Bridging the Divide: District Level Technology Leaders as Agents of Change

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ABSTRACT

Advances in educational technology over the past 60 years present new opportunities for K-12 public school systems, opportunities to shift the focus from curriculum methods emulating the factories of the industrial age to curriculum methods embracing the connectedness of the information age, with the hope that teaching will be transformed from teacher-directed to student-centered, inquiry-based, collaborative learning opportunities. Many districts employ an individual in the role of technology coordinator to handle the technical and instructional support aspects necessary to lead and facilitate technology-driven learning initiatives. This qualitative study explored what two individuals at the district level in the state of Georgia actually do to leverage technology in ways that promote individualized and engaging instructional practices with the aim to better our understanding of how district level practices influence educational technology integration within teaching and learning and facilitate educational improvements.

For this qualitative descriptive case study, two individuals identified at the district level as responsible for coordinating educational technology were purposefully selected. Data sources included three semi-structured face-to-face interviews, collected district level technology and curriculum policy and planning documents, and the researcher's notes. An iterative and reflective process was employed to identify important categories and themes in the data from each case and then across cases.

While it is not possible to statistically generalize the findings from this study, my findings suggest that: (1) the participating district level coordinators assume a leadership role resulting in support efforts particularly suited for transforming instructional practices in their particular system, (2) access to high-speed Internet and information technology

remains a continual, ongoing obstacle to technology integration efforts, (3) instructional support provided for technology integration requires a perpetual, differentiated, and multilayered approach, and (4) a disconnect exists between the intended vision for educational technology integration and the actual focus of many educational initiatives and policies. Recommendations are provided for further research into the relationship between the leadership role of district level technology coordinators, the types of technology initiatives selected, the dimensions of technology integration support provided, and the governance structure of school systems.

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PREFACE

This dissertation is submitted in partial fulfilment of the requirements for a Doctoral degree in curriculum and instruction. Although the work on this research project took place from July 2012 to September 2014, my interest in the field of curriculum and instructional technology originated in 2005 with the coursework required for my Educational Specialist degree in Curriculum and Instructional Technology. Through my exploration into courses covering the theories, models, and perspectives of instructional technology; technology tools for learning environments; systematic design of instruction; leadership in instructional technology; and best practices in instructional technology, I developed an appreciation for the complexities and challenges of integrating technology into instructional practices.

Shortly after I earned my Educational Specialist degree, I noticed a listing in the community newspaper of the top ten salaries of individuals employed by the local board of education. In addition to naming the employee and their position, a breakdown of the state and local allotments for each individual was included. I was startled to discover that 100% of the technology director's salary was paid through local funding. I searched through the Georgia State Department of Education's system allotment sheets to determine what amount, if any, was provided for technology support. According to the system allotment, the district earned roughly eight technology specialist positions. While the allotment sheet specified an exact number of elementary, middle school, high school, media specialist, principals, assistant principals, superintendents, assistant superintendents, secretaries, etc. earned by the district, no indication was provided as to whether the individuals serving in these positions were expected to provide technical

support or instructional support. Moreover, no allotment existed for the position of a central office technology director. I simply couldn't imagine how counties throughout the state handled the management and operation of technical and instructional support for technology and technology integration without an individual designated at the district level.

As I progressed through the doctoral program and was asked to considered possible areas of concentration for my dissertation research, I pondered about the interrelated concepts of curriculum, instructional technology, and organizational change and the ambiguous role of the technology director. Initially, I wanted to survey counties throughout the state to determine the role and responsibilities of the individual charged by the superintendent for managing educational technology. I also considered interviewing a select group of individuals once to gather additional data on their leadership role within their districts. After speaking with my committee, it was apparent that a case study approach focusing on one or two technology directors would provide the type of structure necessary to explore in greater depth the experiences and reality of individuals serving as coordinators of technology and as possible leaders of technology integration.

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Chapter I

THE PROBLEM

Introduction

We live in a wired world. The digital revolution has fashioned a culture of technology dependence as individuals seek ways to be more informed and more productive (Collins & Halverson, 2009). The proliferation of new technologies affects the daily lifestyles of even the youngest in our society, who manipulate smartphones, game devices, and tablet personal computers (PCs) to pull up their favorite songs, online games, and interactive applications. Through a variety of personal, handheld, and portable electronic devices, people communicate with colleagues and contacts, connect with family and friends, and participate in virtual conferences and classrooms. Information is shared and distributed essentially effortlessly. Wireless access to social network sites, informational websites, and on-demand multimedia services delivers a range of content available for *just-in-time* individualized access, thereby changing the way people learn, think, and communicate. The World Wide Web has leveled the global playing field, enabling individuals around the world the opportunity to collaborate in real time without the barriers of time, distance, and language (Friedman, 2007). The technology capabilities that have made it possible for this type of *flattening* of the world, a phrase coined by Thomas Friedman (2007), have also formed new information literacy requirements for the 21st century and a greater need for a workforce capable of employing critical and strategic thinking processes.

Friedman was not the first to recognize the driving force of technological innovation and the demands it would place on learning. Dating back to the late 1950s, the federal government provided funding support for technology in schools, and new technologies in the past 30 years have sparked a renewed interest in funding technology initiatives within public educational K-12 institutions (Cambre & Hawkes, 2004). Findings from *A Nation at Risk,* an 18-month study on the educational system conducted by the National Commission on Excellence in Education, provided the catalyst for increased technology funding in K-12 educational settings by sounding an alarm for educational reform (Coley, Cradler, & Engel, 1997; United States (U.S.) Department of Education, National Commission of Excellence in Education, 1983). The report cited: declining College Board SAT scores; increasing functional illiteracy rates among adults, 17-year-olds, and minority youth; decreasing international academic test rankings of American students; deficient higher order thinking skills among 17-year-olds; and complaints by employers in the private and public sector regarding the basic skill level of new employees, as indicators of the failings within the American public education system (U.S. Department of Education, National Commission of Excellence in Education, 1983). The report also mentioned technological transformations taking place within several occupations and the need for competent workers with digital and information literacy skills who were prepared to embrace learning as a life-long process (U.S. Department of Education, National Commission of Excellence in Education, 1983).

