 62.96 | 25.93 | 11.11 | 0 | 1.48 | .700 |
| P. Have students compare/contrast information from websites with different points of view | 4.0 | 48.15 | 37.04 | 14.81 | 0 | 1.67 | .734 |

The participants most frequently used the Internet for information gathering, a similar result to that found by VanFossen and Waterson (2008). The five most-frequent uses, as determined by the respondents mean Internet use (See Table 8), included gathering background information ($M$=3.44), gathering multimedia ($M$=3.33), encouraging students to gather background information, searching for lesson plans ($M$=3.07), and accessing primary source material ($M$=2.96). Participants reported rarely using the Internet to encourage student communication outside the classroom. Students were not encouraged to communicate using email ($M$=1.81), nor develop WebPages ($M$=1.30). Teachers rarely utilized WebQuests ($M$=1.78), nor did they have the students analyze webpages for bias ($M$=1.48) or compare and contrast websites from different points of view ($M$=1.67). The mean use scores for the remaining six Internet activities ranged from the infrequent, develop a WebPages for courses taught ($M$=2.04), to the nearly frequent, contact other social studies teachers ($M$=2.85).

Level of Classification

The participating teachers were classified as high-level users, mid-level users, or low-level users of the Internet using the two methods employed in VanFossen (1999) and VanFossen and Waterson (2008). The data are reported in table found in Appendix G. Teachers were categorized by their Internet use mean scores ($M_{use}$), using the parameters outlined in VanFossen (1999): high-level users are those whose mean score ranged from 2.75 to 4.0; mid-level users are those whose mean score ranged from 2.0 to 2.74; and, low-level users are those whose mean score ranged from 1.0 to 1.9. Using these parameters, 7 teachers (25.93%) were identified as High-level users, 14 (51.85%) were

Mid-level users, and 6 (22.22%) were Low-level users. These results resemble the quartiles identified in the VanFossen (1999) study.

The participant's Internet use was categorized a second time, using the IUS score described in VanFossen and Waterson (2008). Using this method, an individual's use rate [IUS(rate)] is determined by a summation of frequency scores multiplied by the by expert-validated weighted IUS, as described in Chapter 3. High-level users were identified as having an IUS≥80, Mid-level users as having an IUS between 60 and 79, and Low-level users as having an IUS≤59. Using the IUS score parameters, 16 teachers (59.26%) were identified as High-level users, 10 teachers (37.04%) were identified as Mid-level users, and 1 teacher (3.70%) was identified as a Low-level user. Of the 27 participating teachers, 13 (48.15%) had an increase in their level of Internet use when the rates were calculated using the IUS scores. Indeed, one teacher moved from a Low-level user, as determined by the $M_{use}$, to a High-level user as determined by the IUS score. These increases suggest that the quality of Internet use, as determined by the IUS value, was more influential to the user's classification than the frequency with which the Internet was used.

Teachers were also asked to self-evaluate their level of Internet use (using item 22). As is shown in column 3, of the 27 participants, 12 (44.44%) identified themselves as High-level users, 10 (37.04%) as Mid-level users, and 5 (18.52%) as Low-level users. When compared with their levels as identified by both the $M_{use}$ and IUS scores, 21 (77.77%) accurately identified their level of use, as determined by at least one of the two calculated ratings. Of the remaining 6 teachers, 2 (7.40%) underestimated their level of

Internet use, and 3 (11.11%) overestimated their level of use. The teacher who moved from a Low-level to High-level user self-identified as a Mid-level user. The data pertaining to the level of the teachers' Internet use is presented in Appendix G.

As a follow up to their frequency self-assessment, the teachers were asked about their desire to use the Internet in the classroom. The frequency distribution of the teachers' response to the question is reported in Table 9. Twenty-two of the 27 teachers (81.47%) reported a desire to use the Internet more often or much more often than their current practice. Four teachers (14.81%) indicated that they are using the Internet as much as they care to; and, one teacher (3.70%) reported using the Internet less often than in previous years.

Table 9

*Teachers' Desire for Classroom Internet Use*

| Desire to Use the Internet | Frequency | Percent |
|---|---|---|
| No desire to use in the classroom | 0 | 0 |
| Currently using as much as the care to in the classroom | 4 | 14.81 |
| Would like to use more often than currently using | 10 | 37.03 |
| Would like to use much more often than currently using | 12 | 44.44 |
| Currently using less often than in previous years | 1 | 3.70 |

## Barriers to Technology Use

Teachers were also asked to identify what barriers were prohibiting their use of technology, if they were not currently using the Internet as much as they would like. Table 10 shows the barriers to use identified by the teachers. The most frequently identified barrier was lack of access to equipment, specifically an insufficient number of

classroom computers. Also frequently identified was a lack of training in how to apply the Internet in teaching.

Classroom Internet Use: Teacher Attitude

In addition to measuring the frequency with which teachers used the Internet, question nine asked the participants to reflect on their attitude toward using the Internet in the classroom, as indicated by the level of importance they gave the fifteen teaching activities. Teachers were asked to rate the importance of the 16 categories using a four-point Likert scale (1= *not an important teaching tool/activity*, 2= *a somewhat important teaching tool/activity*, 3= *an important teaching tool/activity*, and 4= *a very important teaching tool/activity*).

Table 10

*Perceived Barriers to Classroom Internet Use*

| Barrier to Use | Frequency | Percentage |
|---|---|---|
| Lack of access to equipment (only 1-2 computers in classroom) | 16 | 59.26 |
| Lack of access to equipment (no Internet access in classroom) | 3 | 11.11 |
| Lack of access to equipment (no projector) | 4 | 14.81 |
| Lack of general computer training | 5 | 18.52 |
| Poor Internet search skills | 2 | 7.41 |
| Lack of training in how to apply the Internet in my teaching | 10 | 37.04 |
| Frustration over failed searches | 3 | 11.11 |
| Internet technology is not an improvement over the textbooks | 0 | 0.0 |
| Concern over students accessing inappropriate materials | 3 | 11.11 |
| My school has a policy that prohibits Internet use in the classroom | 2 | 7.41 |

n = 27

The frequency distribution of the teachers' attitude toward classroom Internet use is shown in Table 11. Sixty-eight percent of the surveyed teachers found encouraging students to use e-mail to be either not important or somewhat important. Similarly, 61.53% of the teachers found encouraging students to develop Webpages as either not important or only somewhat important. Information gathering was identified as either important or very important by nearly all surveyed teachers: gathering background information (92.31%), gathering multimedia (96.15%), encouraging students to gather information (92.31%), accessing primary source materials (92.31%), and accessing digital video clips (92.31%). In addition to such straight-forward information gathering uses, 96.16% of the surveyed teachers indicated that it was important or very important to develop interactive lesson plans that require students to use the Internet.

The participants rated information gathering activities highest among the 16 Internet activities: accessing primary source material ($M$=3.65), gathering multimedia for lessons ($M$=3.62), encouraging students to gather information ($M$=3.54), and gathering background information for lessons ($M$=3.50). The teachers' responses indicate that they view encouraging students to use email ($M$=2.24), and encouraging students to develop WebPages ($M$=2.27) as being an only somewhat important activity. These results are similar to the teacher's frequency of use, where information gathering was the most frequent, and using the Internet as a tool for outside student communication (email and WebPages) was infrequent.

Table 11

*Teacher Attitude toward Internet Use Frequency Distribution*

| | Frequency of use (in percentages) | | | | | |
|---|---|---|---|---|---|---|
| Type of Internet Use | Not important | Somewhat important | Important | Very important | Mean | SD |
| A. Gather background information for lessons you teach | 0 | 7.69 | 34.62 | 57.69 | 3.50 | .648 |
| B. Gather multimedia for use in lessons you teach | 0 | 3.85 | 30.77 | 65.38 | 3.62 | .571 |
| C. Encourage students to use the Internet to gather background information | 0 | 7.69 | 30.77 | 61.54 | 3.54 | .647 |
| D. Encourage students to use e-mail to contact other students or content experts | 20.00 | 48.00 | 20.00 | 12.00 | 2.24 | .926 |
| E. Take students on a "virtual fieldtrip" using the Internet | 3.85 | 15.38 | 38.46 | 42.31 | 3.19 | .849 |
| F. Develop interactive lessons that requires students to use the Internet to complete some take or assignment | 0 | 3.85 | 53.85 | 42.31 | 3.38 | .571 |
| G. Encourage students to develop WebPages for an assignment | 15.38 | 46.15 | 34.62 | 3.95 | 2.27 | .778 |
| H. Develop WebPages for social studies classes you teach | 11.54 | 26.92 | 38.46 | 23.08 | 2.73 | .962 |
| I. Have students complete inquiry-oriented 'WebQuests' | 11.54 | 15.38 | 50.00 | 23.08 | 2.85 | .925 |
| J. Access primary source materials for use in your classroom | 0 | 7.69 | 19.23 | 73.08 | 3.65 | .629 |
| K. Search for lesson plans for particular classes you teach | 3.85 | 7.69 | 38.46 | 50.00 | 3.35 | .797 |
| L. Access digital video clips to use in your classroom | 0 | 7.69 | 50.00 | 42.31 | 3.35 | .629 |
| M. Contact other social studies teachers for professional development or lesson ideas | 3.85 | 11.54 | 26.92 | 57.69 | 3.38 | .852 |
| N. Have students complete specific worksheet activities use the Internet as a resource | 3.85 | 26.92 | 46.15 | 23.08 | 2.88 | .816 |
| O. Have students analyze webpages for accuracy or bias | 7.69 | 30.77 | 34.62 | 26.92 | 2.81 | .939 |
| P. Have students compare/contrast information from websites with different points of view | 3.85 | 23.08 | 42.31 | 30.77 | 3.00 | .849 |

In an effort to determine the relationships among the factors associated with classroom Internet use and technology integration, the intercorrelations among variables were computed. The following variables were used in the correlation analysis: Internet use mean score, IUS score, software use mean, self reported technology use, comfort with software applications, technology training, LCD availability, computer availability, degree earned, teaching experience, age, and attitude toward Internet mean score. The intercorrelation matrix is shown in Table 12. A statistically significant and strong correlation was found between $Mean_{use}$ and IUS score ($r_s$ =.86, p<.01) indicating that, although not a perfect correlation, the two methods for assessing teachers' frequency of Internet use are strongly associated. Statistically significant but moderate correlations were found among six pairings: $Mean_{use}$ and self reported use; $Mean_{use}$ and comfort with software applications; $Mean_{use}$ and mean of attitude toward Internet use; IUS and self reported use; IUS and comfort with software applications; and, teaching experience and teacher age. The correlation between age and teaching experience; however, for this study the correlation is not considered informative. Statistically significant yet weak correlation was present between self reported and both comfort with software applications ($r_s$ =.45, p<.05), and attitude toward Internet use ($r_s$ =.42, p<.05).

*Qualitative Data*

The constant comparison method (Glaser, 1965) was used to analyze the collected qualitative data. Several themes were identified *a priori*, derived from a review of the literature. These themes included attitude toward technology, teaching philosophy, environmental influences, and instructional strategies. Themes were added and revised

throughout data collection and analysis (Merriam, 1998). Following an initial comprehensive review of the qualitative data (from survey free response questions, group interviews, individual interviews, observations, and course documents), the themes were modified to "barriers," "attitude to and comfort with technology," and "teaching and learning." These three themes were then used in the further analysis of the data.

The unit of analysis for the interview data, both group and individual interviews, was words, phrases, sentences, and passages related to the identified codes, which are subsumed under the three identified themes (Appendix H). A second researcher was asked to code multiple sections of the interview transcripts to ensure reliability in data coding. This individual was provided with the revised themes and asked to code the interview sections, identifying codes that would fall within the pre-determined themes. The second researcher's codes were then compared with the codes identified in the initial survey of the data. An agreed list of codes was derived by comparing the two. Using this agreed list of codes, both researchers coded an interview transcription. The two sets of codes were compared to ascertain inter-rater reliability, which was 91.67% agreement between the two researchers' lists. Qualitative data management was conducted using the Atlas.ti program. The program provided an accounting of code frequency counts and quotations for each of the identified codes.

Table 12

*Internet Use Factors: Spearman's Rho Correlation Matrix ($r_s$)*

| | $Mean_{use}$ | IUS score | $Mean_{software}$ | Self reported use | $Comfort_{software}$ | Technology training | LCD availability | Computer availability | Degree earned | Teaching experience | age | $Mean_{attitude}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **$Mean_{use}$** | -- | | | | | | | | | | | |
| **IUS score** | .86** | -- | | | | | | | | | | |
| **$Mean_{software}$** | .35 | .37 | -- | | | | | | | | | |
| **Self reported use** | .59** | .57** | .25 | -- | | | | | | | | |
| **$Comfort_{software}$** | .59** | .68** | .14 | .45* | -- | | | | | | | |
| **Technology training** | .35 | .23 | .08 | .11 | .24 | -- | | | | | | |
| **LCD availability** | .11 | -.06 | .00 | .06 | .21 | .30 | -- | | | | | |
| **Computer availability** | -.01 | .08 | .06 | .02 | -.06 | -.18 | .21 | -- | | | | |
| **Degree earned** | .09 | -.03 | .02 | .34 | .23 | .05 | .27 | -.07 | -- | | | |
| **Teaching experience** | -.23 | -.08 | -.14 | -.13 | -.04 | -.24 | .10 | .33 | .31 | -- | | |
| **Age** | -.03 | .07 | -.21 | -.12 | -.13 | -.17 | -.18 | .31 | .21 | .75** | -- | |
| **$Mean_{attitude}$** | .60** | .61** | .32 | .42* | .30 | .06 | -.02 | .00 | .05 | .06 | .00 | -- |

Note. * p<.05; ** p<.01

$Mean_{use}$ = mean of Internet use from question 9; IUS score = weighted score from question 9;
$Mean_{software}$ = mean of software application use; $Comfort_{software}$ = mean of comfort with software applications;
$Mean_{attitude}$ = mean of attitude toward Internet use from question 9

Group Interviews: Overview

Semi-structured (Merriam, 1998) group interviews with the participating teachers were conducted at each of the three school sites during before-school department meetings. The group interviews were designed to gather information not addressed in the Internet Use Survey such as: use of technology other than the Internet, specific information regarding barriers to use, examples of technology integration, and the participating teachers' attitude toward technology integration. The group interview protocol is provided in Appendix B. As this was a semi-structure interview, questions were modified during the course of the interview to capture additional information.

The group interviews were recorded, transcribed, and analyzed using Atlas.ti software. Frequency counts were provided for each of the codes within the three themes: barriers to use; teaching and learning; and attitude and comfort with technology. Table 13 displays the frequency counts, by code, for each of the three themes. An analysis of the group interview frequency data indicates that the most-often discussed topic was that of equipment-related barriers to technology integration. Indeed, the four codes describing equipment barriers (access to equipment, functionality of equipment, age of equipment, and lack of equipment) were mentioned 52 separate times over the course of the three group interviews, this constitutes 64.20% of the codes associated with barriers and nearly a quarter (23.60%) of all items discussed in the interviews. Barriers related to administrative policy were also frequently discussed; district administrative policies, school administrative policies, high-stakes testing impacts, and firewall issues were

mentioned a combined 32 times, or 39.51% of the barrier-associated items. Over one-quarter of the items discussed during the interview related to teacher and student technology use. However, of the 54 instances of technology use codes, 40 (or 74.07%) related to teacher use of technology, and 14 (or 25.93%) involved student technology use. Under the theme of attitude and comfort with technology, the teachers most often mentioned their own, or colleagues, discomfort with technology. Technology-related professional development was also a concern for the participating teachers. School-specific information is discussed below.

School A: Group Interview

Seven teachers at School A participated in a group interview held in the department chair's classroom. The teachers were asked questions regarding their understanding of student learning, their general use of technology, their use of technology with academically talented students, and barriers to their technology integration. Although each teacher provided his or her own individual perspective to the questions asked, there were general trends evident in the answers provided.

When asked the question, "How do you think students learn best?" The consensus from the seven teachers can be summarized by the following quote from Ms. Carroll, "At this grade level I think they learn hands-on, where they are participating in an activity other than listening or reading… they have some other way to show what they learned, I think it helps." This was clarified by Ms. Cooper, who gave the following answer the question.

> Every child learns so differently and that is why you have to have so many different ways

> and approaches to learning. … We've done songs this year, putting our notes to camp songs and then perform them. Some hated it, because they didn't want to be out there in front of the group. But, you have to tap into whatever is best for them.

Overall, the teachers interviewed at School A identified active learning strategies as being the most effective way of encouraging student learning in the middle grades. When asked about the type of technology used in their classrooms, the teachers expressed frequent use of document cameras and presentation software, and occasional use of interactive white boards and digital cameras. The most commonly used classroom technology was the Internet, for both information gathering and teacher communication. The Internet-based information was used as research for other projects, or as an aid to classroom instruction. Ms. Cooper described a typical use of the Internet in her daily class activities.