A national mission to support technological literacy of students through the advancement of educational technology in schools gained political momentum in the

1990s. President George H. W. Bush's 1990 State of the Union address presented goals, developed during the 1989 National Education Summit of state governors that convey the prior year, for meeting the challenge of preparing students for global competitiveness (States' Impact on Federal Education Policy Project, 2009). President Bill Clinton during his first term in office signed The Goals 2000: Education America Act of 1994 and the Improving America's Schools Act of 1994, which provided funds for educational technology planning at the federal and state level, and the Telecommunications Act of 1996, which provided discounted telecommunications services to schools and libraries (Coley et al., 1997). During his second term Clinton proposed the America's Technology Literacy Challenge, which provided $2 billion in grant money awarded over 5 years to states to provide technology training and support to teachers, to develop technology-based curriculum resources, to purchase additional computer infrastructure, and to increase Internet access (Coley et al., 1997; U.S., Office of Educational Technology, 1996). Under U.S. Secretary of Education Richard Riley, the Clinton administration presented the nation's first educational technology plan, establishing national educational technology goals, and created the Preparing Tomorrow's Teachers to Use Technology (PT3) program, which provided grant funds to support the development of technology instruction within teacher preparation programs (Coley et al., 1997; U.S. Department of Education, Office of Educational Technology, 1996). Nearly $8 billion was invested in educational technology during the Clinton administration, resulting in significant increases in the ratio of computers to students and in the percentage of public schools with Internet access (Halverson & Smith, 2009).

President George W. Bush addressed the integration of technology in the education curriculum as part of the No Child Left Behind (NCLB) Act of 2002, which focused technology efforts on improved student academic achievement. The national technology plan under the Bush administration focused on seven issues: access, data systems, digital content, e-learning and virtual schools, teacher training, budgeting, and leadership (U.S. Department of Education, Office of Educational Technology, 2004). During Bush's administration, allocation of funds for Internet access and computer infrastructure was authorized through the Enhancing Education through Technology Act of 2001 with the primary goal to "assist States and localities in the acquisition, development, interconnection, implementation, improvement, and maintenance of an effective educational technology infrastructure" (Enhancing Education Through Technology Act, 2001; U.S. Department of Education, Office of Educational Technology, 2004).

To encourage the research and development of successful educational technology initiatives, the first administration under President Barrack Obama provided funding grants under the Department of Education's Investing in Innovation Fund, proposed the coordination of federally funded conferences to bring educational technology specialists and private industry technology innovators together, continued funding for the cyber learning research conducted by the National Science Foundation, and passed the Higher Education Opportunity Act (2008), establishing the National Center for Research in Advanced Information and Digital Technologies (U.S. Department of Education, Office of Educational Technology, 2010). The National Educational Technology Plan 2010, developed during the first Obama administration, suggested that states focus on the core

elements of learning, assessment, teaching, infrastructure, and productivity (U.S. Department of Education, Office of Educational Technology, 2010). The federal plan called for: individualized and engaging instructional practices that consider what people learn, when people learn, and how people learn; technology-based formative and summative assessments to provide real data on student learning to be used for classroom and school-wide continuous improvement efforts; a connected teaching model allowing teachers opportunities to collaborate with educators and professionals around the world on developing technology-based resources to manage the learning environment; sustainable models for increasing technology infrastructure and support, including greater access to the Internet in and out of school, one-to-one Internet access devices for students and teachers, data management resource centers, and platforms for resource sharing; and the restructuring of the American school system to utilize the power of technology in improving efficiency and productivity as present in the workforce (U.S. Department of Education, Office of Educational Technology, 2010).

Workplace demands for the digital age, as perceived by the committee charged with developing the National Education Technology Plan 2010, necessitate that individuals be lifelong learners, effective problem-solvers, creative thinkers, and intelligent consumers of information (U.S. Department of Education, Office of Educational Technology, 2010). Research studies (Chen, 2008; Cradler, McNabb, Freeman, & Burchett, 2002; Culp, Honey, & Mandinach, 2003; Jonassen, Howland, Marra, & Crismond, 2008) support the belief that educational technology integration, if applied properly to the curriculum, promotes student learning and assists students in attaining the higher-order thinking, problem solving, and communication skills identified

by the National Education Goals Panel, the International Society for Technology in Education (ISTE), the State Educational Technology Directors Association (SETDA), and the Partnership for 21st Century Skills as critical for working in the 21st century. Kleiman (2004) believed that technology was capable of affecting what is taught and the manner in which teaching occurs, as well as the roles and expectations of both students and teachers. Instructional technologies such as communication tools, video, visual graphics, simulations, data analysis tools, and interactive applications were identified by Ringstaff and Kelley (2002) as instrumental in providing students with opportunities to develop critical thinking, collaboration, and problem solving skills, as well as capable of tailoring instruction to individual student's needs. Forcier and Descy (2008) found that technology can be used in team learning projects to promote collaboration among groups of students with diverse backgrounds and skills. In addition to assisting students to develop higher order thinking skills, the inclusion of technology into learning opportunities was found to increase students' motivation, self-confidence, self-esteem, attendance, and perception of their role in learning, according to a meta-analysis of research on educational computer use conducted by Ringstaff and Kelley (2002). Educational technologies have the potential to serve as a catalyst, shifting instructional practices from teacher-directed lessons towards student-centered inquiry-based learning opportunities, which require students to employ higher level thinking skills (Culp et al., 2003; Ringstaff & Kelley, 2002). Niederhauser, Lindstrom, and Strobel (2007) noticed a positive impact when technology tools were given and used by students to explore hands-on active learning scenarios within science instruction.

The educational technology movement that began in the 1950s expanded under each presidential administration in an attempt to reform the educational system to meet the demands of the 21st century. Underlying each administration's reform effort was an awareness of the technological transformations taking place throughout the world and the power of educational technology as "a source of knowledge, a medium for transmitting content, and an interactive resource furthering dialogue and creative exploration," to transform the K-12 educational system (Levin & Wadmany, 2008, p. 234). Some notable transformations have taken place. As for the desire to increase the availability of educational technology and Internet access in public schools, the nation has made progress. Wells and Lewis (2006) found consistent progress in expanding access to equipment and infrastructure in public schools from 1994 to 2005. In their 2006 publication, *Internet Access in United States Public Schools and Classrooms: 1994–2005*, Wells and Lewis (2006) found that 97% of teachers had one or more computers available in their classroom and 93% had Internet access daily. In their 2007 assessment of the status of K-12 educational technology across the nation, *Technology Counts* (2007) found that 49.5% of students had access to a computer in the classroom, and that 77% of students had access to computers in a lab or media center, with a ratio of 3.8 students per instructional computer and 3.7 students per high-speed Internet-connected computer. Key findings from a series of fast-response surveys administered to national educational representatives at the district, school, and teacher level on the availability and use of educational technology by the U.S. Department of Education's National Center for Education Statistics (NCES) from 2008 to 2009 found almost universal access to the Internet (93%) and at least one computer (97%) in classrooms (Gray, Thomas, & Lewis,

2010a). Administrators reported a variety of educational technology devices made available for instructional purposes including projectors (97%), digital cameras (93%), and interactive whiteboards (73%) and indicated a range of 5.3 to 1 as the ratio of student to computers in classrooms (Gray, Thomas, & Lewis, 2010b). Evidence of districts utilizing a district networking system (92%), planning for long-term technology replacement (67%), and housing online district resources (92%) was also noted in the researchers' key findings (Gray, Thomas, & Lewis, 2010c). The annual state technology inventory for conducted in 2010 by the GA DOE (GA DOE) Office of Technology Services (2010) reported 99% of schools with high-speed Internet access, 97% of classrooms with high-speed Internet access, and a state ratio of 2.65 students per modern instructional computer in K-12 schools. The 2012-2103 annual state technology inventory provides a more detailed accounting of the types of operating systems, types of computers, and age of the devices, reflecting an overall increase of 202,714 computers available for student instructional use (GA DOE, Office of Technology Services, 2012). Roughly 74% of these devices are less than 5 years old (GA DOE, Office of Technology Services, 2012). In the past, access to high-speed Internet and information technologies was considered the first-order barrier to integration of technology into instruction, but based on these findings access to educational technology does not appear any longer to be the primary barrier to teachers' integration of technology into classroom instructional practices in the United States, generally, or in the State of Georgia in particular (Ertmer, 2005; Gray et al., 2010a; Gray et al., 2010b; Gray et al., 2010c; GA DOE, Office of Technology Services, 2012; Wells & Lewis, 2006).

Regarding educational technology use, many of the teachers responding in the survey conducted by Gray et al. (2010a) indicated use of a variety of software for instructional or administrative purposes and reported access to their districts' data management system for grading (94%), recording attendance (93%), and viewing student assessment data (90%). Use of select features of this system by teachers was fairly high as well with 90% using it sometimes or often for grade management, 90% using it sometimes or often for attendance recording, and 75% using it for viewing student assessments (Gray et al., 2010a). Conceivably these actions have improved the efficiency and productivity of K-12 teachers. Yet, the educational community has not transformed educational uses of technology as desired to provide individualized, engaging instructional opportunities for students whereby they develop critical thinking, collaboration, and problem solving skills. As reported by teachers, use of educational technology by students was limited and differed greatly depending on the socioeconomic level of the attending students (Gray et al., 2010a). Teachers employed in schools considered to be high poverty, as determined by the percentage of students eligible for free or reduced lunch, reported greater student use of drill and practice software (83%) than word processing software (56%) or multimedia presentation software (36%). Students attending low poverty schools were reported to primarily use word processing software (66%), multimedia presentation software (47%), and drill and practice software (61%). Overall, the frequency of students' classroom use of educational technology tools for exploring hands-on, student-centered inquiry-based learning opportunities, such as contributing to blogs or wikis (17%), using social networking sites (16%), conducting experiments (50%), developing or running demonstrations/models/or simulations (40%),

and designing a product (30%), was low and reflects the need to rethink policies and plans directed at technology integration. Despite federal policies supporting the acquisition of educational technologies with the expectation that technology would transform the educational environment to prepare students for the 21st century workplace, the increased availability of technology in schools has not transformed instructional practices as hoped (Bauer & Kenton, 2005; Collins & Halverson, 2009; Cuban, 2001; Ertmer & Ottenbreit-Leftwich, 2010).