> I use photographs all the time. We just did capsule hotels in Japan and when they saw what one looked like, they went nuts. I started by going to the board… what is a capsule. "Pills are" "Okay, show me…draw it on the board." Then I showed them what a capsule hotel looks like and they went bonkers. Photographs are so important.

The photos she described were taken from various Internet sites and projected during class. Student use of technology was identified, specifically in doing research for a project, or in the use of presentation software. However, the teachers more frequently identified their own use of technology.

Table 13

*Frequency of Identified Codes: Group Interviews*

| Theme | | Frequency |
|---|---|---|
| Barrier to use | | |
| | Access to equipment | 17 |
| | Functionality of equipment | 15 |
| | Age of equipment | 8 |
| | Lack of equipment | 2 |
| | District administrative policies | 11 |
| | School administrative policies | 9 |
| | High stakes testing | 5 |
| | Firewall | 7 |
| | Physical Environment | 6 |
| | Financial Concerns | 6 |
| | Time constraints | 2 |
| | Digital Divide | 2 |
| | | 81 |
| Teaching and learning | | |
| | Teaching philosophy | 11 |
| | Student-centered | 8 |
| | Higher-order thinking | 5 |
| | Curriculum constraints | 2 |
| | Understand needs of talented | 8 |
| | Prepping students for tomorrow | 4 |
| | Purchase own equipment | 4 |
| | LCD projector use | 4 |
| | Internet use – whole class | 7 |
| | Internet use – teacher | 1 |
| | Presentation software – teacher | 9 |
| | Presentation software – student | 5 |
| | Digital filmmaking | 1 |
| | Other technology – teacher | 12 |
| | Other technology – student | 4 |
| | Teacher administrative technology use | 1 |
| | Information availability | 8 |
| | Laptop use – teacher | 2 |
| | Laptop use – student | 4 |
| | | 111 |
| Attitude and comfort with technology | | |
| | Teacher attitude toward technology | 4 |
| | Teacher comfort with technology | 1 |
| | Teacher discomfort with technology | 7 |
| | Teacher experience with technology | 2 |
| | Technology in teacher education | 2 |
| | Technology in professional development | 5 |
| | Fear of inappropriate materials | 2 |
| | Student attitude toward technology | 1 |
| | Student comfort with technology | 3 |
| | Student experience with technology | 2 |
| | | 28 |

They were asked about the benefits of integrating technology into their classes. The consensus was best summarized by the following quote from Ms. Roberts. "I see it as more up to date. And, they are more interested. Because they are more interested, it really gets their attention and they remember more. They participate more." The teachers saw technology as a way to interest the students, and to open their horizons.

> These kids in our community, are so protected that they don't realize how special their lifestyle is compared to the rest of the world. So, we get to open up opportunities for them that they wouldn't have and that their parents certainly wouldn't allow them to experience. … It's wonderful, the opportunities that it (the Internet) opens up. Seeing the waterfalls, and actually understanding the power of them. You can't get that when you just read it. (Ms. Edge).

The potential pitfalls of Internet use were discussed in the interview, specifically students accessing inappropriate material. However, the expressed consensus was that the benefits were worth the risks associated with student Internet use.

When questioned about the factors influencing their technology integration, the first response was "equipment availability." The functioning laptop carts at School A are housed in the school's media center. Ms. Edge described the issues with accessing the media center and the available technology.

> Access to media center is an issue; because we are a "Smart school" … which makes it (the media center) the only place to meet. So that means that every club or organization that has more members than can meet in a classroom (meets in the media center) …. Our media center is used for meeting for the area director, it is

> used for testing – it is constantly closed. It's just very frustrating. You can book the media center – but you get bumped. You think you have the media center and three weeks later… "I'm sorry, you've gotten bumped." It's very annoying.

Ms. Cooper expressed another concern with all the functional computers being housed in the media center. "If I want the laptop carts, I have to go into the media center with possibly three or four other classes going on in there. And, I'm too ADD to do that."

School A does have one new laptop cart, purchased with a matching grant. According to Ms. Edge, who wrote the grant, these computers are not currently being used for two reasons. 1) When the school year began, they were used as an emergency solution to the insufficient number of computers purchased for the technology electives. 2) The computers have a design issue that makes them particularly fragile, and are not feasible for use in a classroom.

There were two other laptop carts available for check out. However, according to Ms. Edge, they are not functional.

> The other two laptop carts we have are scavenged from carts from when the school opened up seven years ago – in 2000. But, they are Apples and there are only about half on the cart that actually work. The last time I brought it into my room, it was a waste of time… it's just not worth it. They don't charge. It's like little suckling pigs around the cart as the kids are all tied to the cart, trying to get power to them. … I've tried them and it's just a waste of time. …You lift some of them (the Apples) and you can see the guts (of the computer). They are falling apart.

Indeed, the equipment availability and functionality has become such an issue that several of the teachers have purchased their own, and that is what is being used in the classroom.

Two additional barriers to technology integration were discussed in the interview. Ms. Roberts voiced the following opinion about how the state's high-stakes testing has affected her technology use. "FCAT explorer, FCAT explorer. If you want to do FCAT explorer – that's great. But, if you want to do anything else, there is no interest or support." FCAT explorer is the FDOE sponsored test practice site for students. A second issue, vocalized by Ms. Carroll, was her own comfort with technology and the lack of available options for help. "I want to do a PowerPoint with hyperlinks and some music in, that's at the level where I am at and I don't have any help. … The people that are resources are overloaded. And some of us are less technical than others."

Overall, the teachers who participated in the School A group interview saw technology integration as beneficial to their own teaching and for their students learning. However, they did identify multiple barriers that are prohibiting them from maximizing the potential benefits of technology. Those barriers include equipment availability, equipment functionality, high-stakes testing, and teacher comfort (or discomfort) with technology.

School B: Group Interview

Seven teachers from School B participated in a group interview held in the classroom of one of the participating teachers, Ms. Smith. As in the interview held at

School A, each teacher had their own perspective on the questions; however, there was consensus related to student learning and barriers to technology integration.

Similar to the teachers at School A, the teachers at School B identify active learning strategies as being the most effective for student students in the middle grades. The following quote from Ms. Dennis best captures the opinions expressed by the participating teachers. "I think they learn best by doing hands on activities, and when they teach other students. Sometimes I will have them create their own PowerPoint, or create their own lessons to teach something, they seem to be learning it best when they are actually presenting it to someone else." Other teacher added activities that include problem solving and knowledge application as being assistive to student learning; however, all teachers identified active learning as being the most effective with their students.

The teachers were asked to describe their use of non-Internet technology. The teachers reported use of LCD projectors, interactive whiteboards, presentation software, and document cameras. One teacher, Mr. Stephens, also indicated that he uses digital cameras, flash drives, digital portfolios, and digital filmmaking in his classroom. The most frequently identified use of technology in the School B interview was the teacher's use of an LCD projector to project presentations and website.

The majority of the interview addressed the barriers the teachers perceived as inhibiting their technology integration. The number one concern of all the participating teachers was equipment, both access and functionality. Their concern is typified by Ms. Dennis, who commented, "I know a lot of my team would like to do a lot of these things

(use technology). But, you have to check it (the LCD projector) out and return it that same day. They just don't feel like going down every single day and checking it out. They want to have it already set up and ready to go." Ms. Gonzalez expressed a similar concern. "Heaven forbid you turn it (a laptop cart) in late, or something takes longer than you would think it takes and you need a little extra time. With scheduling, it's very difficult." The teachers at School B identified access to the technology as a major impediment to their technology integration. Indeed, due to perceived restrictions to equipment access, one of the teachers in the interview purchased her own laptop, document camera, and LCD projector. Several others have purchased a laptop to use in class.

Unlike School A, which had two semi-functioning laptop carts that could be checked out, and no fully functioning carts that could leave the media center, School B had six portable laptop carts with wireless Internet and wireless laser printing for checkout from the media center. The majority of the computers in the six carts do function; however, their full functionality was a concern expressed by multiple teachers in the interview.

> [W]e're talking about a fleet of computers that are 2001 technology and we're in 2008 right now. Some of the basic barriers to have true multimedia, to have the truly integrate and do the interactive types of things that kids need to learn, you need good microphones, you need integrated cameras in laptops to do really good presentations, good speakers, external hard drives, or labs that have space to save huge files because that's where we are in 2008. (Mr. Stephens)

Other teachers agreed with the Mr. Stephens's sentiments. When discussing the computers in her classroom, Ms. Smith expressed the following frustration. "There are so many web quests and fun things for social studies on the Internet that are good … but, the technology we have just can't handle it." She further explained her frustration when she discussed a problem she had recently faced. "I had a student come in and plug in a jump drive into one of the laptops and his jump drive is so advanced that the computer wouldn't even load it." Mr. Charles best described the sentiments of the teachers in the interview.

> What comes to mind is the quote that I've run across several times …. "Our job is to prepare students for their futures, not to prepare students for our lives." Frankly, that's kind of what we are doing. We are working with 20th century technology and trying to prepare them for the 2020s – the students for what they will be doing in the 2020s. There's a world of difference.

The teachers at School B are not lacking equipment. However, they are faced with problems inherent in technology, functionality and compatibility.

In addition to concerns over access and functionality, several teachers expressed concern about their own ability to use the available technology. Ms. Gonzalez stated the following, "I want to really learn how to use things more. …. I would like to have more knowledge, and so I would like more training on different things so that I could figure out how to use it in the classroom." She says that she feels "somewhat intimidated because I would have computer problems and Mr. Stephens would send the kids over to help me with it. And whereas I'm grateful that they came over and fixed it, I don't know where to

go to learn more." Ms. Gonzalez's concerns about teacher knowledge and comfort were echoed by Ms. Smith, who said, "I know we have Smart boards down there (in the media center), but no one knows how to use them."

A final barrier identified during the School B group interview was the impact that standardized testing has had on the ability to integrate technology into the classroom. Mr. Stephens was particularly concerned with the impact that the school's focus on test preparation has had on student technology use.

> I would say definitely that the focus is to teach skills …. in the year before last, we did the History Fair which was extremely high level research and we used the technology, digital documentaries. … I feel that there's a lot of pressure to constantly to make that (the FCAT) the focus. That is what the administration wants to hear. They want to see the continuous improvement model. We are constantly working, and re-teaching the skills. While they were getting the same skills, I felt, by doing the History Fair, it wasn't as measurable. And, therefore in order to sit down with an administrator and say here is a digital documentary. It's ten minutes long. We spent an entire semester creating this and it is extremely high level research. The kids were doing 21st century skills and they were applying their knowledge, here's their product. And, within that they had to find main idea and analyze content… all the things we've been doing (with the continuous improvement model) but it's not as measurable without the test. It's harder to defend.

His concern that the FCAT was supplanting student technology use was supported by Ms. Taylor who said, "I would agree. When you do things that are more project-based learning or you're trying to put things in more multi-media, it's harder to measure and it's harder to prove to an administrator."

The teachers at School B see the value of using technology in the classroom, but they are faced with barriers that they perceive as inhibiting their technology integration. Although they have equipment, unlike School A, the teachers still feel that there are equipment barriers impeding their use of technology. The barrier most often described, and which had the most vehement reaction, was equipment functionality, or a lack of functionality. Also of concern for these teachers was access to equipment, their own comfort with technology, and the impact that standardized tests have had on student use of technology.

School C: Group Interview

Four teachers at School C participated in a group interview held in the department chair's classroom. Similar to the two previous two interviews, the participating teachers were asked questions related to student learning, technology integration, and barriers to use. As previously stated, the teachers each had a unique perspective on the questions asked; however, there were general trends which were evident from their answers.

When asked about how students learn best; the general consensus was that students need learning environments that require them to manipulate content. Mr. Brady's comment captures the sentiments of the four participating teachers. "It's them working with the content rather than you just talking at them. Whether it's manipulating

it through a physical project or doing something with computers… have to manipulate it (the content) no matter what." Each of the teachers mentioned students need to "work with" with content – in other words, they advocated active learning as most effective for student learning in the middle grades.

All of the teachers in the group interview mentioned using an LCD projector, or a interactive whiteboard, on daily basis. When asked about the availability of projectors at School C, Mr. Brady stated that "everyone who wants one," has an LCD projector. Also inquired about was the availability of portable laptop carts. The teachers reported that there were seven, each with a minimum of 12 functioning laptops, available for checkout. Although equipment appears to be readily available at School C, Mr. Brady purchased his own projector, laptop, and Bluetooth tablet, to ensure that he had daily access to equipment.

Unlike the two prior schools, where access was of major concern, the teachers at School C were more concerned with incompatibility issues and the district firewall.

> One of the problems I have is compatibility. The stuff I make at home, I bring it here and it doesn't work. The computers here are 4-5 years old, the one I use at home… I bring it here and I get a notepad with all these codes on it. Alright, not going to do that lesson. That's three hours wasted planning. (Mr. Michaels)

Mr. Michaels was not alone in his sentiment. Mr. Brady stated that incompatibility was a major issue, due mainly to a large school district's ability to fund updated technology. He joked that "we are at a fairly new school and most of our computer hardware and things are relatively new … five years, six years, whatever. That's new for schools."

All four teachers expressed a frustration with the restrictiveness of the district Internet firewall. Ms. Castor commented that it would be nice if teachers could "go to more websites and not always be blocked out. …. You can go to a place and see dirty-filthy pictures by typing in one thing here at school. And then you type in something like "baseball," I'm making that up, but you go there and you're blocked." While all acknowledged a need for the security, they questioned whether the firewall could differentiate between student and teacher log-ins. "For teachers… leave it for the kids. But, for us – give us a little more access… Students could have one, teachers could have another" (Ms. Castor).

Technology professional development was another frustration for these teachers. All four identified themselves as regular users of technology. They found that the professional development offered by the school district was inappropriate for their needs.

> It's an issue of the type of training offered. Because, what's the training? I've been to the Instructional Services Center; it was a waste of time. I already knew all that. Why did I go? I think thhey focus too much on word and PowerPoint and picture taking, rather than things we can actually use. Like how do I use that Mimeo, how do I use that Smartboard? I know they have some of that training, but it isn't always available. (Ms. Castor).

Mr. Brady concurred with Ms. Castor, "most of the trainings are for the reluctant computer user who hasn't really done much of anything to this point and they are just starting to learn. But, those of us who have been doing it for a while and are comfortable, there is nothing new that is available to use."

Despite their frustrations with compatibility, the firewall, and available professional development, all four teachers viewed technology as being beneficial to their academically talented students. Mr. Michaels said that using technology gave him credibility with his honors students. “I like to use it because it makes the content I’m teaching seem much more validated, and that they teacher that is teaching it probably knows what he’s talking about. He knows where to find information – rather than just some guy up there in a monotone talking from a book.” Mr. Brady saw technology, especially the Internet as providing academically talented students “with some of the materials they need to excel and bring them up to their ability level with technology.” Student interest in technology was also mentioned in the interview. Mr. Michaels stated, “I like having my kids use computers because it is actually a motivation for them to do it. If you give them a piece of paper and a book, they are not going to want to do it. If you give them some kind of technology to play with while they are doing it, it will make it more fun and they probably will do it better.” Ms. Dennis also identified technology as being a “school to work skill. Besides the higher order thinking, they learn how to process while using the equipment at the same time. It helps them organize and work with other people, especially if it something that they have to work together on.”

Overall, the teachers at School C articulated many of the same benefits of technology integration that teachers from both School A and B identified. They also expressed frustration with equipment functionality. Access to equipment seems to be less of an issue at School C than either School A or B. Despite the reported access to equipment, teachers at School C also purchased their own equipment to ensure daily

availability and functionality. The teachers at School C expressed more concern over the district firewall and technology professional development than did the teachers at Schools A and B.

Despite the differences among the three schools, there were several commonalities that can be identified. First, teachers at all three schools viewed active learning as the most effective way of teaching students in the middle grades; and, the teachers identified technology as an effective tool to engage students in active learning. All of the participating teachers identified benefits from integrating technology, most in the form of information access and presentation. At all three schools, several barriers to technology use were identified; the most frequently mentioned were equipment-related. Teachers expressed particular frustration with the functionality of computers—which included equipment age, as well as compatibility issues. Other equipment-related barriers included access and the restrictiveness of the district firewall. Several teachers expressed concern over the impact that high-stakes testing has had on student technology use—particularly that they feel pressure from administration to focus more on skills and less on project-type assignments. Finally, teachers at both ends of the spectrum in ability to use technology expressed displeasure with the availability of technological professional development. Teachers who were hesitant users of technology reported that there was not enough professional development available; and teachers who were regular technology users were frustrated with the simplicity of the professional development offered. These three group interviews concluded the first phase of this two-part study.

Case Studies: Overview

The second phase of this study involved the case studies of ten volunteer teachers, five from School A and five from School B. In this phase, the teachers were asked to participate in formal, semi-structured interview (Merriam, 1998), provide one month's class documents, and be observed using technology in what they perceive as a "typical manner." The individual interviews were recorded, transcribed, member-checked, and analyzed using Atlas-ti software. Frequency counts for the combined ten interviews were provided for each of the codes within the three themes: barriers to use; teaching and learning; and, attitude and comfort with technology. Table 14 displays the frequency counts, by code, for each of the three themes.