According to Keith Krueger (2010), CEO of the Consortium for School Networking, "effective leadership is essential to ensure technology is leveraged from an enterprise perspective in terms of improving and innovating learning and enabling students to become literate for the 21st century" (para. 3). Kruger (2010) advocated for technology leadership within educational systems to facilitate technology-driven learning. While serving as principal of Freeport Middle School during the Maine laptop project, Chris Toy (n.d.) re-evaluated his perspective on the impact of technology within the educational environment. According to Toy (n.d.) effective integration of technology required a shift in the way educators in his school thought about teaching and learning. Toy (n.d.) identified educational technology leadership as the main factor in determining the effectiveness of educational technology initiatives on instructional practices. Leaders provide the vision, establish the expectations, coordinate the support, communicate with stakeholders, and model the use of technology as a learning tool (Toy, n.d.). Educational technology leaders can have the greatest impact on student learning when they expand the focus of technology integration from simple access of equipment to a shared vision of

what technology integration instructional practices look like with the teaching and learning processes.

Although the title used to distinguish the individual charged with coordinating technology efforts in the educational environment varies from district to district and state to state, 51% of the 1,408 districts participating in the NCES survey reported employing a full-time individual responsible for providing educational technology leadership and 32% reported employing an individual part-time in this role (Gray et al., 2010c). This qualitative study explored what two individuals at the district level in the state of Georgia actually did to leverage technology in ways that promoted individualized and engaging instructional practices with the aim to better our understanding of how district level practices influence educational technology integration within the realms of teaching and learning and facilitate educational improvements. Specifically, (1) how do these individuals charged with coordinating district level educational technology integration think about the support and modeling of technology integration as part of their role and responsibilities and in turn serve as agents of instructional and systemic change transforming integration of technology practices in K-12 classrooms; (2) how have the personal and professional experiences of these individuals serving in this role influenced their decisions regarding educational technology integration initiatives; and (3) what are their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration?

Conceptual Framework

Simple exposure to technology does not transform into technology integration expertise and the notion that growing up in the technological age makes one technology

knowledgeable is a fallacy (Davies, 2011). Peck, Cuban, and Kirkpatrick (2003) presented a rationale for why teachers and students are not necessarily instinctively prepared to use technology in the educational setting: Technology use for social means does not translate to technology use for an academic means. Davies (2011) asserted that "students are generally enthusiastic about using educational technology, but teachers sometimes mistake technology interest for technology literacy, and activity involving technology for learning through technology" (p. 47). Collins and Halverson (2009) acknowledged incompatibility between the application of the new technologies and traditional school instruction, stating that, "schools have kept new digital technologies on the periphery of their core academic practices" (p. 6). A 2000 report by the NCES, cited by Cambre and Hawkes (2004), found minimal changes in teaching practices or student learning as a result of the inclusion of educational technology within classrooms. Cuban, Kirkpatrick, and Peck (2001) noted low levels of integration of educational technology, finding that most teachers and students infrequently use classroom computers despite the increased acquisition of educational technologies. Through interviews conducted with 21 teachers at two high schools in Silicon Valley, Cuban et al. (2001) found that self-reporting of information technology use was generally associated with administrative and communication tasks; only four teachers surveyed indicated a major change in teaching pedagogy as a result of increased access to technology. Moreover, when used, educational technology integration was often used to support existing instructional practices rather than being embraced in a transformative way (Cuban et al., 2001). Research conducted in the past 6 years continues to supports this premise. Niederhauser et al. (2007) found that teachers rarely use technology to engage students in

"experimental research projects" (p. 502) or in ways that encouraged the development of "conceptually challenging problem-solving skills" (p. 507). Levin and Wadmany (2008) found that teachers' instructional practices were often limited to applications used for direct instruction and for administrative purposes. Chen (2008) found that teachers often perceived technology integration as a means for delivering curricular content and preparing students for state mandated assessments, especially in high poverty schools. He noted that professional development opportunities for teachers often endorsed traditional approaches to technology integration (Chen, 2008). Teachers continue to use traditional teaching pedagogy rather than pedagogy involving systematic weaving of content, pedagogy, and technology to support the transformation of classroom instructional practices (Domine, 2009). Technology integration efforts often failed to support instructional practices thought to be most effective in facilitating student learning (Ertmer & Ottenbreit-Leftwich, 2010).

In their analysis of data collected during the 2001-2003 Use, Support, and Effect of Instructional Technology Study (USEiT), Miranda and Russell (2011) identified three predictors of teachers' technology integration practices actually incorporating technology into instruction: (1) teachers' experiences using technology, (2) teachers' pedagogical beliefs about the benefits of technologies in learning, and (3) teachers' perception of outside pressure requiring technology integration. Pedagogical beliefs, defined by Domine (2009, p. 57) as the "strategies or styles of teaching," proved to be one of the greatest hindrances in teachers' implementation of technology integration initiatives and initially identified by Ertmer (1999) as the second-order barrier impacting technology integration in schools, following the first-order barrier of access. Using data gathered

from the Focus on Integrated Technology: Classroom Observation Measurement instruction, Judson (2006) did not find a significant correlation between teachers' self-reported pedagogical beliefs and attitudes towards technology with their observable technology integration practices; he speculated that the discrepancy between teachers' self-reported beliefs and their practices was due in large part to teachers' limited knowledge and understanding of technology integration practices and pedagogy (Judson, 2006). Similarly, the pedagogical beliefs of the participants in Chen's (2008) case study, which were self-reported as aligned with constructivist ideology, did not actually align with their instructional practices. Chen (2008) reasoned that it was external factors, like the demands placed on teachers to meet high-stakes testing proficiency requirements and teachers' beliefs about the effectiveness of technology in helping students achieve educational goals, which contribute to technology integration practices. In their literature review of technology professional development opportunities for teachers, Lawless and Pellegrino (2007) concluded that teachers' understanding of teaching and learning pedagogy had more significant impact on technology integration practices than teachers' level of knowledge or comfort with technology software and applications. Overbay, Patterson, Vasu, and Grable (2010) also found that technology integration depended more on teachers' beliefs about the usefulness of technology in facilitating student-centered learning opportunities than other factors, such as access to computers, computer knowledge, teaching experience, and administrative support. Domine (2009) argued that consideration of teachers' philosophical and pedagogical beliefs regarding teaching, learning, and technology must be the first step in transforming educational technology integration practices. Through regular use and reflective thinking on pedagogical beliefs

about the nature of learning and instructional practices, teachers can overcome the second-order barrier that impedes educational technology integration (Becker, 2000; Bryant, 2008; Levin & Wadmany, 2008; Matzen & Edmunds, 2007; Ringstaff & Kelley, 2002; Shuldman, 2004).

While several researchers and educational organizations advocate for the systematic weaving of content, pedagogy, and technology (Davies, 2011; Domine, 2009; GA DOE, 2008; Lackney, 2005; Mishra & Koehler, 2006; Trinidad, 2003), teachers' lack of understanding of instructional design practices and the ability to determine when and how technology is best used within instruction have been newly identified as the third-order change barrier for technology integration in classrooms (Chen, 2008; Cuban et al., 2001; Ertmer & Ottenbreit-Leftwich., 2010; Palak & Walls, 2009; Tsai & Chai, 2012). Ronnkvist, Dexter, and Anderson (2000) found most teachers lacking in knowledge of instructional design methods. Gorder (2008) found that teachers used technology for productivity needs and direct instruction, but were unfamiliar with the curriculum design methodology for integrating technology effectively into teaching and learning. A focus group of new teachers described their lack of technology integration preparation within their undergraduate classes and reported the lack of even any reference by the institution to available national technology standards for teachers (Chesley & Jordan, 2012).

Altering classroom practices to reach the levels of cognitive processing associated with higher level thinking skills through technology integration requires thoughtful construction of the learning environment (Cambre & Hawkes, 2004; Creighton, 2003). In his 2007 book, entitled *The Art and Science of Teaching: A Comprehensive Framework for Effective Instruction*, Robert Marzano (2007) acknowledged the long standing notion

that effective teaching involves the combination of scientific knowledge of learning theories and content with the creative process of carefully designed instructional activities. Instructional design models provide a systematic method for constructing the learning environment in terms of desired outcomes (Reiser & Dempsey, 2002). Developed in the1970s for the U.S. Army, ADDIE, an acronym representing the five phases of instructional design approach which include analysis, design, development, implementation, and evaluation, became the roadmap for several classic instructional design model practices, such as Dick and Carey (1978), Dick, L. Carey, and J. Carey (2009), Mager (1988), Morrison, Ross, and Kemp (2001), Rossett (1990), and Smith and Ragan (2004), that seek to integrate technology effectively into instruction (Reiser & Dempsey, 2002). According to Reiser and Dempsey (2002), the value of instructional design models lies in the systematic determination of common goals, strategies, and assessments for instruction. This philosophy of instructional design has been modified in recent years to reflect the role of the learner within the process of instructional development and the realization that modern computing tools allow, even command at times, greater involvement of students and teachers in the development of instructional material (Brown & Green, 2011).

Technology has been placed in classrooms with the expectation that its presence alone would lead to integration and improved student learning (Frazier & Bailey, 2004). In reality, Larry Cuban (2001), former high school teacher, district superintendent, past president of the American Educational Research Association, and professor of education at Stanford University, found minimal changes in teaching practices or student learning as a result of the mere presence of technology in schools and suggested that computers

and telecommunications-based technology tools have been oversold and underused in educational settings. While these new technologies have appeared in the classroom in increasing numbers, they have not revolutionized classroom instructional practices in the same manner as they have revolutionized practices in the workplace and home, outside the public school setting (Collins & Halverson, 2009; U.S. Department of Education, Office of Educational Technology, 2010). The frequency of student use of technology inside schools sharply contrasts with their use outside of schools (Collins & Halverson, 2009; Technology Counts, 2007). Addressing that disparity between student use of technology outside of school and their exposure to and use of technology within the schools for student initiated learning experiences and instruction remains a key objective within the federal government's National Technology Plan 2010 (U.S. Department of Education, Office of Educational Technology, 2010). As the GA DOE K-12 Technology Plan 2007-2012 cautioned, "educational technology is not, and never will be, transformative on its own" (p. 7) According to Culp et al. (2003), stakeholders, that is: policy makers, potential employers, school administrators, teachers, parents, and students, must move beyond a singular focus on infrastructure and accessibility towards an expanded focus, which includes the examination of educational policies aimed at transforming the educational system and supporting the thoughtful construction of the learning environment to include the weaving of content, pedagogy, and technology to close the gap between the promise and the potential of educational technology.

The International Society for Technology in Education (ISTE) identified the following as necessary conditions for leveraging technology for learning: a shared vision, empowered leaders, consistent and adequate funding, equitable access, skilled personnel,

ongoing professional learning, technical support, standards for digital literacy defined within the curriculum framework, student-centered learning opportunities, ongoing assessment and evaluation of instructional practices, supportive community partnerships, and polices supporting technology integration (ISTE, 2009a). Becker (2000) recognized the coordination of these dimensions of instructional technology support as an organizational responsibility. Herbold (2010) similarly found the need to evaluate the structure of the entire educational system to predict the potential for the successful integration of educational technology within instructional practices.