An analysis of the frequency counts of codes from the combined individual interviews suggests that equipment-related barriers were a dominant concern for the participating teachers. Equipment-related barriers were mentioned 83 separate times over the course of the ten interviews, 43.23% of all barriers discussed and 13.52% of all items discussed in the interviews. Of particular concern was access to equipment, functionality of equipment, and a lack of equipment. Teacher and student use of technology was mentioned 141 times, or 22.96% of the items discussed. Within these 141 separate instances, 94 (66.67%) were related to teacher use of technology; 47 (33.33%) were about student use of technology, which was similar finding to the group interviews. A discussion of the individual case studies are provided below, with information from the document analysis and classroom observation provided for additional insight.

Table 14

*Frequency of Identified Codes: Individual Interviews*

| Theme | | Frequency |
|---|---|---|
| Barrier to use | | |
| | Access to equipment | 45 |
| | Functionality of equipment | 18 |
| | Age of equipment | 6 |
| | Lack of equipment | 14 |
| | District administrative policies | 8 |
| | School administrative policies | 26 |
| | High stakes testing | 27 |
| | Firewall | 6 |
| | Physical Environment | 4 |
| | Financial Concerns | 10 |
| | Technology Specialist | 4 |
| | Time constraints | 16 |
| | Student skills | 2 |
| | Digital Divide | 6 |
| | | 192 |
| Teaching and learning | | |
| | Teaching philosophy | 42 |
| | Teacher-centered | 24 |
| | Student-centered | 23 |
| | Higher-order thinking | 28 |
| | Curriculum constraints | 7 |
| | Technology need greater for non-gifted | 1 |
| | Understand needs of talented | 11 |
| | Prepping students for tomorrow | 12 |
| | Purchase own equipment | 6 |
| | LCD projector use | 9 |
| | Internet use – whole class | 15 |
| | Internet use – teacher | 4 |
| | Internet use - student | 20 |
| | Word processing – teacher | 3 |
| | Word processing – student | 1 |
| | Presentation software – teacher | 15 |
| | Presentation software – student | 9 |
| | Digital filmmaking | 3 |
| | Other technology – teacher | 22 |
| | Other technology – student | 6 |
| | Teacher administrative technology use | 15 |
| | Laptop use – teacher | 4 |
| | Laptop use – student | 6 |
| | Desktop use –teacher | 1 |
| | Desk top use – student | 2 |
| | | 289 |
| Attitude and comfort with technology | | |
| | Teacher attitude toward technology | 40 |
| | Teacher comfort with technology | 16 |
| | Teacher discomfort with technology | 20 |
| | Teacher experience with technology | 12 |
| | Technology in teacher education | 13 |
| | Technology in professional development | 14 |
| | Fear of inappropriate materials | 2 |
| | Student attitude toward technology | 7 |
| | Student comfort with technology | 1 |
| | Student experience with technology | 8 |
| | | 133 |

Case Study: Ms. Hill

Ms. Hill is a 7th grade World Geography at School A. She is in her early 40s and is the only participating teacher in the study to have earned a specialist degree in Educational Leadership. A 14 year veteran teacher, Ms. Hill has taught 4th grade, 7th grade, and grades 9-12, in Georgia and Florida. Neither Ms. Hill's bachelor's nor master's degree is in education; she earned her bachelor's degree in parks and recreation management, and her master's in public administration. Prior to teaching, she worked for county parks and recreation departments. She earned her teacher credentials by taking certification courses as a non-degree seeking student. She indicated that there was little instruction in technology integration in her educational background.

When asked about her teaching philosophy, she said, "All kids can learn and all kids should be given the biggest and broadest opportunity to go way above the bar. I think that people learn through experience – experiential learning. …. I feel that if you are learning something important, you should put it to use." Her described teaching philosophy, which advocates active learning, is in slight conflict with her expressed role as a social studies teacher.

> [I]t changes with each subject. When I was teaching government to seniors, I really felt it was my role to teach them to be responsible citizens, and walking them through the entire process – understanding what the Constitution was and why it is important for them and voting. In US History – I felt like my job was to give them a clear picture of why we are like what we are today. In Geography, I

> really try to give them a skill set. I give them some historical background and some fact-based things – but really I feel it's more a skill set and understanding our place in the universe.

It's interesting that when asked to explain her role as a social studies teacher, she identified what she would be "giving" the students, which is in conflict with her statement that people learn through experience. It appears from these indices that Ms. Hill would fall into the "teacher as manager" role in Schuerman's (1998) matrix (Appendix E).

Ms. Hill's use of instructional technology reflects her described role as a social studies teacher more than her stated teaching philosophy. She indicated her most frequent use of technology was in administrative uses, specifically using PowerPoint presentations as a tool for lesson planning, e-mails, and grade book software. She did state that she felt technology integration was essential for today's student.

> The way it is now, you would be crazy not to. …. For teaching today's kids if you don't use it, you are cutting them off from extra exposure they will need for the future.

Ms. Hill specifically mentioned using Google Earth, PowerPoint presentations, and websites in her classroom. She alluded to a desire to use technology for student projects. "I used to have kids draw a dictionary… now it's make a website, make a PowerPoint. If it's there I would like to use it."

In an observation of what she deemed to be a typical use of technology, she used a PowerPoint presentation to guide a lecture with graphic organizer (Duplass, 2006), followed by supplemental websites. Used as another mode for presenting information, the websites were quickly visited and little time was given for a through analysis of the available information. The documents provided by Ms. Hill appear to corroborate her statements in the interview and the classroom observation. She provided 8 documents to be analyzed. Of the eight, seven required students to process information. However, only one required critical thinking (as identified in Figure 3); which was also the only example of student technology use. In this activity, students were asked to complete on-line research. The remaining activities were various worksheets that required little in the way of critical thinking and appeared to be practice activities associated with content presentation.

As was indicated in the group interviews, Ms. Hill has encountered barriers to her technology integration. Technology availability has been an issue for her in years prior. To compensate for a lack of technology, she used money received for National Board Certification to purchase a laptop and LCD projector.

> I bought my own projector this year…. I bought it and I bought myself a laptop. I bought that with my National Board money.… I argued with my husband that this was what I wanted to spend my money on… I need it, I will use it. The school doesn't have enough, so I probably won't get one.

Another availability concern she expressed was accessing the portable carts in the media center.

> There isn't enough time. For example, we have two class sets of computers in the media center, if every teacher wanted to do at least one technology project we would (have problems). Luckily there are a lot (of teachers) who don't want to do it, so I can get in there a few more days. Getting a consistent number of days takes a lot of planning ahead and beating out all the other teachers who are planning ahead…. when I plan to do a project and book it (the class set of computers). Low and behold we'll have a pep rally, a firedrill, or testing. I got knocked off so many times this year for testing. And, it's too bad, so sad.

Ms. Hill and other teachers from School A reported that the functioning laptop carts were only available for use in the media center, which was often unavailable due to schedule conflicts. She also expressed concern over her ability to use the available technology. "[T]hey invented this wonderful Smart board that sits down in the media center; but, I don't know how to use it… Gradually over time, I'll learn how to use it. But, by the time I learn how to use it, there will be something better."

Also identified were issues related to student technology use. "…either not knowing or not remembering the basic skills like how you log in, or change a font, or how you research … Google is the god of everything …" Ms. Hill expressed concern over the students' ability to process the amount of information available on-line.

> They can get a ton more information at their fingertips in two seconds. They don't know how to filter through it and pick out what are the important things. They also don't know how to document it. I spend time doing that. But, I feel like I'm not doing my social studies then when I get off on that… but it's an FCAT skill.

Despite these frustrations, Ms. Hill views technology integration as necessary for preparing her students for tomorrow.

> If we go out and find people in real jobs these days and ask them, most of them will have a comfort level with using computers and technology. I think it makes them better prepared for the real world – not necessarily social studies but life in general.

Case Study: Ms. Alexander

Ms. Alexander is an 8th grade United States History teacher at School A. She is in her early 40s and has a master's degree in Educational Leadership. A ten-year veteran teacher, Ms. Alexander has taught 4th grade and 8th grade. The 2007-2008 year was Ms. Alexander's last year in the classroom; she moved to an administrative position for the 2008-2009 school year. Ms. Alexander does not have a bachelor's degree in education. She earned her teaching certificate after completing a bachelor's in liberal studies. She indicated that she received no instruction on the use of technology within the classroom.

When asked to describe her teaching philosophy, Ms. Alexander stated, "It sounds cliché, but 'all kids can learn.' And, by that I just mean being able to find the avenues, the strategies, the skills, anything to go ahead and help these kids be successful in school." She clarified her statement by saying, "I think that when kids explore their world, it's a lot more meaningful than someone regurgitating." Her stated teaching philosophy was supported by how she viewed her role as a social studies teacher.

> As a social studies teacher I just wanted to engage the kids in real-world experiences. The textbook is one thing and the kids don't always know the reality

> of the textbook, so I try to take things off the pages. I teach it (the textbook materials) but I also bring in real-world experiences – on how the past is really preparation for the future; and, how they can use that information to propel forward. That was my whole purpose for doing projects, because it gave them hands-on experience with social studies, with the world, with teaching as I do as the teacher.

Ms. Alexander is a proponent of the *History Alive!* program from the Teachers Curriculum Institute (Bower, Lobdell, & Owens, 2005).

> From the first time that I utilized History Alive methodologies in my class, I can honestly say it changed my whole outlook on teaching social studies. I used to teach in rows. I used to teach lectures…I had the kids answer the questions, then we would go over the questions, and then we would go to the next… It was boring for me. The kids were sleeping, there were behavior problems. So when I got a chance to answer the questions and construct for me the question with the answer that was the turning point. It was in my first year. Because, once I went to the training and saw how I could use the training in my classroom, it changed everything.

She organized her class in groups and required her students to complete a variety of projects, both within the class and at home. On the day she was observed, students were presenting a six-week long project on the Presidency. Students were required to complete a group project that included researching the events in a selected president's term in office, and then teach that information to their classmates. The project included an oral

presentation, a visual presentation, a handout, and student-created assessment. The group presenting during the observation had created a PowerPoint presentation to share their information. After time for the initial research, students completed the assignment at home, including creating the presentation. It appears from the interview, observation, and class documents that Ms. Alexander falls in the "teacher as facilitator" role identified by Schuerman (1998).

Although she identified technology as being an important part of a student's education, "kids are going into the 21st century and beyond. So, technology is very big. Kids are not doing what they have been doing in the past – which is dealing with textbooks and that stuff." When discussing technology in the classroom, Ms. Alexander most often mentioned her own equipment use – including e-mail, using a course website, document cameras, and PowerPoint. She rarely mentioned student use of technology, except when referring to at-home access. Indeed, when asked if she had any goals for using technology in her classroom, she replied that she had none.

Despite her apparent ambivalence toward classroom technology use, Ms. Alexander did see connections between technology and critical thinking. "I think it's (technology) application. I see that being the application part of Bloom's. I had the opportunity to see it happen when I introduced my project, I told the kids what I wanted from the project, and then let them go on their own." She also saw technology as providing students with the "hands on" opportunity that they need to learn.

Although Ms. Alexander had an LCD projector and a document camera permanently in her room, she felt that she had limited access to equipment. The principal

restricted use of the laptop carts during the year. Originally, they were not allowed in the portables, where Ms. Alexander taught. By the end of the year, the laptops were not allowed out of the media center. "If I wanted to use the cart, I would have to go to the media center to do that." She further described the scenario in the media center.

> You have two computer stations, and you had the laptops that you could check out. And then, you had people using the media center, like the Language Arts teachers using the media center to check out books. Other classes used it for videos. There was a lot of activity in the media center.

She also expressed frustration with the availability of seemingly minor equipment, such as sufficiently long Ethernet cords to permit projecting the Internet using the LCD projector, which the media specialist was reluctant to provide. Interestingly, when asked directly what barriers she faced, her response was, "None…the majority of the kids had technology." It was apparent from her answer to this question, and others, that she didn't conceptualize technology integration to be student use of technology within the classroom -- that was something to be done at home.

Case Study: Ms. Edge

Ms. Edge is a 7th grade World Geography teacher at School A. In her early 50s, Ms. Edge has 6 years of classroom experience, all at School A, and all in 7th grade geography. She has a bachelor's degree in biology and received her teaching certificate through the district's Alternative Certification Program (ACP). She reports receiving little in the way of technology-related professional development through ACP; indeed, she could only recall receiving instruction in Excel.

When asked about her teaching philosophy, she stated, "every child should be given an opportunity…it's my job, when they aren't doing well, to figure out what is wrong to try and help them." She went onto describe her classroom. "I can't stand a completely quiet room. I like to hear things going on – to see them interacting with one another… I want interaction. I want to know what is going on in their heads." Her statements about her role as a social studies teacher appear to match her stated teaching philosophy. Specifically, she identified her role as "teaching the kids how to use cause and effect, to understand that you can't judge the people of the past by today's standards; and, to get them to see outside their personal experiences." It appears that Ms. Edge operates in the "teacher as facilitator" role in Schuerman (1998), due largely to her dedication to challenging her students' conception of reality. However, she did express frustration with the current school climate. "What I came to realize that teaching reading skills seems to be where the emphasis is now – to the point where it supersedes the curriculum. Which I think is really sad."

Technology is something that she thinks is essential in today's classroom. Specifically, teachers should provide students to develop researching skills using on-line materials.

> It is absolutely critical that we teach them the difference between a blog, an encyclopedia, and a primary source. They don't have, especially in middle school, the critical thinking skills to be able to discern the difference.…We have to face the fact that these kids aren't going to be using the encyclopedias when they go to work. We've got to teach them the skills to prepare them for real life, and it's

going to be on the Internet. We can't do it if we don't have access to it in the classroom.

When asked to describe how she used technology in her social studies class, Ms. Edge described student use of websites for information gathering and educational games, and the use of PowerPoint for group work presentations. An analysis of the documents submitted support her interview statements. Over the course of the month in which the documents were collected, the students used the computers in the media center at least three times; twice to work on their "tall tales" project and the third to access educational review games. The classroom observation confirmed her statements and the available documentation. Students were engaged in review activities using on-line geography quizzes. The students were responsible for running the technology, and the website was projected for whole class viewing.

Similar to the other teachers at School A, Ms. Edge expressed frustration over equipment availability and functionality. "It's like the media center guards it with its life so that you can't get it (portable laptop cart) into your classroom." Not only are the carts corralled in the media center, their functionality is questionable. "They have all been scavenged. We used to have four of them (laptop carts) but they have all been scavenged so that we are down to one. And, the kids are like little suckling pigs… all corded to the cart – because they won't charge anymore. It's a nightmare." Due to her frustration with the school's equipment, Ms. Edge, as other teachers have done, purchased her own laptop, document camera, and LCD projector to use in her classroom; thus ensuring daily access to technology.

Despite her frustrations, Ms. Edge continues to see the benefits of using technology with her students, especially the academically talented.

> It allows me to take them to a whole new level…With technology, it just opens up so much more… There is so much more that you can do with them. Because, usually the honors have more empathy, more understanding, they are able to look at the world outside of themselves in 7th grade. I've taught both. The lower level kids, they're not there yet, they'll get there. But, they're just not there yet. The honors kids, you can just take them so much further.

Technology, especially the Internet, provides Ms. Edge with the tool to open her students to a "globalized society."

Case Study: Ms. Roberts

Ms. Roberts is a 7th grade World History teacher at School A. In her early 30s, Ms. Roberts has a bachelor's in Social Science Education and a master's in Instructional Technology (IT). She has taught for six years, teaching 7th grade geography and 8th grade history at two schools in the district. This was Ms. Roberts' final year at School A; she moved to a school district on the east coast of Florida for the 2008-2009 school year. Due to her master's in IT, she has an extensive background in classroom technology.

When asked about her teaching philosophy, Ms. Roberts stated, "all students respond to high expectations. It is important to find what touches them – what gets their interests… and intrigues them." In the social studies, she sees that as manifested in getting "kids to care and to get global issues to touch their lives – to show them how it touches their lives." Indeed, she sees technology as being one of the ways to intrigue

students. “Just the fact that you are using technology hooks a lot of kids, because that is what they are used to. That is their life.”

Ms. Roberts has a highly favorable opinion about technology integration, as one might expect with an IT masters. She sees technology as providing students with “novel” situations. “[T]technology is new scenarios, new variables thrown in... that’s what makes them think and have to solve problems – it’s having to make choices, having different outcomes, different things they can do.” In her social studies class, students are required to use the Internet to complete scavenger hunts, conduct research for projects, and use educational games for review. She also uses a document camera, an LCD projector, and a laptop on a daily basis. She did express that she would like to have the students do more with technology.

> When I first started teaching, I thought about how I wanted to teach kids HTML just so they could make their own webpage to put projects up. But, I’ve never had time to do that. I can’t cover the curriculum. So, just teaching them how to use PowerPoint… some of them know everything, some not nothing. Just trying to catch them up so that they can do something takes just too much time away from the curriculum. It really unfortunate because I think they really need it.

Part of the frustration she felt was curricular time constraints; another was pressure from high-stakes testing. “If you can’t directly correlate what you are doing to what will improve their FCAT, no cares about it… how can you directly correlate learning HTML with increases in FCAT scores?”

In addition to curricular and testing frustrations, Ms. Roberts identified the district firewall, equipment availability, and teacher knowledge as being major barriers to technology integration. Ms. Roberts was in a unique situation at School A. Because of her IT expertise, her colleagues regularly called on her for technical assistance, when the school's technical specialist was not available. She sees technology professional development to be a district-wide barrier to technology integration.

> I try to do as much as I can, but it definitely doesn't meet the demand. I could be at school every night until 8pm and not get done. Training is definitely a big issue. There are a lot of teachers who don't know. But then I notice when you do go to training… for people like me I have to sit through a class where it's…. "click this" then wait ten minutes because somebody messed it up. I think it needs to be more targeted training. I think that is a big barrier.

As has been previously discussed, the laptop carts at School A are restricted to the media center. Ms. Roberts found that she had trouble accessing the media center on numerous occasions.

> We have two computer labs in the media center. It's the courses that are FCAT Tested (that have access) … I've been kicked out of the lab or had the lab taken away from me for science, because science is on the FCAT now. Social studies is the low-man on the totem pole now because 'why do we need that stuff…. Social studies isn't on the FCAT?' They know we aren't going to do FCAT explorer for hours and hours and days and days – so we don't need it (access to the computers).

Her lack of access eventually led to her nearly giving up trying to gain access. "By the middle of the year, I wasn't asking as much. I would still ask, just not as much."

In an examination of the class materials Ms. Roberts submitted, it is evident that although she has technical skills, students are not necessarily reaping the benefits. The integrated technology was teacher-directed, and the majority (12 of 16 activities provided) did not require critical thinking. Indeed, many of the activities were worksheets that required little beyond reading comprehension. It appears from an analysis of her submitted documents and interview responses that Ms. Roberts would fall into the "teacher as manager" role from Schuerman's (1998) matrix. Ms. Roberts left the district before arrangements could be made for an observation; therefore, the interview and documents materials could not be verified with observation data.

Case Study: Ms. Cooper

Ms. Cooper is 6th grade World Geography teacher at School A. In her late 50s, Ms. Cooper has 11 years of teaching experience in 5th and 6th grades, both in her current position at School A and at an elementary school in another state. Although her bachelor's is in elementary education, Ms. Cooper spent several years working as an assistant in the engineering field. Little in the way of classroom technology was included in her teacher preparation.

When asked to describe her teaching philosophy, she said, "Every child can learn… I'm going to reach them some way… When they are in my classroom, they are going to learn something." She expanded her discussion of her teaching philosophy to include that her background is in Direct Instruction, and that she tries "to bring in a lot of

different ways to teach somebody." Her teaching philosophy is further illustrated by her response to the inquiry about her role as a social studies teacher. "[T]o introduce different cultures and people… to inform my students where other places are… and to respect other people's culture, religions, ethnic groups…" It is apparent from her comments that Ms. Cooper's classroom is teacher-centered, in that she is the origin of information in the class, which would place her in the "teacher as manager" role from Schuerman (1998).

She sees technology as something that "everyone should be using." When discussing how she uses technology in her classroom, she discussed projecting pictures from the Internet, requiring students to conduct Internet research, gathering current information for her geography class, and projecting images using a document camera. A class observation confirms her reported use of technology, in that she used a document camera to share images with her students. Ms. Cooper did not supply documents for analysis; therefore the class observation and interview data can not be compared with documentation.

Similar to other teachers at School A, Ms. Cooper views the biggest barrier to technology integration is equipment availability, specifically the housing of the computers in the media center.

> Just getting to the computers. That's the biggest barrier, if I want to use the computers. They are all signed out, or it's too noisy in there. At times you can have four classes in there and they are all talking… You could also have a class in there (the media center) doing research, and another one checking out books. You could have five classes. And that is not the way I teach. I can't have that much

distraction.

She also suggested that there are not enough computers for a school the size of School A. In a discussion of the lack of equipment at the school, Ms. Cooper reflected on what was available at her previous school; and, in stark contrast, what was not available at her current school.

> At my previous school, every classroom had two computers for the children, the teacher had her own computer, the students had one hour a week that they went to a computer lab, where I told the computer teacher what we were studying – so she integrated it. Every classroom had a projector… We also had two 30 laptop carts that we could sign out and take to our classrooms at any time. Which is not the case here.

Indeed, this lack of access to the equipment, particularly the laptops, appears to be the consistently identified barrier to technology integration for the five teachers at School A.

Case Study: Ms. Buckley

Ms. Buckley is a 6th grade World Geography teacher at School B. In her early 50s, Ms. Buckley has four years of teaching experience, all in 6th grade at school B. She holds a bachelor's degree in elementary education, and a nursing degree earned more than 20 years prior. She reports taking two courses related using technology in the classroom.

When asked about her teaching philosophy, Ms. Buckley stated, " I am a very open teacher, and, I enjoy hearing the students' opinions. I enjoy having debates in the classroom, I believe it gets their brains working, and it might get them to think in a

different way and learn something new." Later in the interview, she clarified her position with the following statement. "[T]he best environment is not just strictly books but also things they can put their hands on – that they can do. I believe that students learn best by doing, and I try to accomplish this by changing it up often." An analysis of the class documents provided by Ms. Buckley shows that although she uses a variety of strategies in her class, few (3 of 20) incorporated critical thinking strategies; and none required the students to use technology. In the class observation, Ms. Buckley used a PowerPoint review activity, one that was both a presentation of information and a quiz on the five themes of geography. The PowerPoint was completed as a whole-class activity. It appears from these indices that Ms. Buckley operates in the "teacher as manager" approach to learning (Schuerman, 1998).

In the Internet Use Survey, Ms. Buckley had one of the highest frequency of use and IUS scores, indicating that she is a frequent user of technology. However, when asked directly, Ms. Buckley acknowledged that she does not regularly use technology, due to a perceived lack of available equipment.

> We just don't have the computers here. Every time you want to sign up to do something in the library – it is already taken – there are other teachers in their working – or they are doing something in there. So we just don't have that availability –I feel.

She stated that she had a document camera in her class; but, did not have an LCD projector to display the images. Additionally, she expressed a desire to have a laptop available for her use. She did, however, have three desktops in her classroom, one teacher

desktop and two for student use. These perceived equipment-related barriers, according to Ms. Buckley, prevented her from integrating technology the way that she would have liked. "If you had laptop computers – that function- that would be awesome. I would use it at least three times a week – if not more."

An additional barrier to her use, one that is not solely equipment-related, was the impact of high-stakes testing. Ms. Buckley indicated that there has been a push at School B to focus on the FCAT. "For me, using technology is a better way to teach them. But as far as the high stakes testing in concerned – the FCAT – you have to teach to the test." Not only is the test-focused curriculum affecting her integration, she has found it difficult to access the portable laptops during the two months prior to test administration.

Although not often used in her class, Ms. Buckley views technology as an essential component to student education.

> I feel it is essential because the students are very visual – with day and age and the way students are. They grow up with technology. Their minds are all keyed to technology. They are playing games at home. They are on the Internet at home. They are doing everything with their little hands and the buttons and going – they are used (*sic.*) to that. To stand up there lecturing or writing on the board – it gets a little boring for them. Where if you have even the ELMO alone with an LCD – it is something different for them and they are like "Wow" and pay attention.

Case Study: Mr. Stephens

Mr. Stephens, one of two men included in phase two, is an 8th grade United States History teacher at School B. In his late 30s, Mr. Stephens has 12 years of teaching experience in grades 6-11, the majority of which has been at two middle schools, the last five years at School B. In addition to social studies, Mr. Stephens taught technology courses at a district high school. He has a bachelor's degree in history, and earned his teaching certificate by taking non-degree seeking classes at a local university. He reports that there was little classroom technology incorporated in his teaching preparation, as he earned his certification in a non-traditional manner. However, prior to teaching, he worked for a computer company and has had a long interest in technology.

When asked about his teaching philosophy, he replied that it was to "[b]e open-minded and have an approach that can reach as many learning styles as possible… integrate the curriculum and offer students an opportunity to be successful with their skills." He views his primary role as a social studies teacher as citizenship education and developing 21st century skills. He states, "I want to make sure my students can be successful and have a leg up in the work world. I'll tell you what it's not. It's definitely not teaching toward a test." He manifests his ideals regarding teaching and social studies education through a democratic classroom, one in which they regularly work in cooperative groups to complete tasks.

Mr. Stephens views technology as an essential component of student education, due to the world in which the students will exist after graduating from school.

You can't even work at McDonald's without having some sense and

> understanding of technology. The world we live in, there is a divide between what the kids do in their personal lives, which are usually tech-based, and the classrooms, which is generally book-based… Tech literacy needs to be daily and it needs to be something that will help the kids achieve in the future. There are timeless ways to teach – and sometimes, the kids are so inundated with technology, that it becomes extremely powerful to just use a book or use imagery. But, the truth is that isn't the world we live in anymore. They have to be completely competent with technology.

To achieve the technology literacy described by Mr. Stephens, he sees a need for personal laptops for each student, digital cameras, photo editing, video editing, and external hard drives, among other equipment. He sees this vision as not a possible reality due to budgetary restrictions and district maintenance contracts.

> We're there with the technology. But the school district is behind because of signing three-year technology contracts. It costs them an arm and a leg for something that is $700, they are paying $1400. I understand they have a comprehensive contract for repair purposes – where they essentially have one fleet and they can swap out for maintenance. And that is the goal for them – long-term maintenance. But, it's an antiquated concept. They hire employees on staff to do all repair work – it becomes too complex for them and they become overwhelmed.

He also questions why the district is not using Apple products. "[We] are the only major school district in the top twenty in the United States that isn't allowed to have Apple

computers... In the middle and elementary level, Apple is clearly the better product. The standard in the industry in video production is Apple and final cut. Why we aren't training the kids that way is beyond me."

When asked about barriers to technology integration, Mr. Stephens identified a number of issues both at the district and school level that have impacted both him and his colleagues. At the school-level, he feels pressure from "office politics" related to equipment check out, specifically "being perceived as an 'over-user' or one who dominates or not being fair to others." Additionally, the schools equipment is "either broken, and needs repair, and software security is so limiting, for example even being able to see a CD Rom drive, the security doesn't allow it on a student laptop." He is particularly frustrated with the district security policies. Many student flash drives cannot be recognized by the school's computer without an administrative password, given only to the technology specialist. He acknowledges the need for security. He sees the benefits of technology integration outweighing the risks. The district, according to Mr. Stephens, sees it differently.

> Right now, the district, the school, and the tech coordinator see the risk as more important than student learning. That is clearly something that needs to be changed in my opinion…You have to risk and you're going to have to place teachers in a position where they have to monitor students; and that's what we do with everything. I don't know why the computer should be any different. We monitor them with the use of scissors, we monitor them with during testing, and so why is it that the computer can't be the same way. The technology is out there.

> There is special vision software that you can see every desktop, you can see what the kids are working on…some security is good… But, not so limiting that a student can't make their own digital portfolio because their flash drive isn't recognized because it needs administrator rights to be recognized. Saving work is the number one issue at that point. What is the point of starting a project if you can't save?

Equipment functionality, district security, and "office politics" are only a handful of the barriers Mr. Stephens identified in the interview. He has felt increased pressure from school administration to focus on tested reading skills; and feels that technology-based assignments are not valued because they cannot be measured. As a reaction to the perceived pressure he stated that he has "limited" himself on the amount of technology he integrates into his social studies class.

Despite these pressures, frustrations, and barriers, Mr. Stephens does continue to use technology in his social studies classroom. He describes the way he integrates technology in the passage below.

> There are a number of ways to use technology to teach social studies. The way I'm doing it is first of all, voices of the past are really powerful. You can take and audio or video clip – whether it's JFK's speech or Martin Luther King's speech, you can present that to the class and be in the room with them (the historical figure) with sound. You can take the civil war and show movies… but further than that, you want students to get to the point where they make and create their own. Teaching to others is the highest level of Bloom's. You want them to take

> the kids, have their research and then in turn apply and synthesize it, and the kids teach it to the class. I think that's how they learn best. And, I think they do the most work for it, and they also have a lot of ownership. And, I think we are more successful in meeting our learning objectives when we do it that way.

Mr. Stephens is clearly passionate about technology, 21st century literacy, and the social studies. Class observations and document analysis confirmed his described technology utilization. On the day his class was observed, students were working in groups of three to four students to complete what Mr. Stephens has termed "the company project." This assignment is an on-going project that lasts for the last six to eight weeks of the school year. In the project, students form companies that contract with Mr. Stephens to complete tasks to demonstrate their understanding of the course content, and in return receive "payment." The students' final grades for the project are based on the total revenue each group member earns. The students craft contracts using a word processor, conduct research using the Internet and school databases, create PowerPoint presentations and digital documentaries, and use spreadsheets to outline their payroll. This technology integrated project is facilitated by Mr. Stephens, but is directed by the students and their own interests. This observed project, when combined with statements he made in the interview suggest that Mr. Stephens operates in the "teacher as facilitator" role in Schuerman's (1998) matrix of teaching and learning approaches (Appendix E).

Case Study: Mr. Adams

Mr. Adams, the second of the two men in phase two, is an 8th grade United States History teacher at School B. In his early 60s, Mr. Adams has 38 years of teaching

experience in the middle grades. Originally earning a bachelor's in economics, he finished his teaching credentials in 1970. Seven years later, he earned a master's in Educational Leadership. Mr. Adams reported receiving an extensive exposure to technology in his teacher training; including computer program. However, as this technology training was in the early 1970s, he felt that it was of little use to him in this digital age.

When asked to describe his teaching philosophy, Mr. Adams said, "I think that my role as a teacher is to help them develop critical thinking skills…I think that I'm here to help them mature, not only in an academic sense but in a social sense." He also explained that students learn best when they are happy, and that by using a variety of teaching strategies, and encouraging students to use their individual talents, he can provide a welcoming and enjoyable classroom experience. These statements suggest that Mr. Adams fulfills the "teacher as manager" role in Schuerman's (1998) matrix.

Currently, Mr. Adams most often uses technology as an administrative tool, such as using e-mail and an electronic grade book. He has used PowerPoint for class presentations; and, has worked with his teammates to develop interdisciplinary projects that required Internet research. He views technology as an elective component in student education; "because of all of the regulation that comes along with it. I think the intention is great -- but with all the rules and regulations that keep kids from doing the research I think it has taken a giant step backward. I don't know what to do about that."

As his above statement suggests, Mr. Adams has encountered barriers to technology integration. He listed a number of issues, including his "own insecurity" and

time constraints. His dominant concern was with the restrictions to Internet use, specifically the district's firewall. The following quote exemplifies his frustration.

> I couldn't get the picture of Daniel Webster and Hayne's debate on Google Images because it's not in the book – I couldn't get it through the filter. I couldn't get any video of Alan Sheppard or John Glenn's space flight. I had a warm-up related to it… and I said … "let me see if I can get that." And I couldn't.

He did not report any concerns with the functionality of the equipment. "As far as I know they are pretty good. I think the computers need to be upgraded eventually." His satisfaction with the equipment is most likely due to the fact that he does not use it regularly. He recently purchased a laptop for class use, and he does not frequently assign tasks that require the students to use the school's technology. It seems unlikely that he would be as aware of functionality issues as someone who uses technology on a near-daily basis, such as Mr. Stephens.

Mr. Adams sees the benefit of integrating technology within the classroom, especially in the realm of higher-order thinking, specifically with information management. "I think that (with) technology, if you can gather enough information that you can use the higher order … What do you think will happen? Can you back up your ideas? Can you find the information that backs up your position? I think it could work that way." Despite seeing the benefits of using technology, Mr. Adams rarely does so. In an analysis of his class materials, there was not a single occasion of technology use by either him or the students. On the day of the classroom observation, Mr. Adams did utilize a PowerPoint presentation as an exam review. After class, he confided that another

teacher had made the presentation and that he was somewhat nervous using it. The students, however, were engaged and seemed to respond well to his use of the presentation software.

Case Study: Ms. Norris

Ms. Norris teaches both 7th grade World Geography and 8th grade United States History at School B. In her late 20s, Ms. Norris earned a bachelor's in interdisciplinary social science. She later returned as a non-degree seeking student to earn her teaching credentials. Currently in fourth year of teaching, Ms. Norris has taught 6th, 7th, and 8th grade social studies at School B. She reported that technology was omnipresent in her teacher preparation, including Internet-based classes, use of various equipment, and guest speakers specifically addressing technology integration in the social studies.

When questioned about her teaching philosophy, she responded that it was "helping shape and promote growth in children's aptitude and for them to be able to walk away with something they can implement in their future lives, whether it is basic life skills, or teaching responsibility and ownership." In her social studies class, this manifests in her students knowing "[w]hat their responsibilities as a citizen are. How they can be a better person in the community whether it's just participating – voting, or being respectful of other diversities." She also stated that modeling has a significant impact on student learning. "[B]asically if it is modeled for them, then it's taught in a way that they can grasp it." This statement suggests that Ms. Norris subscribes to a more teacher-centered learning environment, one with the teacher serving as a manager of information (Schuerman, 1998).