School organizations, as perceived by Hodas (1993), are hierarchical in nature and have recognizable lines of power originating with the district level administrators. Acceptance or refusal of technological initiatives directly relates to the vision and values established at the district level and embraced by the entire school organization (Hodas, 1993). Berrett, Murphy, and Sullivan (2012) acknowledged the importance of a shared vision by all organizational members as a key factor for sustaining technology integration initiatives. Districts that were noted by researchers Johnson and Chrispeels (2010) in their review of literature as effective at bringing about change in instructional practices also had strong leaders, a system-wide goal, consistent implementation of the curriculum across schools, data-driven strategies for improvement, and content-driven professional development leading to the belief that it is district office personnel who serve as agents of change across the entire school system (Johnson & Chrispeels, 2010). Technology Coordinators, a district level position that emerged as technology was being introduced in the educational environment, provide a range of technical and instructional support services to district and school personnel and should, in theory, provide the type of

coordinated leadership necessary to reform instructional integration practices (Frazier & Bailey, 2004).

There are currently 181 school districts across Georgia. According to OpenGeorgia.gov (2012), local district boards of education in the state reported 180 individuals with the title Technology Director during the 2012 school year. In theory, these individuals are Georgia's technology coordinators, conceived by educational researchers as playing a critical role in leading system wide change by shifting organizational emphasis from a narrow focus on infrastructure to a broader system view of educational technology integration in K-12 schools. In practice, to what extent do these individuals at the district level coordinate the necessary conditions and the dimensions of support required to leverage technology in ways that promote student-directed learning and the development of students' higher level thinking skills? I believe that educational leadership at the district level is required to lead the type of systematic, thoughtful construction of the learning environment whereby educational technology is used in truly transformative ways. To what degree do the individuals serving in this role perceive the support and modeling of technology integration as part of their responsibility? I propose that the role, responsibilities, and beliefs of the individuals serving at the district level in the capacity of coordinator of educational technology can significantly shape the extent to which technology integration occurs in K-12 classrooms. For those who do perceive this responsibility, how do they execute district level improvement plans that develop, transform, and sustain systematic pedagogical and organizational change? I suggest that a disconnect may exist between the intended vision and the actual focus of many federal, state, and local educational initiatives and policies,

which in turn impacts the types of instructional support for integrating technology provided to teachers and the expectations for educational technology use in K-12 classrooms.

Purpose of the Study

In theory, educational technology in the form of computers, interactive boards, student response systems, and the Internet has the power to expand and enrich the educational opportunities of all students. Yet I have observed that the increased availability of technology resources in classrooms has had only marginal impact on the structure of classrooms and schools, or on teachers' instructional practices. I began teaching in the fall of 2002 in a second grade classroom equipped with three desktop computers. I was not required to participate in the InTech training program, which was created by the Georgia State Board of Education and offered through the local Educational Technology Training Center for the purpose of training teachers on instructional uses of technology, as I was enrolled in a graduate program for my Masters in Education. As a self-taught computer user, I was comfortable exploring the educational programs and resources available through purchased subscriptions and online. My lessons plans and several instructional materials were created using word-processing software. Student use, however, generally consisted of drill and practice programs and use of multimedia presentation software. The following year I applied to participate in a county initiative entitled *Technology in the Classroom*. As one of the two participants selected at my school, I received four additional desktop computers, a laptop, digital camera, scanner, projector, and interactive white board. After attending the week long training session provided by a fellow teacher, I was required to plan and post weekly

lesson plans to a county server. Throughout this period, I progressed through the stages of technology integration, as described by Sandholtz, Ringstaff, and Dwyer (1997), and found myself adapting technology into my somewhat traditional instructional methods. In 2007 I completed my Instructional Technology Education Specialist Degree through Valdosta State University, which gave me first-hand experience with online instruction, instructional design principals, cooperative learning, constructivist ideology, and selection of technology tools for instructional purposes. With this knowledge, I transitioned my classroom to incorporate more cooperative, project-based learning activities. This process overlapped with my professional transition into the role of teacher for gifted elementary students. These two experiences shaped my instructional practices and increased my interests in promoting the integration of educational technology into student-centered learning opportunities.

Over the past 10 years, I have witnessed efforts taken by the Information Systems Department of the district to provide a basic technology suite to all teachers. Greater access to instructional computers for student use, laptops for individual teacher use, and interactive boards and LCD projectors within classrooms were part of a technology initiative included within my district's technology plan. Transformations in instructional practices among select teachers have taken place, but it appears that many teachers in the schools with which I am familiar continue to employ traditional methods of instruction, which only use technologies in basic, low-level ways despite the vision created by national educational organizations and federal and state government policies. White boards, for example, are used in the limited way in which blackboards were historically used. Data management, communication, and informational media has significantly

increased with greater access to computers and the Internet, yet core changes in instructional practices in relation to how teachers teach and how students learn have not occurred.

Two years ago, I was presented with a classroom set of Netbooks for student use within my classroom. While I was pleased to have greater student access to technology and had some experience with instructional design principles for developing curriculum as part of my graduate coursework, I was overwhelmed by the dramatic change required in the design of my daily instructional lessons and activities to incorporate technology for student directed learning. It is my desire to reach the last stage of technology integration, invention, shifting instruction from teacher driven to student driven. My evolution thus far through the stages of teaching with technology have been self-driven and have had little to do with directives or desires from county or school-based leaders.

I believe that educational leaders are faced with many challenges, but perhaps the greatest is the need to comply with federal and state accountability mandates. So much emphasis has been placed on preparing students for standardized tests. This, I believe, has had a tremendous impact on district and school based improvement efforts and the level of consistent instructional support and guidance provided to school for technology integration. I also believe that the vision established at the district level for technology integration is based in part by the personal and professional experiences of the individual responsible at the district level for coordinating technology.

My experience transitioning into the role of instructional developer, my interest in educational technology, and my educational background in curriculum and instructional technology led me to seek greater understanding of the district's role in providing

technology leadership for facilitating the systemic change required to sustain and advance educational technology integration. Research studies have explored various factors that can impact the success of instructional technology integration initiatives including teacher beliefs, perceptions, and readiness (Baylor & Richie, 2002; Bingimlas, 2009; Bryant, 2008; Byrom & Bingham, 2001; Cambre & Hawkes, 2004; Chen, 2008; Cuban, 2001; Davis, Preston, & Sahin, 2009; Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Fuller, 2000; Gorder, 2008; Inan & Lowther, 2010; Judson, 2006; Levin & Wadmany, 2008; Mishra & Koehler, 2006; Palak & Walls, 2009; Tsai & Chai, 2012; Windschitl & Sahl, 2002); school support structure (Bryant, 2008; Byrom & Bingham, 2001; Davis et al., 2009; Dexter, Seashore, & Anderson, 2002; Herbold, 2010; Langran, 2006; Nguyen, 2007; Ringstaff & Kelly, 2002; Ronnkvist et al., 2000; Strudler, 1994; Tondeur, Cooper, & Newhouse, 2010); leadership (Anderson & Dexter, 2005; Berrett et al., 2012; Byrom & Bingham, 2001; Creighton, 2003; Herbold, 2010; Higgins & Russell, 2003); organizational culture (Hodas, 1993); and site-based technology support (Brown, 1998; Hearrington, 2006; Langran, 2006; Marcovitz, 1998; Moursund, 1992; Nguyen, 2007; Strudler, 1994; Whitney, 2000; Woods, 2000). Research has been conducted on the role, responsibilities, and characteristics of district level technology coordinators in a few states (Ausband, 2006; Lesisko, 2004; Lewis, 2005; Reilly, 1999; Webster, 2010) and district level technology coordinators' perceptions of barriers to technology integration (Paszkowski, 2008), but little research has been conducted on the leadership role of the district level coordinators of technology in fostering organizational change and transforming instructional integration practices (Cox-Cruey, 1998; Wagner, 2004). That is precisely the focus of this study.

Patton (2002) identified holistic thinking as a key component of the systems perspective, whereby the whole is made up of interdependent parts. Kensler, Reames, Murran, and Patrick (2011) suggested that systems thinking tools provide "a practical approach to improving evidence-based practice" (p. 36). In his explanation of the system's approach to educational reform, Hansen (1994) referenced Seymour Sarason's book, *The Predictable Failure of Educational Reform*, written in 1991. According to Sarason, the term system is reflective of the existence of parts with connections and boundaries that work in a complex relationship (Hansen, 1994). Recognition of the interrelated workings between the parts was perceived by Sarason as key to the concept of systems thinking and to accomplishing educational reform initiatives (Hansen, 1994).

Fullan (2010) identified Systems Thinking as a key factor in systemic change initiatives within educational organizations. Richmond (1994) was the first to use the term Systems Thinking dating back to his work developing the STELLA software in 1985. Richmond (1994) defined Systems Thinking as "the art and science of making reliable inferences about behavior by developing an increasingly deep understanding of underlying structure" (p. 6). Senge (1990) defined Systems Thinking as "a discipline for seeing wholes…a framework for seeing interrelationships rather than things, for seeing patterns of change rather than snapshots" (p. 68). According to Fullan (2010), the term "systems go" represents the actions when each part of the educational system aligns with a common vision and engages in the power of working collaboratively towards meeting organizational goals. Spillane (2005) found that through these collaborative interactions, leadership practice was constructed. His theory of leadership reflects the reciprocal, pooled, and coordinated interdependency that develops between members within the

educational system as they work individually and collectively to establish a shared vision of desired instructional practices (Spillane, 2005).

Lunenburg (2010) similarly recognized schools as systems and noted the degree of openness between parties within the public educational system and the environment. The educational system, consisting of classrooms, schools, and district offices, are open systems that contain the five basic elements of:

- inputs (human, financial, and physical and information resources);
- transformation process (internal operation and management of the organization);
- outputs (student achievement, teacher performance, school relations, and attendance);
- feedback (evaluation of school operation and management); and
- environment (social, political, and economic factors affection organization performance). (Lunenburg, 2010, pp. 2-3)

In the systems view, all the parts of the system are interrelated. A process occurs within the system whereby inputs are transformed into outputs. Feedback provided on the process and the final outputs influence organizational plans. Environmental factors similarly influence the system, impacting the allocation of resources, the expected outcomes, and the process by which the transformation is to be performed. This conceptual theory of systems was proposed by Lunenburg (2010) to be particularly effective for analyzing and exploring processes within educational organizations.