She is currently using technology for administrative purposes; she utilizes a personal organizer to maintain class records. When asked if technology integration is an essential or an elective component in student education, her response was, "For me because it's all new for me I'm just trying to get my feet wet. I want to use it. But right now it's an elective component." She did say that she would like to increase her use of technology, because she feels "that integrating technology in the social studies is most definitely beneficial. Because there are different ways of learning, different ways of presenting material – I would like to be as diverse as I can get..." When questioned further, it was evident that Ms. Norris' vision of technology integration was largely teacher-centered.

> Different forms of lessons, different forms of technology – whether it is PowerPoint, LCD projector, overhead – instead of me standing there lecturing and them sitting there staring, I can have a PowerPoint presentation ready. It serves as a visual aid or reinforcement.

Indeed, when asked if technology was "something more that you engage in, or do you see it as something the students can also engage in?" Her response was the following. "The students engage in – it's more for them than for me. Not only are they hearing it, they are also seeing it in front of them." Although she is right that the student would be more engaged than in a traditional lecture without visuals, the integration she described is teacher-centered. Throughout the course of the interview, Ms. Norris did not address student use of technology. An examination of the documents she provided supports her description of her class activities and technology use. Technology was used for content

presentation in one class activity. Students were provided an option to use technology in their project work, but these were at-home projects. If students wished to use technology it was to be done at home. The class observation confirmed the teacher-centered use of technology and classroom organization. Ms. Norris did not lecture, however information was carefully disseminated through a video, assigned readings, and assigned tasks.

When questioned about barriers she has encountered when trying to use technology, her predominant concern was her own aptitude. "I'm just not a technological person. I never know what cord goes where, where to plug it in. I think it is a matter of having appropriate training to use it." Ms. Norris could potentially be classified as a reluctant user of technology; of the 27 teachers participating in this study, she was only one not to have home Internet access.

Case Study: Ms. Smith

Ms. Smith is 7th grade World Geography teacher at School B. She is in her mid 20s and has three years of teaching experience, all in her current position. She earned a bachelor's in history and a master's in secondary social studies education. She did have an educational technology course during her teacher preparation; in which, she created lessons that integrated various forms of technology.

When asked about her teaching philosophy and the ways in which students learn best, she responded with the following statement.

> I would say that every kid can learn -- its just how to do you tap into how that kid learns. Being a teacher is all about patience and how much you are willing to help that student…. It's just figuring out ways kids learn -- tap into their background

> knowledge. Let them try to experience what I'm trying to teach them instead of standing up there going on and on and on about nothing.

Her statement suggests that she operates in the "teacher as manager" role in Schuerman's (1998) matrix, which emphasizes modeling, and helping students to process reality. This philosophy is demonstrated in her classroom with her reported use of a variety of strategies to engage students in the learning process, including activities from *Geography Alive!* (Bower, Lobdell, & Owens, 2005).

Ms. Smith identified technology as an essential component of student education. Her most-frequent uses of classroom technology are as an administrative tool and as a form of content presentation, through PowerPoint. She also regularly uses websites in whole-class presentations to supplement class discussion and readings. An analysis of the documents provided by Ms. Smith indicates that she does indeed regularly utilize her LCD projector to examine websites and present class content. Indeed, during the observed class, the students engaged in a visual discovery activity in which they analyzed images projected on the screen using the LCD projector.

During the interview, Ms. Smith discussed the development of higher order thinking using technology with the following statement.

> I think any kid can Google on the Internet. But if they are able to tell the difference between a good website, a bad website, credible information, or if something was edited on Wikipedia because someone thought it would be funny… if they can determine if the information that they are gathering on the internet matches up, or if they can take what they've read in their text and turn it

into a power point – to me that's higher order thinking. And I would love to do that.

Interestingly, in the section of question 9 that addressed analyzing websites for bias and accuracy, Ms. Smith indicated that it was a "somewhat important teaching tool or activity" and that she "never" did it in her class. This seems to be a significant inconsistency. It is likely that her response to the survey is more accurate and her answer in the interview was given to attempt to provide a "correct" answer.

She also appears to possess a misunderstanding of academic talent. When asked if technology was particularly appropriate for academically talented students, she replied with the following statement.

> Those kids have that technology at home, they have computers at home, they have internet access, they know how to use PowerPoint. To me, the need is more for the advanced and regular kids--because they don't have that and they need to be exposed to it to see how this type of information and knowledge and how to use technology can help them later on in life.

This statement makes one erroneous assumption, that all academically talented students possess socio-economic privilege. This is not the case; especially in a school with the economic diversity of students found in School B, where 36.69% of the students receive free or reduced lunch.

Ms. Smith expressed a desire to use technology more frequently than she currently does. She indicated that there were several barriers inhibiting her technology integration. According to her, the significant barrier was equipment availability. With

regard to availability, she expressed concern over the apparent inequity of equipment dispersal among the academic disciplines. Specifically, all mathematics teachers were provided with a laptop, and document camera, and an LCD projector. She also voiced frustration with the time constraints that are associated with checking out equipment.

> It's the feeling of being so rushed…So I have this lap top cart for two weeks, but someone has it right behind me and what happens if the laptops don't work on the cart and what happens if I can't get it to print? What if we are running behind? There are so many time constraints that it's not fair. It's not fair that certain people get more technology than others. I would use it as much as they would, but I only get it for a certain amount of time.

Also of concern was equipment functionality, appropriate training on available equipment, and pressure from the FCAT. "[H]igh stakes testing has definitely taken out the fun of using technology and letting the kids sit down and be creative. We've created FCAT robots. Despite the frustration she feels with trying to overcome availability, functionality, and other barriers to technology, Ms. Smith still sees technology integration as a worth-while endeavor in the social studies. "If I had it my way, everyone would have the available technology; and, the kids want that too."

The results from these ten case studies support the findings from the group interview. Teachers see the value in using technology in the social studies. They see it as a tool for information gathering, and in some instances for encouraging critical thinking. They all expressed concern over various barriers to technology integration. The most frequently identified barriers were equipment access and functionality. Several teachers

identified both pressure from high-stakes testing and district security policies as inhibiting their successful utilization of technology. The manner in which each teacher utilized the available technology varied depending upon their own situation, teaching philosophy, and comfort with technology.

*Summary of Findings*

Each of the three research questions was examined using both the quantitative data collected through the survey, and the qualitative data gathered in the group interview and case studies. The three research questions are addressed in the following sections.

Research Question 1

The first research question pertains to the frequency and manner with which middle school social studies teachers use digital technology with their academically talented students. This question is addressed through survey questions 9-24 and is triangulated with information in the group interview and ten case studies.

The 27 participant teachers reported an average of 10.56 hours of at-school computer use, and 11.37 hours of at-home computer use. The most frequently used application was word processing software, with nearly 89% of the surveyed teachers reporting using word processing five or more times per week. Although not as frequent as word processing, nearly 78% of the participants reported using presentation software. The teachers reported rarely using spreadsheet, productivity, web publishing, or FTP software.

Participant teachers were classified as high-level, mid-level, or low-level Internet users as determined first by their mean use score (from survey question 9), and then

through the Internet Use Scale score, described in VanFossen and Waterson (2008). Using the mean scores classification, 7 teachers were identified as high-level users, 14 were mid-level users, and 6 were low level users. When the participants were reclassified using the IUS method, all teachers were either high-level users (16 participants), or mid-level users (11 participants). Thirteen of the teachers' classifications were increased at least one level. This classification increase is interesting, as it suggests that the type of Internet use may have more influence than the frequency with which it is used. Nearly 78% of the participating teachers were correctly able to indentify their frequency of Internet Use, suggesting that the teachers possessed a level of self-awareness with regard to their classroom technology integration.

Of the 27 participating teachers, all but one reported having home Internet access. The teachers used the Internet more frequently for personal reasons than for professional purposes. When asked about their professional use of the Internet, the teachers reported most often using the Internet to gather information, a result similar to VanFossen and Waterson's (2008) findings. The teachers did not encourage their students to use the Internet to connect with those outside of the classroom, either through website development, or through email. The teachers also rarely used WebQuests, and they did not often require their students to analyze websites for bias, accuracy, or perspective. These data were supported by the group interviews. Teachers at each of the three schools repeatedly extolled the benefits of technology as a way of gathering information, for both them and their students. There was little discussion of using the Internet for other purposes, such as web design.

As Phase 2 of the study included interviews, as well as document analysis and classroom observations, the technology integration of the ten case study teachers could be examined more closely than can be done through a survey instrument. All ten teachers reported using digital technology for administrative purposes, to gather background information, and for content presentation. Of the ten teachers, only two appeared to regularly encourage student in-class on-line research, and technology project creation. The remaining eight teachers either occasionally used the schools' available technology for student research and project creation, or students were expected to use their at-home technology.

The typical teacher in this study frequently uses technology, both for personal and professional purposes. Most often the teacher uses technology for word processing, administrative purposes, and content presentation. When using the Internet, the teacher is searching for information, or encouraging students to search for information. The teacher is not using technology for web designing, nor for file sharing. Additionally, the teacher is not requiring students to analyze websites for bias, perspective, or accuracy.

Research Question 2

The second research question inquires into the teachers' use of digital technology to support higher-order thinking. This question is addressed with information taken from survey question 9, with additional information provided in the group interviews and case studies.

Question 9 of the Internet Use Survey listed 16 classroom uses of the Internet. Of these 16, six require students to utilize higher-order thinking skills, which is a necessary

component of an appropriate education for academically talented students. These six uses include requiring students to conduct research; to create a website; to complete an inquiry-based 'WebQuest;' to complete an interactive assignment using the Internet; to analyze websites for accuracy and bias; and, to compare and contrast websites from divergent perspectives. Each of these tasks requires students to critically analyze information and use problem solving to complete a task.

Of the six tasks described, only one was used by a majority of the participant teachers. Over 80% of the teachers surveyed reported that they required their students to use the Internet to gather information at least occasionally, 38.46% reported doing so frequently. Although the teachers required their students to access information from the Internet, their responses indicate that they do not require the students to analyze the information found. Indeed, nearly 89% of the teachers surveyed reported that they either rarely or never had students analyze websites for accuracy and bias. Over 85% of the teachers stated that they either rarely or never had students examine websites from different perspectives. Although teachers weren't asking the students to analyze the websites, nearly 41% developed lessons that required the students to use the Internet to complete an assignment. The lessons, however, were not inquiry based 'WebQuests,' as over 77% of the participating teachers reported rarely or never using them in their class. Nor, were the teachers requiring students to create web pages. Indeed, over 92% of the teachers reported never or rarely requiring student web design; of this group, 77.78% reported never requiring students to design webpages.

In the group interviews and individual case studies, teachers stated that they could see a connection between higher-order thinking and technology use, and all teachers agreed that higher-order thinking was important in the social studies. The teachers identified that maneuvering through vast stores of information on-line requires students to utilize critical thinking, specifically analysis and synthesis; and, that students have to learn to problem solve when dealing with the questionable functionality of the schools' computers. The case studies supported the survey data, in that only technology-related lessons requiring higher-order thinking involved information gathering, with the exception of one teacher, Mr. Stephens. In his classes, students were engaged in a variety of technology-related projects that required higher-order thinking, such as digital filmmaking and creating presentations.

The majority of teachers in this study view technology as an essential component to student education, largely due to the need to prepare students for a technology-driven future. This sentiment is best-summed by Ms. Dennis at School C, who identified technology integration as a "school to work skill. Besides the higher order thinking, they learn how to process while using the equipment… it helps them organize and work with other people, especially if it something that they have to work together on."

The typical teacher in this study sees the value of technology in the social studies, and identifies it as helping students to develop higher-order thinking skills. However, by using technology as either a form of content presentation or a source of information, the teacher is limiting the possible benefits to the students' higher-order thinking. Although students are being required to gather information, and decide what is relevant and

important, clearly a higher-order thinking skills, other opportunities for critical thinking are being missed—specifically in analyzing websites for bias, accuracy, and perspective. These activities would be a natural extension of the already implemented task of information gathering.

Research Question 3

The third question inquires into the factors that influence the participating teachers' use of digital technology. A review of the literature indicated that there are several factors that influence a teacher's use of technology. These factors include equipment availability (Friedman, 2006), teacher comfort with technology (Mishra & Koehler, 2006; VanFossen, 1999), technology-related professional development (Mishra & Koehler, 2006; Shaunessy, 2005; VanFossen, 1999), and teaching philosophy (Manfra & Hammond, 2007). In addition to the factors listed above, teacher attitude toward technology was considered to be a factor separate from professional development and teaching philosophy. The survey provided information pertaining to equipment, comfort, attitude, and barriers. Relationships among these factors were examined using correlation analysis. Information gleaned from the survey was further examined using both the group interviews and the case studies.

In his 2006 study, Friedman found that teachers reported that lack of access to equipment, specifically an LCD projector, was the predominant barrier to their technology integration. The survey for the current study indicate that all but one teacher had access to at least one computer in their classroom. The teacher without a computer was a floating teacher, who did not have a classroom. Nearly 63% of the surveyed

teachers have more than one computer in their classroom. Internet connection speed was determined to be fast, although heavy on-line traffic would slow connection speed during class. Twenty-five of the 27 teachers reported having access to an LCD projector; indeed, 18 had a projector placed permanently in their room. There were mobile laptop carts available for checkout at all three schools. The correlation analysis examining the relationship between LCD availability, computer availability, and Internet use, indicated that no correlation existed among the three.

Despite a lack of a statistically significant correlation, and having a great deal of technology within the school and classroom, teachers still reported that the largest barrier to their technology integration was equipment, both availability and functionality. In reviewing the group interview and case study data, it becomes evident that although teachers do have some concern about the amount of technology available, the real issue in equipment availability is administrative policies regarding equipment check out. This is especially true at School A, where although there are laptop carts available, they cannot leave the media center. By limiting the mobile carts to this space, the administration has in effect reduced student access to technology. Indeed, several teachers at School A reported being "kicked out" of the media center, or being frustrated with the media center learning environment, which could have as many as five classes working in a facility the size of four classrooms. Although School B's checkout policy was not as restrictive as School A's, the teachers at School B expressed their frustration with the time limits for equipment check. In contrast, accessing equipment was not identified by the participating teachers at School C as being a barrier to their technology integration.

The teachers at all three schools expressed great frustration with the functionality of the available technology, due to equipment age and district security measures. Mr. Charles, a teacher at School B best summarized the teachers' displeasure with the age of the equipment. "We are working with 20th century technology and trying to prepare them for the 2020s. There is a world of difference." The age of the schools' equipment has led to compatibility issues in software and available memory. Several of the teachers expressed frustration with the schools' computers not being able to download websites, run programs, or display presentations that they prepared on their home computers. Mr. Michaels from School C voiced their frustration.

> One of the problems I have is compatibility. The stuff I make at home, I bring it here and it doesn't work. The computers here are 4-5 years old, the one I use at home… I bring it here and I get a notepad with all these codes on it. Alright, not going to do that lesson. That's three hours wasted planning.

Not only are teachers frustrated with what amounts to wasting their own time, but they are also frustrated that their students are prevented from saving materials due to the schools' computers inability to read newer flash drives. Ms. Smith at School B described a situation in her classroom. "I had a student come in a plug in a jump drive (USB flash drive) into one of the laptops and his jump drive is so advanced that the computer wouldn't even load it." There are ways to enable the laptops to recognize the newer flash drives; however, this would require administrative privileges, which are available only to the school's technology specialist and principal. If students cannot save work, the

teachers question whether it is appropriate to ask students to create a product on the school's computers.

Another functionality concern for many of the teachers in this study was district policies, especially with regard to security. There were two areas of concern with the district's security policy. First, was the issue of administrative passwords, which was described in the previous paragraph. The second issue, that was voiced at all three schools, was concern over the district's firewall. Although the teachers understand the need for security, they question whether or not a uniform firewall is the answer. They suggest that the firewall should be modified "[f]or the teacher… leave it for the kids. But, for use—give us a little more access…Students could have one, teachers could have another" (Ms. Castor).

Unfortunately, in the current economic climate, the functionality of equipment will most likely not improve, as upgrading the districts' equipment would require significant outlays of capital. Indeed a number of teachers at all three schools have purchased their own equipment to use in the classroom; thereby, reducing issues of compatibility and availability. However, despite equipment issues, a few of the teachers, specifically Mr. Stephens and Ms. Edge, continue to utilize the available technology; they have figured out how to "make it work."

Several researchers have suggested that appropriate technology-related professional development would influence teachers' technology integration (Koehler & Mishra, 2008; Mishra & Koehler, 2006; Shaunessy, 2005; VanFossen, 1999). The participants in this study reported a mean of 6.63 hours of technology professional

development, with a range of no training to 20 hours. A weak correlation existed between technology professional development and the frequency of use (as indicated by the mean score). This suggests that although a relationship may exist between training and use, it is weak. The qualitative data collected in this study provide some clarity to the impact of professional development on teacher technology use.

Teachers at all three schools indicated that they saw a need for technology-related professional development. The participants described a desire of how to use and incorporate interactive white boards, and to become more familiar with the technology available in the schools. The teachers at School C suggested that targeted professional development would be more effective than what is currently being offered in the district. Mr. Brady stated, "most of the trainings are for the reluctant computer user who hasn't really done much of anything to this point and they are just starting to learn. But, those of us who have been doing it for a while and are comfortable; there is nothing new that is available to us." It appears from this comment, as well as others made throughout the study, that the training currently being offered in the district is insufficient for both the reluctant and the experienced computer user.

It is logical to assume that teachers who are more comfortable with technology will be more likely to use it in their classrooms. In the survey, participants were asked to indicate their level of comfort with a number of software applications. All 27 teachers reported being "very comfortable" with word processing. The teachers also indicated being "moderately comfortable" to "very comfortable" with presentation software. They were not as comfortable with other applications, i.e. spreadsheets, web design, and file

sharing. A correlation between comfort and frequency of use could be expected; however, this was not the case. The correlation analysis indicated a moderate relationship between teacher comfort with technology and teacher attitude toward Internet use.

Teacher attitude was assessed using question 9 of the survey instrument. The question not only inquired about the frequency with which the teachers used technology, but also the teachers' perceptions toward each of the 16 activities. The participants were assigned an attitude mean score, similar to their frequency of use mean score. It was this mean score that was then compared with other factors in the correlation analysis, in which the relationship between comfort and attitude was found. It is logical that teachers who are more comfortable with technology, including the Internet, will have a more favorable opinion of ways to incorporate it (the Internet) into the class.

As one might expect, the teachers most highly valued information gathering activities, which mimics their use patterns. Attitude and use rates were similar for both activities that encourage student communication with those outside the classroom, the teachers reported that these were of low importance, and they did not ask students to use the Internet in this manner. Interestingly, most of the teachers surveyed stated that analyzing webpages for accuracy, bias, and perspective were important or somewhat important learning activities; this is drastically different from the frequency with which teachers used these strategies. These results suggest that in the case of analyzing websites, factors other than attitude may be in effect, such as time constraints.

The final factor influencing teachers' technology integration examined in this study was teaching philosophy. There were no questions in the survey that assessed the

participants' teaching philosophy. Instead, the participants were asked a variety of questions in the group and individual interviews designed to uncover their teaching philosophy. In addition to direct questioning, an analysis of class documents and classroom observations provided a window into the learning environment created by the teachers. The teachers participating in the interviews all expressed a need for the middle grades students to be engaged in active learning. This is epitomized by Mr. Brady's statement. "It's them working with the content rather than you just talking at them. Whether it's manipulating it through a physical project or doing something with computers… have to manipulate it (the content) no matter what." Although all the teachers vocalized a belief in active learning, the manner in which they implemented active learning strategies was dependent upon their teaching philosophies.

Most of the teachers included in phase two utilized a teacher-centered, "teacher as manager" (Schuerman, 1998) approach to instruction, as indicated by their responses to interview questions, an analysis of the collected documents, and through classroom observations. Three teachers (Mr. Stephens, Ms Edge, and Ms. Alexander) can be classified under the "teacher as facilitator" approach to instruction (Schuerman, 1998), also as indicated by their interview responses, documents collected, and classroom observations. Two of the three teachers who view their role as a facilitator of learning were the only teachers in Phase 2 to frequently encourage in-class student use of technology, as indicated through document analysis and classroom observations. These two teachers, Ms. Edge and Mr. Stephens, required students to conduct research on-line and then create a product using technology. Ms. Alexander, the third teacher classified as

a facilitator also required the students to complete an extensive project requiring students to construct their own understanding of a topic. Some of the students in Ms. Alexander's class chose to use technology to complete the project; however, this was done at home, not in the class setting. The remaining seven teachers, although they crafted learning experiences that used technology, it was typically used as a form of content presentation, with the teacher in control of the technology and the content.

It is apparent from the data collected in this study that a teacher's integration of technology is influenced by a number of factors, not the least of which is equipment availability and functionality. Indeed, teachers at all three schools indicated that equipment was a significant barrier to their classroom use of technology. Perhaps most interesting are the findings with regard to attitude, comfort, and teaching philosophy. The data indicate that participating teachers are more likely to have a positive attitude about technology integration if they are comfortable with the equipment. Additionally, a teacher's instructional preference and teaching philosophy has a significant impact on the way in which the teacher uses the available technology. Mr. Stephens and Ms. Edge, the two teachers who used technology in a student-centered format, both were comfortable using technology, saw the benefits of using technology with their students and their behaviors indicate that they subscribe to a "teacher as facilitator" philosophy.

# Chapter 5

## Conclusions and Future Research

### *Introduction*

#### Purpose of the Study

Interest in technology integration within the social studies classroom continues to be of interest as the new technologies and new research shape the field (Friedman & Hicks, 2006; O'Brien, 2009). This study attempted to fill a void in the existing research. Specifically, this study examines the use of technology in the middle schools, with academically talented students, an area which has not previously been investigated.

The purpose of this study was to determine the ways in which social studies teachers of academically talented students in high-performing western Florida middle schools use digital technology in their classrooms, and the factors that influence this use. As this study examined the type of technology used, the frequency of technology use, and the factors that impacted the teachers' use of technology, a mixed methods approach (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 1998) was deemed most appropriate.

#### Research Questions

This study was designed to address the following research questions; all of which were addressed with both quantitative and qualitative data collected using mixed methodology.

1. To what degree do social studies teachers in high-performing middle schools utilize technology in teaching academically talented students?
2. How do social studies teachers in high-performing middle schools use digital technology to support higher order thinking?
3. What factors influence social studies teachers in high-performing middle schools inclusion of digital technology in their teaching of academically talented students?

Research Methods

This study utilized a mixed-method research protocol, incorporating both quantitative and qualitative analyses in an effort to answer the above research questions (Creswell and Plan, 2007; Onwuegbuzie & Leech, 2005; Tashakkori & Teddlie, 1998). Quantitative data were collected using a survey, modified from VanFossen's 2005 Internet Use Survey, designed to examine classroom teachers' use of the Internet for instructional purposes, and the factors that facilitate or hinder that use. Information obtained through this survey was expanded upon with the data obtained through group interviews at each of the three participant schools. To enhance information gathered in the survey and group interview, ten teachers participated in the second phase of this study, which included interviews, observations, and document analysis. The use of these various sources of data provided the ability to investigate further information inaccessible through survey analyses alone. Additionally, multiple data sources provided the opportunity to triangulate findings.

*Discussion of Findings*

Mixed methods studies may initially appear messy, with information from various data sources contradicting each other. However, there is power in the mess. Survey data is limited in what it can assess; it is limited by the questions asked and what the participant is willing to share. Through the use of mixed methods the participants' responses to the survey can be verified and challenged through the use of qualitative methods. Often, this will process will uncover conflicting data. This study is no exception. Contradictions in data were seen in the teachers' responses to the importance of technology integration and their actual implantation of digital technology. The participant teachers indicated, through the survey instrument and the interviews (both group and individual), that technology integration was important for student learning. However, in an analysis of their practice, (as evidenced by their survey responses, document analysis, and classroom observations) it was clear that although teaches were using technology, it was not in a manner to encourage the development of the students' 21st century literacy skills (See Figure 2). The teachers reported that they used the Internet to gather information, and that it was important for students to do the same. However, few teachers required students to gather and analyze information in the class setting.

The participating teachers suggested that the roots of the discrepancy between their desire and their practice were the barriers to technology integration inherent in the classroom. Friedman (2006) identified equipment availability, particularly access to an LCD projector, as a determinant in teachers' use of technology. The teachers in this study

reported access to and functionality of equipment to be barriers to their use. However, nearly all teachers reported having computers in the classroom; and, they also reported that they could access LCD projectors. Indeed, the majority of the teachers had an LCD projector permanently available to them in their classroom. The teachers' issue related to equipment evidently stems from a different source; specifically functionality and administrative policies.

The teachers identified multiple administrative policies that have hindered their use--such as School A's laptop cart checkout policy, and the district's security measures. There are solutions to these problems. First, schools, as typified by School A, need to re-examine their checkout policies, and provide teachers with a more flexible procedure. Second, district security policies need to be re-examined. The current firewall is all-inclusive; all users are blocked from potentially threatening websites. Several of the teachers suggested an alternative, having levels of firewalls that are accessed with the user's login codes. In this system, teachers would have more latitude on the Internet to access instructional materials that are blocked by more stringent firewall measures. Finally, the teachers expressed concern with the security measures inhibiting functionality, specifically newer flash drives not being recognized by the school's equipment. Newer flash drives often have to be loaded onto a computer upon their initial use. The way the school system currently operates, teachers do not have administrative access to load software, which would include these flash drives. Teachers need to be provided with limited administrative privileges so they can load flash drives and trouble shoot potential problems.

Technology is always evolving; therefore, the functionality and compatibility of equipment will be a continuing problem for schools. Indeed, most of the teachers at the three participating schools expressed frustration with the functionality of the equipment available for their instructional use. This situation is not going to change in the near future, especially within the constraints of the current budgetary concerns. Therefore, teachers need to be shown how to work with the technology available to them in their classrooms. As suggested in the literature (Mishra & Koehler, 2006; Shaunessy, 2005; VanFossen, 1999), technology-related professional was identified as a need by many of the participants; however, concerns were voiced about the usefulness of the currently offered technology-related professional development. What needs to happen is that teachers need to be provided with training opportunities using the equipment that is available to them in their classroom. This would require trainings to take place at the school level, using the school's equipment. By educating teachers what is possible using the available technology, then it is hoped that they would be more comfortable integrating technology into their instructional practices.

The literature suggests that appropriate education of the academically talented student requires that students be engaged in activities that encourage higher-order thinking and creativity; which are modified for the students' needs through instructional process, and content, and student product (Clark, 1997; Rakow, 2007; Tomlinson, 1996, 2002). Thus technology integration that meets the needs of the academically talented student would include opportunities for the student to gather information and craft products that demonstrate their understanding. This cannot be accomplished if the only

individual with access to technology is the teacher. It appears from this study that most of the teachers at these three schools are not using digital technology in a way as to challenge the academically talented student and encourage their intellectual development.

What can be done? A look at Mishra and Koehler's (2006) TPACK conceptualization of teacher technology integration could be informative. Using the TPACK construct, the manner in which teachers integrate technology, if they integrate, is determined by the interaction of three forces: content knowledge, pedagogical knowledge, and technological knowledge. Each of these three forces will influence the manner in which teachers utilize technology. To be more specific, teachers need not only know how to use technology; but, also know how to use technology to teach their specific field. The results from this study can be viewed within the TPACK construct. The teachers whose teaching philosophy was managerial used teacher-centered pedagogical methods, with or without technology. Teachers whose teaching philosophy was more constructivist, with the teacher acting as a facilitator to learning, used student-centered pedagogical methods, with or without technology. By adding teachers' technological knowledge into the mix, you have a clearer picture of how these teachers used technology with their academically talented students. The teachers who were not comfortable using the available equipment, generally chose other pedagogical methods. The teachers who were comfortable with the available equipment used technology in a manner that supported their pedagogical style, whether it was teacher or student centered. If it is important for academically talented students to be provided with opportunities to engage in tasks requiring higher-order thinking, then it is important that their teachers be

provided with an opportunity to develop student-centered pedagogical skills. Additionally, teachers need to be provided with discipline-specific training that demonstrates how to encourage student thinking and creativity through technology integration. Potentially, such training could lead to a shift in the teachers' TPACK, one that would encourage appropriate educational opportunities for academically talented students using technology.

*Possibilities through Technology*

Much of the discussion of this study's results has focused on the barriers to technology integration, both real and perceived, and the disparity between teachers' attitude toward technology and their actual practice. Yet, there were teachers who took part in this study who demonstrated technology integration in such a way that the educational needs of the academically talented student could be met, these outliers are of interest due to their ability to integrate technology despite the barriers.

It is suggested by information presented in the literature review, and by Sheffield (2007) that academically talented students benefit from a class environment that encourages higher-order thinking and creativity through the use of digital technology. Of the teachers participating in this study, one teacher, Mr. Stephens, utilized technology in his classroom in such a way that the academically talented students were required to conduct on-line research, synthesize information, and create a product to share with a class. The tasks he required of the students were within the framework of a larger, student-driven, group work project, which not only addressed their cognitive needs through appropriate content, process, and product; but also their affective needs through

group work, and opportunities for self-regulation. Mr. Stephens did not have a laptop cart in his room. He had four computers available for student use; yet, he was able to craft the technology-driven learning experience by working with other teachers and with the school's media specialist. Mr. Stephens managed the technology needs of his students by requiring students to sign-up for shifts on the available computers, by completing status reports if they used the computers in other areas, and by providing non-Internet reference materials so that the students would not loose their momentum without a computer.

Mr. Stephens exemplifies an outstanding teacher of academically talented students. He knows that they are coming of age in a digital world, and is dedicated to encouraging the development of their 21st century literacy skills. Although he feels frustration with equipment barriers, and administrative policies, he has found a way to integrate technology effectively in his American History class. What can be learned from Mr. Stephens' example?

First, when looking at Mr. Stephens' background, it is apparent that he has a great understanding of how to appropriately use technology to teach the social studies to academically talented students; he utilizes classroom technology for student creation, not only content presentation. In other words, he has TPACK as described by Mishra and Koehler (2006). This suggests that the TPACK framework is informative and should be used as an organizing tool for pre-service and in-service education. Specifically, technology professional development should be targeted to address the teachers' needs in content, pedagogy, and technology; and conducted using the technology available to the

classroom teacher. Professional development using the TPACK construct would require that the teachers not only be taught technology, but also content-specific pedagogy. Preparing teachers to appropriately educate academically talented students would require that they first be well-versed in student-centered, constructivist teaching practices within the content area, which in this study was the social studies. Once teachers have been exposed to and provided an opportunity to practice student-centered teaching, then the technology layer can be added. Technology professional development should include exposure to available technologies, which would include demonstrating use, as well as providing opportunities for teachers to collaborate and create lessons using technology available in the classroom. Technology is a tool that teachers will use the further their existing practices. If they utilize teacher-centered strategies, then their technology use will be teacher-centered. Conversely, if teachers utilize student-centered strategies, then they are more likely to involve students in technology integration.

Second, in light of budgetary concerns in the current economic situation, it is unlikely that major changes will occur in available classroom technology. Therefore, it is imperative that pre-service teachers be taught to think of possible solutions to the perceived barriers to technology integration, which can be addressed if technology professional development is done in the school setting.

Mr. Stephens demonstrated entrepreneurship when he solved the equipment availability issue by working with other teachers, and by providing reference materials when students rotated off the computers. Imagine what Mr. Stephens could have accomplished in a classroom with ample technology. As the price of technology

continues to decrease, it would benefit schools to re-examine their purchasing practices and equipment policies. Additionally, it is beneficial for pre-service teachers and in-service teachers to be exposed the variety of cost-effective technology available, so that they can act as an advocate for technology integration.

Digital technology is vital to this information age. To expect students to learn in an environment that does not include them in the use of information technology places them at a disadvantage for their future. It is undeniable that barriers to technology integration exist. However, teachers like Mr. Stephens, whose entrepreneurial strategies should serve as an example of what technology integration can be, despite these barriers.

*Limitations*

There were limitations to this study that should be discussed. First, not all of the schools meeting the selection criteria were included in the study, due to a lack of response from the school's administration. Second, due to the a slow response rate from the department chair at School C, teachers from that school could not be included in the case study phase, as there was not sufficient time to collect data by the time the phase one components were complete. Third, not all materials were collected from all ten case study participants. Ms. Roberts left the district before she could be observed; and, Ms. Cooper failed to provide course materials, although she was sent multiple reminders. Fourth, this study spanned two academic years; the time of year when the participating teachers were interviewed and observed may have had an effect on their responses and teaching strategies. This potential limitation was lessened through the use of multiple data sources, which served as both triangulation and clarification. Fifth, due to the nature of the study,

including the small sample size, findings from this study cannot be generalized to a larger population. Sixth, it is possible that surveyed participants provided what they considered to be socially appropriate responses rather than what they actually did in the classroom . By using multiple data sources, this legitimation threat was lessened. Finally, also a threat to the legitimacy of the research is the researcher's own bias; which could taint the interpretation of the data. This legitimation threat was controlled through the use of member checking, for the individual interviews, and by assessing inter-rater reliability.

*Summary*

This mixed-methods study examined middle school social studies teachers' use of digital technology in their teaching of academically talented students. The study was conducted in two phases: school level and individual case study. In the school level phase, teachers were asked to complete a survey first used by VanFossen (1999) that examines social studies teachers' use of the Internet, and participate in a school-based group interview. In the individual case study phase, ten teachers were asked to participate in an individual interview, collect classroom documents for a document analysis, and agree to be observed while using technology in a way they deemed "typical." Data from the survey were analyzed using frequency counts, and correlation analyses utilizing Spearman's *rho*. Data from the group interviews and individual interviews were analyzed using the constant comparison method. Information gleaned from classroom observations and document analysis served to triangulate information gathered through the survey and interviews.

All teachers in this study were classified as either a mid-level or high-level user of technology as determined through the method described in VanFossen and Waterson (2008). The teachers most frequently used the Internet for information gathering and content presentation. Rarely did they require their students to communicate with others outside the classroom; nor did they require students to analyze websites for bias, accuracy, and perspective. When asked to evaluate the importance of tasks, information gathering was most frequently identified as "very important." As would be expected based on their frequency scores, the teachers did not view requiring students to communicate with individuals outside the classroom as an important learning task. However, despite the teachers' failure to have students analyze websites, the teachers did view this as an important learning task. In an analysis of the type of technology integration most often used, it was apparent that the teachers were not using technology to engage students in higher-order thinking or creativity, with the exception of two teachers.

In an analysis of the factors influencing the participating teachers' technology integration, several themes arose. First, nearly all of the teachers included in this study viewed equipment, either access or functionality, as a barrier to their technology integration. Second, teacher comfort with technology was associated with the teacher's attitude toward, and ultimately frequency of, technology integration. Third, a teacher's teaching philosophy appears to have an impact on the way in which technology is integrated into the classroom. Mishra and Koehler's (2006) TPACK construct is of particular use as a method to explain the manner in which the participating social studies

teachers used technology with their academically talented students. It is apparent from the data collected in this study, that most teachers in this study do not use technology in the classroom in a manner that would be most beneficial to academically talented students. Most teachers are using available classroom technology as a form of content presentation, with the teacher as manager of both information and technology. More appropriate for the needs of academically talented students, coming of age in a digital world, would be for teachers to facilitate student learning by providing students with opportunities to gather information through on-line data sources, analyze material for relevance and importance, and then create a product using technology. By doing so, teachers could encourage the development of the academically talented students' higher-order thinking, creativity, and encourage 21st literacy.

*Recommendations for Future Research*

The results of this study are similar to those reported by VanFossen (1999), VanFossen and Waterson (2008), and Friedman (2006) in that teachers largely used the Internet for gathering information; and, that teachers perceived equipment availability and functionality to be a barrier to their technology integration. Of the four studies, including this one, two are multiple case studies and the other two are state-wide surveys. A potential study that would link these four with other similar studies would be a meta-analytic study, possibly through a research synthesis procedure, to see if commonalities among the studies exist. A meta-analysis would provide an opportunity for generalization which is not possible with most of the research conducted in social studies technology integration (Friedman & Hicks, 2006).

Findings from this study suggest that teaching philosophy is an important influence in the way in which teachers use technology. Judson (2006) failed to find a connection; yet, Manfra and Hammond (2007) reported that in their case studies, philosophy, indeed, played a role in the nature of technology integration. A potential study of interest would be a larger scale examination of teaching philosophy, the frequency of technology use, and the type of technology integration. This could be done using a research design similar to the one employed for this study, in which a survey is followed by targeted case studies. The survey for such a study would need to include information not only on the frequency of technology use; but, also information pertaining to type of use and teaching philosophy.

One of the more interesting findings pertaining to teacher attitude toward and use of the Internet was that although the majority of the teachers in this study viewed having students analyze websites for bias, accuracy, and perspective as an important learning activity, few did so. Another possible study to come out of this research is to examine what barriers are preventing the teachers from requiring students to analyze information. It was suggested that time constraints may be a cause; however, it is unclear in this study where the barriers lay.

Mr. Stephens' technology integration is of particular interest, as the structure of his class and student assignments were decidedly different from other teachers in the study. Indeed, the method in which he integrated technology into his social studies class optimized opportunities for students to interact with technology through research and product creation. A potential follow-up study to this one would be an in-depth case study

of Mr. Stephen's class, perhaps as ethnography. This method would capture the culture of the technology integrated social studies classroom, which isn't discussed in this study. Information obtained through a study of outliers, such as Mr. Stephens, would provide insight into what makes them and their teaching practices different; which could provide guidance for teacher preparation and in-service professional development.

Finally, an easily utilized taxonomy of technology integration does currently exist in the literature. A possible future study could be the creation of this taxonomy. This would require an meta-analysis of the existing literature, as suggested previously, combined with numerous in-depth case studies. The detail gathered in case study research could be used to fully describe the levels of technology integration, which would not be available through meta-analyses, nor through survey data.

Technology and the social studies is emerging from its adolescence (Berson & Balyta, 2004). Research in the field is moving into new areas—including digital citizenship, new technologies, and social networking. However, questions still remain as to what is actually happening in the classroom, how we can understand teacher technology integration, and what we can learn from extraordinary teachers to prepare pre-service teachers and assist practicing teachers. The recommend studies described address these needs.

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Appendices

Appendix A

*Survey Instrument*

**Internet Use Survey**

School: _____

The purpose of this survey is to gather information regarding the classroom use of the Internet by secondary social studies teachers. Some questions ask about equipment in your classroom. If you are a floating teacher, please think about each classroom your are in as your classroom.

**Internet and Equipment Availability:**

1. Please indicate the number of computers in your classroom. (Please select one answer. If you answered "no computer" go to Question #5.)

___ I have no computer in my classroom
___ I have a single computer in my classroom
___ I have 2-3 computers in my classroom
___ I have 4 or more computers in my classroom

2. Please indicate the type of Internet access you have in your classroom (Select one):

___ I have no Internet access in my classroom
___ I have a slow Internet connection (<56K) for one computer
___ I have a slow Internet connection (<56K) for multiple computers
___ I have a fast Internet connection (>56K/DSL) for one computer
___ I have a fast Internet connection (>56K/DSL) for multiple computers

3. Please describe your ability to project images from a classroom computer (Select one):

___ I have no access to a projector
___ I can run output from my computer to a TV screen in my classroom
___ My school has one LCD projector that I can check out
___ My school has multiple LCD projectors that I can check out
___ I have an LCD projector located permanently in my room

4. Please describe the availability of equipment to print out resources from the Internet at your school (e.g., to print out primary sources such as photographs, maps, etc.):

___ I cannot print out materials from the Internet at my school
___ I use a school-wide, or departmental printer with a limited budget for printing
___ I use a black and white inkjet printer located in my classroom
___ I use a color inkjet printer located in my classroom
___ I use a black and white laser printer located in my classroom
___ I use a color laser printer located in my classroom

Appendix A (Continued)

5. How many computers in the computer lab at your school have Internet access? (If answered "I never use the lab" or "none" proceed to Question #7.)

___ I never use the lab
___ none
___ less than 15
___ 15
___ 16
___ 17
___ 18
___ 19
___ 20
___ 21 or more

6. How would you describe the computer lab's Internet connection?

___ Slow dial-up (<56K)
___ Fast dial-up (>56K)
___ DSL/Cable/Ethernet

7. Please describe your access to laptop carts, or classroom notebook computers (Select all that apply)

___ We do not have these in my school
___ We have one laptop cart with wireless Internet access available for checkout
___ We have multiple laptop carts with wireless Internet access available for checkout
___ We have multiple classroom sets of wireless notebooks available for checkout.

8. Do you have Internet access at home?

___ Yes
___ No

Appendix A (Continued)

**Technology and Internet Use:**

9. Do you view this teaching activity/tool as important for your teaching? How often do you use the Internet in the following ways? (Select the responses that match your opinion and use by placing a ✓ in the appropriate box.)

| Not an important teaching tool / activity | A somewhat important teaching tool / activity | An important teaching tool / activity | A very important teaching tool / activity | | Never | Rarely (several times per year) | Occasionally (several times per month) | Frequently (Once per week or more) |
|---|---|---|---|---|---|---|---|---|
| | | | | A. Gather background information for lessons you teach? | | | | |
| | | | | B. Gather multimedia (music, maps, etc.) for lesson you teach? | | | | |
| | | | | C. Encourage students to use the Internet to gather background information? | | | | |
| | | | | D. Encourage students to use e-mail to contact other students or content experts (e.g., historians)? | | | | |
| | | | | E. Take students on a "virtual fieldtrip" using the Internet to visit a museum or other on-line location? | | | | |

Appendix A (Continued)

| Not an important teaching tool / activity | A somewhat important teaching tool / activity | An important teaching tool / activity | A very important teaching tool / activity | | Never | Rarely (several times per year) | Occasionally (several times per month) | Frequently (Once per week or more) |
|---|---|---|---|---|---|---|---|---|
| | | | | F. Develop interactive lessons that require students to use the Internet to complete some task or assignment? | | | | |
| | | | | G. Encourage students to develop their own WebPages for an assignment? | | | | |
| | | | | H. Develop WebPages for social studies classes you teach? | | | | |
| | | | | I. Have student complete inquiry-oriented 'Web Quests'? | | | | |
| | | | | J. Access primary source materials (e.g., images, diaries, historic newspaper articles, documents, etc.) for use in your classroom? | | | | |

Appendix A (Continued)

| Not an important teaching tool / activity | A somewhat important teaching tool / activity | An important teaching tool / activity | A very important teaching tool / activity | | Never | Rarely (several times per year) | Occasionally (several times per month) | Frequently (Once per week or more) |
|---|---|---|---|---|---|---|---|---|
| | | | | K. Search for lesson plans for particular classes you teach? | | | | |
| | | | | L. Access digital video clips to use in your classroom? | | | | |
| | | | | M. Contact other social studies teachers for professional development or lesson ideas? | | | | |
| | | | | N. Have students complete specific worksheet activities using the Internet as a resource? | | | | |
| | | | | O. Have students analyze webpages for accuracy or bias? | | | | |
| | | | | P. Have students compare/contrast information from websites with different points-or-view? | | | | |

Appendix A (Continued)

10. On average, how many hours per week do you spend on your computer **at school**?

| | | | | |
|---|---|---|---|---|
| ___ 0 | ___ 5 | ___ 10 | ___ 15 | ___ 20 or more |
| ___ 1 | ___ 6 | ___ 11 | ___ 16 | |
| ___ 2 | ___ 7 | ___ 12 | ___ 17 | |
| ___ 3 | ___ 8 | ___ 13 | ___ 18 | |
| ___ 4 | ___ 9 | ___ 14 | ___ 19 | |

11. On average, how many hours per week do you spend on your computer **at home**?

| | | | | |
|---|---|---|---|---|
| ___ 0 | ___ 5 | ___ 10 | ___ 15 | ___ 20 or more |
| ___ 1 | ___ 6 | ___ 11 | ___ 16 | |
| ___ 2 | ___ 7 | ___ 12 | ___ 17 | |
| ___ 3 | ___ 8 | ___ 13 | ___ 18 | |
| ___ 4 | ___ 9 | ___ 14 | ___ 19 | |

12. How many times per week do you use the Internet for **professional purposes** (e.g., lesson planning, research, materials gathering, professional development)?

| | |
|---|---|
| ___ Never | ___ 5-6 times |
| ___ 1-2 times | ___ 7-8 times |
| ___ 3-4 times | ___ 9 or more times per week |

13. How many times per week do you use the Internet **for personal productivity or enjoyment purposes** (e.g., online banking, shopping, communication with friends, email)?

| | |
|---|---|
| ___ Never | ___ 5-6 times |
| ___ 1-2 times | ___ 7-8 times |
| ___ 3-4 times | ___ 9 or more times per week |

14. How many times per week do you use word processing software (e.g., Microsoft Word) for personal or professional purposes?

| | |
|---|---|
| ___ Never | ___ 5-6 times |
| ___ 1-2 times | ___ 7-8 times |
| ___ 3-4 times | ___ 9 or more times per week |

15. How many times per week do you use spreadsheet software (e.g., Microsoft Excel) for personal or professional purposes?

| | |
|---|---|
| ___ Never | ___ 5-6 times |
| ___ 1-2 times | ___ 7-8 times |
| ___ 3-4 times | ___ 9 or more times per week |

16. How many times per week do you use graphic/image software (e.g., Photoshop) for personal or professional purposes?

___ Never ___ 5-6 times
___ 1-2 times ___ 7-8 times
___ 3-4 times ___ 9 or more times per week

17. How many times per week do you use presentation software (e.g., Microsoft PowerPoint) for personal or professional purposes?

___ Never ___ 5-6 times
___ 1-2 times ___ 7-8 times
___ 3-4 times ___ 9 or more times per week

18. How many times per week do you use productivity/scheduling software (e.g., Microsoft Outlook) for personal or professional reasons?

___ Never ___ 5-6 times
___ 1-2 times ___ 7-8 times
___ 3-4 times ___ 9 or more times per week

19. How many times per week do you use web publishing software (e.g., DreamWeaver) for personal or professional reasons?

___ Never ___ 5-6 times
___ 1-2 times ___ 7-8 times
___ 3-4 times ___ 9 or more times per week

20. How many times per week do you use FTP software (e.g., WS_FTP) to upload files to a school server?

___ Never ___ 5-6 times
___ 1-2 times ___ 7-8 times
___ 3-4 times ___ 9 or more times per week

Appendix A (Continued)

21. How comfortable do you feel using the following computer applications? (Select responses that match your level of comfort by placing a ✓ in the appropriate box.)

| | **Uncomfortable** | **Somewhat Comfortable** | **Moderately Comfortable** | **Very Comfortable** |
|---|---|---|---|---|
| Word processing (e.g., Microsoft Word) | | | | |
| Spreadsheets (e.g., Microsoft Excel) | | | | |
| Graphic/Image software (e.g., Photoshop) | | | | |
| Presentation software (e.g., PowerPoint) | | | | |
| CD-ROM Instructional Simulations | | | | |
| Productivity/Scheduling software (e.g., Microsoft Outlook) | | | | |
| Web publishing software (e.g.,DreamWeaver) | | | | |
| FTP software to upload files to school server (e.g.,WS_FTP) | | | | |

22. How would you classify your instructional-related Internet use?

___ I am a frequent user of the Internet in my instructional practices.
___ I am a mid-level user of the Internet in my instructional practices.
___ I am an infrequent user of the Internet in my instructional practices.

23. Which statement best describes your desire to use the Internet in your classroom teaching? (Select only one)

___ I have no desire to use the Internet in my classroom.
___ I am currently using the Internet **about as much as I care to in my classroom**.
___ I would like to be using the Internet **more often in my classroom**.
___ I would like to be using the Internet **much more often in my classroom**.
___ I am currently using the Internet **less often than I have in the past**.

Appendix A (Continued)

24. If you answered "more often," or "much more often" to Question #23, which of the following factors currently prohibit you form increasing your classroom Internet use (check all that apply).

___ Lack of access to equipment (only 1-2 computers in my classroom)
___ Lack of access to equipment (no Internet access in my classroom)
___ Lack of access to equipment (no projector)
___ Lack of general computer training
___ Poor Internet search skills
___ Lack of training in how to apply the Internet in my teaching/classroom
___ Frustration over failed searches (i.e., sorting through Google searches to find relevant material)
___ I don't believe that Internet technology is an improvement over textbooks or other materials for my students.
___ I am concerned about students accessing inappropriate material over the Internet
___ My school has a policy that prohibits Internet usage in the classroom (if you check this, please answer Question #25).

25. If you checked "my school has a policy that prohibits Internet usage in the classroom" in Question #24, please explain below.

_____
_____
_____

26. Please describe any additional concerns (not listed) that may prevent you from greater use of the Internet in your classroom:

_____
_____
_____

27. In your opinion, what are the potential benefits of using the Internet in your classroom for your students? In other words, why go to the trouble of having students use the Internet in your classroom?

_____
_____
_____
_____

Appendix A (Continued)

**Background Information:**

28. What courses are you currently teaching? (check all that apply)
___ World Geography
___ American History
___ Other social studies course _____

29. What grade level(s) are you currently teaching? (check all that apply)
___ 6
___ 7
___ 8

30. What is your gender?
___ Female
___ Male

31. How old are you?

| | | |
|---|---|---|
| ___ 24 or younger | ___ 35-39 | ___ 50-54 |
| ___ 25-29 | ___ 40-44 | ___ 55-59 |
| ___ 30-34 | ___ 45-49 | ___ 60 or older |

32. Years of teaching experience (including this year): _____

33. What is your highest earned degree?
___ Bachelor's
___ Master's
___ Specialist's
___ Doctorate (PhD or EdD)
___ Other _____

34. How many hours of training or professional development have you had related specifically to using the Internet to teach social studies in your classroom? (Select one answer. If you answered "None", please go directly to question #35.

| | | | | |
|---|---|---|---|---|
| ___ 0 | ___ 5 | ___ 10 | ___ 15 | ___ 20 or more |
| ___ 1 | ___ 6 | ___ 11 | ___ 16 | |
| ___ 2 | ___ 7 | ___ 12 | ___ 17 | |
| ___ 3 | ___ 8 | ___ 13 | ___ 18 | |
| ___ 4 | ___ 9 | ___ 14 | ___ 19 | |

35. If you answered that you have had training or professional development in related to using the Internet in the social studies, please describe this professional development.

_____
_____
_____

36. Please take a moment to reflect on this survey and provide some feedback for the researcher. Perhaps you have a strong opinion about the use of the Internet in social studies classrooms? Perhaps you expected a different set of questions on this survey? Perhaps you want to share a positive or negative experience you have had using the Internet in your social studies classroom. Please feel free to outline these reactions (or any other) below.

_____
_____
_____
_____
_____
_____
_____

May I contact you later to participate in additional portions of this study?
___ Yes
___ No
If yes, please write your Email address and work phone number on the back of this survey.

**Thank you for your time and input.**

Appendix B

*Group Interview Protocol*

School: _____

Number of teachers eligible to participate in the group interview: _____

Number of teachers participating in the group interview: _____

Time of interview: _____ AM PM

Date of interview: _____

Interview location:

_____

Description of interview location:

Questions:

- How do you think students learn best? Please explain your answer.
- What type of technology, other than the Internet, are you using with your honors classes?
- How would you describe your technology use with your honors classes? Please describe the way you typically use technology in your honors class.
- In your opinion, is it beneficial to use technology with your honors students? Please explain.

- What factors do you see encouraging or inhibiting your use of technology in your honors classes?
    - Equipment availability?
    - Comfort with technology?
    - Appropriate training?
    - FCAT pressure?
- If you could alter the factors influencing your integration of technology, would you? If you would, how would you change your current situation and instructional practices?

Appendix C

*Individual Interview Protocol*

Participant: _____ (code)

School: _____

Time of interview: _____ AM PM

Date of interview: _____

Interview location:

_____

Description of interview location:

Questions:

- How long have you been teaching?
- What grade levels have you taught? Where?
- What is your educational background?
- Is teaching your first career? If not, what other types of employment have you had?
- When did you complete your education coursework?
- What type of technology was included in your teacher preparation, if any?
- What do you see as your primary role as a social studies teacher? (Follow up question as necessary.)
- How would you describe your teaching philosophy?
- What type of environment do you think is best for student learning?

- Describe a typical day in your classroom. What are you doing? What are the students doing?
- In what ways do you currently use technology for administrative purposes?
- Do you view the inclusion of technology as essential or an elective component in student education? Please explain.
- How do you envision technology integration? Is this vision a reality? Please explain.
- With regards to technology in the classroom, what do you feel most confident doing? What do you feel least confident? Has your confidence levels influenced your technology integration? How?
- What barriers do you encounter when trying to integrate technology?
    - Probing questions related to: materials, management, support, and skill
- How has high-stakes testing affected your technology integration?
- When you hear the term higher-order thinking, what do you envision?
- How do higher-order thinking and technology relate to one another?
- How do you include technology in your social studies class?
    - Follow up questions related to: materials, management, planning and projects
- Describe your plans for the year – re: technology and higher-order thinking.

This list of questions is a base of questions. Other questions may arise during the interview.

Appendix D

*Classroom Observation Protocol*

**School**: _____

**Teacher Observed (code)**: _____

**Date of Observation**: _____

**Time of Observation**: _____ AM/PM to _____ AM/PM

**Period Observed**: _____

**Total number of students during observation**: _____ (as part of class)

Number of boys: _____ Number of girls: _____

**Diversity (number of each ethnic group – determined by appearance)**:

Asian/Pacific Islander _____ African American _____ Hispanic ___

White (non-Hispanic) _____ Native American _____ Other _____

**Map of the Classroom**:

Appendix D (Continued)

**Instruction Observation**:

| Time | Teacher Actions/Directions | Student Actions |
|---|---|---|
| | | |

Appendix D (Continued)

**Listing of media/technology available in the classroom**:

_____

**Objective of lesson observed**:

_____

**Technology utilized in the lesson**:

_____

**Does technology use match or reflect the learning objectives?** YES NO

**How did the use of technology assist students to meet the lesson's objectives?**

_____

**How is the technology being used in the class?**

_____

**What is the teacher's role--a guide to student use or a presenter of information?**

_____

**Is the use of technology appropriate for the student's age and skills? Explain.**

_____

**Is equitable time provided for all students to use technology? Explain.**

_____

**Are students engaged in cooperative learning when using technology?** YES NO

**Is technology introduced for independent, small-group, or whole-class use?**

_____

Observation form adapted from Reed and Bergmann (2005)

Appendix E

*Schuerman's (1998) Matrix of Teaching and Learning Approaches*

| Role of Teacher | Transmitter | Manager | Facilitator | Collaborator |
|---|---|---|---|---|
| Nature of Knowledge | Universal, objective, and fixed | Universal and "objective" (influenced by knower's prior knowledge) | Individually constructed; "objective" (contingent on knower's intellectual development) | Socially constructed; "subjective" (distributed across knowers) |
| Grounding Theoretical Tradition | Behaviorism | Information Processing | Cognitive Constructivism | Social Constructivism |
| Metaphorical View of the Learner | Switchboard | Computer | Naïve Scientist | Apprentice |
| Nature of Teaching Activity | Present Reality to students: disseminates information incrementally, demonstrate procedures, reinforce habits with independent practice | Help students process reality: assemble information-rich environments, model expert memory and thinking strategies, foster metacognition | Challenge student's conceptions of reality: promote disequilibrium with discrepant objects and events, guide students through problem solving activities, monitor reflective thinking after discoveries | Participate with students in constructing reality: elicit and adapt to student (mis)conceptions, engage in open-ended inquiries, guide self and students to authentic resources and procedures |
| Nature of Student Activity | Replicate reality transmitted by authorities: listen, rehearse, recite | Manipulate reality perceived through senses: practice thinking and memorizing activities, develop schemata and automatize skills, practice self-regulatory strategies | Experience reality during physical and social activity: assimilate information, develop new schemes and operations to deal with novel experiences, reflect on physical, social, and intellectual discoveries | Create reality during physical and social activity: manufacture "situated" (cultural) understandings, actively engage in open-ended inquiries with peers and teachers, reflect on co-constructed meanings |

Appendix F

*Teacher Comfort with Software Applications – Frequency Distribution*

| Software Application | | Frequency | Percent |
|---|---|---|---|
| Word processing software | | | |
| | Uncomfortable | 0 | 0 |
| | Somewhat comfortable | 0 | 0 |
| | Moderately comfortable | 0 | 0 |
| | Very comfortable | 27 | 100 |
| Spreadsheet software | | | |
| | Uncomfortable | 4 | 14.81 |
| | Somewhat comfortable | 4 | 14.81 |
| | Moderately comfortable | 9 | 33.33 |
| | Very comfortable | 10 | 37.04 |
| Presentation software | | | |
| | Uncomfortable | 1 | 3.70 |
| | Somewhat comfortable | 2 | 7.41 |
| | Moderately comfortable | 9 | 33.33 |
| | Very comfortable | 15 | 55.56 |
| Productivity software | | | |
| | Uncomfortable | 8 | 30.77 |
| | Somewhat comfortable | 8 | 30.77 |
| | Moderately comfortable | 8 | 30.77 |
| | Very comfortable | 2 | 7.69 |
| Web publishing software | | | |
| | Uncomfortable | 14 | 53.85 |
| | Somewhat comfortable | 5 | 19.23 |
| | Moderately comfortable | 4 | 15.38 |
| | Very comfortable | 3 | 11.54 |
| File transfer protocol (FTP) software | | | |
| | Uncomfortable | 15 | 57.69 |
| | Somewhat comfortable | 4 | 15.38 |
| | Moderately comfortable | 3 | 11.54 |
| | Very comfortable | 4 | 15.38 |

Appendix G

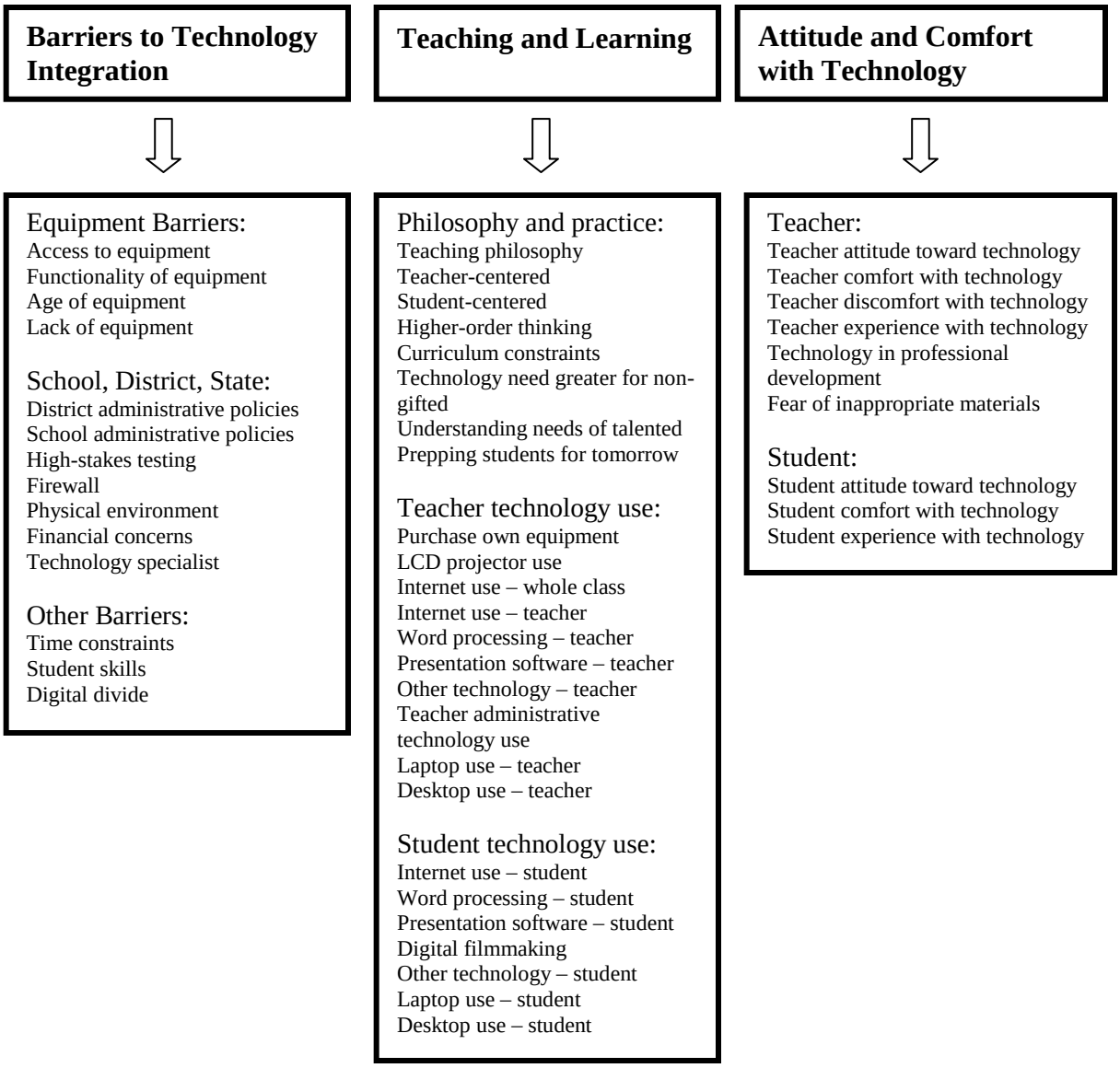
*Teacher Internet Use Level: Mean$_{use}$, IUS, and Self-reported Ratings*

| Participant | $M_{use}$ (Rate) | IUS (Rate) | Self-reported rate |
|---|---|---|---|
| **1.1 (Buckley)** | 3.0 (High) | 114 (High) | Mid |
| **1.2 (Smith)** | 2.19 (Mid) | 83 (High) | High |
| **1.3 (Norris)** | 2.06 (Mid) | 81 (High) | Low |
| **1.4 (Stephens)** | 2.81 (High) | 111 (High) | High |
| **1.5 (Adams)** | 1.81 (Low) | 66 (Mid) | Low |
| **2.1** | 1.5 (Low) | 101 (High) | Mid |
| **2.2** | 3.38 (High) | 129 (High) | High |
| **2.3** | 2.0 (Mid) | 70 (Mid) | Mid |
| **2.4** | 2.5 (Mid) | 96 (High) | Mid |
| **2.5** | 2.13 (Mid) | 79 (Mid) | High |
| **3.1 (Roberts)** | 2.5 (Mid) | 94 (High) | Mid |
| **3.2 (Hill)** | 2.94 (High) | 110 (High) | High |
| **3.3 (Alexander)** | 2.0 (Mid) | 69 (Mid) | High |
| **3.4 (Cooper)** | 1.94 (Low) | 68 (Mid) | Mid |
| **3.5( Edge)** | 3.13 (High) | 115 (High) | High |
| **4.1** | 1.75 (Low) | 61 (Mid) | Low |
| **4.2** | 2.44 (Mid) | 88 (High) | Mid |
| **4.3** | 1.63 (Low) | 63 (Mid) | Low |
| **4.4** | 2.38 (Mid) | 98 (High) | High |
| **4.5** | 1.63 (Low) | 56 (Low) | Low |
| **4.6** | 2.13 (Mid) | 77 (Mid) | Mid |
| **5.1** | 2.0 (Mid) | 74 (Mid) | High |
| **5.2** | 2.5 (Mid) | 86 (High) | High |
| **5.3** | 2.25 (Mid) | 82 (High) | Mid |
| **5.4** | 2.88 (High) | 112 (High) | High |
| **5.5** | 2.13 (Mid) | 75 (Mid) | Mid |
| **5.6** | 2.94 (High) | 110 (High) | High |

Note. $M_{use}$ determined by calculating the individual's reported mean of Internet use from question 9; rate determined as described in VanFossen (1999). IUS is a summation of individual's reported frequency multiplied by the weighted score provided in Table 2; rate determined as described in VanFossen & Waterson (2008). Self-reported level are as reported in survey question 22.

Appendix H

*Matrix of Codes Used in Qualitative Analysis*



Appendix I

*Institutional Review Board Exemption Letter*

UNIVERSITY OF
SOUTH FLORIDA

April 1, 2008

Caroline Sheffield, MA
College of Education
Secondary Education
EDU 162

RE: **Exempt Certification** for IRB#: 106685
Title: *A Multiple Case Study Analysis of Middle Grades Social Studies Teachers' Instructional Use of Digital Technology with Highly-Able Students at Three High-Performing Middle Schools*

Dear Ms. Sheffield:

On 28 March 2008, the Institutional Review Board (IRB) determined that your research **meets USF requirements and Federal Exemption criteria 1 - Established or commonly accepted educational settings/Normal educational practices.** It is your responsibility to ensure that this research is conducted in a manner reported in your application and consistent with the ethical principles outlined in the Belmont Report and with USF IRB policies and procedures.

Please note that changes to this protocol may disqualify it from exempt status. It is your responsibility to notify the IRB prior to implementing any changes.

The Division of Research Integrity and Compliance will hold your exemption application for a period of five years from the date of this letter or for three years after a Final Progress Report is received. If you wish to continue this protocol beyond those periods, you will need to submit an Exemption Certification Request form at least 30 days before this exempt certification ends. If a Final Progress Report has not been received, the IRB will send you a reminder notice prior to end of the five year period; therefore, it is important that you keep your contact information current with the IRB Office. Should you complete this study prior to the end of the five-year period, you must submit a Final IRB Progress Report for review.

**Please reference the above IRB protocol number in all correspondence** to the IRB c/o the Division of Research Integrity and Compliance. In addition, we have enclosed an Institutional Review Board (IRB) Quick Reference Guide providing guidelines and resources to assist you in meeting your responsibilities when conducting human subjects research. **Please read this guide carefully.**

OFFICE OF RESEARCH • DIVISION OF RESEARCH INTEGRITY & COMPLIANCE
INSTITUTIONAL REVIEW BOARDS, FWA NO. 00001669
University of South Florida • 12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • Fax (813) 974-5618

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-9343.

Sincerely,

Paul G. Stiles, J.D., Ph.D., Chairperson
USF Institutional Review Board

Enclosures: IRB Quick Reference Guide

Cc: Valentina Lepsky-Perla, USF IRB Professional Staff

SB-EXEMPT-0602

## About the Author

Caroline C. Sheffield is a doctoral candidate in Secondary Education Curriculum and Instruction, with an emphasis in Social Science Education at the University of South Florida (USF). She is currently a visiting instructor in Secondary Education at USF. Her research interests include an interested in how 21st literacy is manifested in innovative teaching practices within the social sciences. She is particularly interested in how technology is used in classrooms to engage students in higher-order thinking. She holds a Master's of Arts in Anthropology from Wake Forest University and a Bachelor's of Arts in Anthropology from the College of William and Mary. Ms. Sheffield teaches courses in elementary and secondary social science methods, a pre-internship practicum course, and a diverse learners elective course. She has served on the executive board of the graduate student forum of a national organization, and has served as a reviewer for numerous publications and conferences. She is a former middle school social studies teacher in both Duval County Public Schools in Jacksonville, Florida and in the School District of Hillsborough County, in Tampa, Florida.