Selection of a research approach involves recognition of the beliefs, values, and experiences of the researcher. Maxwell (2005) referred to this concept as the researcher's

worldview or paradigm and characterized it as the glue that typically ties goals, theories, research questions, methods, and validity threats together. Guba and Lincoln (1994) formulated three fundamental questions to be used by researchers in defining their inquiry paradigms:

> (1) The ontological question- What is the form and nature of reality and, therefore, what is there that can be known about it?
>
> (2) The epistemological question- What is the nature of the relationship between the knower or would-be knower and what can be known?
>
> (3) The methodological question- How can the inquirer (would be knower) go about finding out whatever he or she believes can be known? (p. 109)

I believe that coordinators of technology at the district level construct their own reality of the transformation process based on their beliefs and personal and professional experiences. Through exploration of these realities we can begin to understand the role of educational technology leadership on organizational change and technology integration practices in K-12 classrooms. Since multiple realities exist and are constantly transforming, it was necessary to identify the specific and shared elements maintained by individuals serving in the position of coordinators of technology. To understand the reality of what technology coordinators experience as educational technology leaders and their perception of this responsibility, I had to connect myself to the participants and construct my findings through the investigative process. The findings had to be subjective in nature based on my interpretation of the data. Out of the four paradigms presented by Guba and Lincoln (1994), constructivism was the most suitable research paradigm to guide the design of this study. As Guba and Lincoln (1994) contend:

> Knowledge accumulates only in a relative sense through the formation of ever more informed and sophisticated constructions via the hermeneutical/dialectical process, as varying constructions are brought into juxtaposition. One important mechanism for transfer of knowledge from one setting to another is the provision of vicarious experience, often supplied by case study reports. (p. 114)

I wanted to discover how district level coordinators of technology help administrators and teachers rethink technology integration, instructional practices, and student learning. I wanted to understand how their beliefs and personal and professional experiences shaped their actions in fostering organizational change and transforming instructional practices. A deeper understanding of individuals serving in this role and their perceptions of conditions that facilitate or impede the process could provide insight into the current reality and the realistic prospect of educational technology integration. My hope was that information gathered from this study could be used to inform educational policy at the state and local level and serve as a resource to district level administrators who seek methods for utilizing technology in ways that revolutionize education.

Limitations of the Study

Case study was selected as the most appropriate research design to explore the background, behaviors, and perceptions of individuals selected to fulfill the role of district level coordinator of educational technology. This method of exploring a bounded system places the researcher in the role as the primary instrument of data collection, which was a limitation for me given my current position of employment. As a teacher, I am limited to three personal days a year and have a similar holiday schedule as other

school systems in the state. These factors limited my ability to use additional qualitative data collection methods beyond interviewing, document analysis, and field notes. Due to geographical and time constraints, participant selection was limited to individuals employed in nearby counties and the number of interviews per participant was limited to three. Document analysis was limited to the documents provided by the participants or available online. While this method provided an insightful portrayal of the leadership role taken by the two selected participants, generalizability of the findings to the larger population of individuals serving in this field is not possible, nor is it possible to make causal conclusions regarding the relationship between the participant's backgrounds and their leadership behaviors. As the sole researcher and primary instrument of data collection and analysis in this study, my limited training in interviewing and observation techniques may have restricted the participants' responses during the interviews. Lastly, my personal subjectivity on the topic may be perceived as a hindrance both to the collection and the analysis of data.

Chapter II

REVIEW OF LITERATURE

Introduction

The focus of this dissertation was to examine the professional and educational backgrounds of district level coordinators of educational technology, their leadership actions for transforming instructional educational technology integration practices, and their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration. This chapter provides a review of literature on what is known about educational technology, its integration into instructional practices, the responsibilities and expectations associated with the position of coordinator of technology, and the support system the district level coordinator of technology establishes within their district for transforming technology instructional practices within K-12 classrooms.

The first section of this chapter, Historical Framework of Technology in Education, provides an understanding of the historical framework in which educational technology has developed and is delivered in the United States. Over the decades, the concept of technology, educational technology, and instructional technology have been regularly revisited by theorists, practitioners, institutions, and organizations, many of which subscribe to varied definitions and perspectives of educational technology. Exploring the fluctuating view of educational technology and instructional technology,

the paradigm shift from a field focused on media to one of practice, and the evolving understanding of the affiliation of instructional design with communication, information processing, and learning theories helps explain why many K-12 educators are confused about how well they are actually integrating technology.

Section two of the literature review, Forces Shaping Curriculum, investigates the federal, state, and local policies and outcomes driving daily instructional practices in K-12 classrooms. Stakeholders at the district and school level face increased pressure to improve student achievement and adhere to yearly federal accountability requirements. Tracing the involvement of the federal government in educational policies and the subsequent drive towards national educational standards, particularly technology standards, sheds light on the additional factors influencing school organizational culture, the vision of educational technology within a district, and the allocation of support resources for facilitating technology integration.

The third section, Evolution of the Definition of Educational Technology, and the fourth section, Framework for the Integration of Educational Technology in K-12 classrooms, explore the complexities of defining the term, formulating educational technology standards, and planning for educational technology within K-12 classrooms in the State of Georgia. Learning *from*, *about,* and *through* technology are different concepts, each containing a range of integration practices whereby technology can be used as a tool. Understanding the varied functions of educational technology and expectations for integration is vital to this research.

Transforming Educational Systems within a Systems View of Educational Technology, section five, considers a systems definition of educational technology in

order to understand the divide between the promises of technology infused learning and the reality in Georgia's K-12 public education system.

The final component of the literature review, the District Technology Coordinator, explores the role and responsibilities of individuals serving in the field, research on the duties and support they provide to schools and teachers, and the leadership characteristics undertaken at the district level that shape educational technology practices.

Historical Framework of Technology in Education

The need for productivity and efficiency has driven technological developments since the formation of early civilizations. Dating back throughout the agricultural, preindustrial, and pre-modern periods of Western history, there has been a desire to locate, access, and share knowledge (Gilton, n.d.). Derived from the Greek form *techne* meaning craft, technology is generally defined as "the practical application of knowledge especially in a particular area" (Technology, n.d.). Historically, the function of educational technology was considered to be a communication process whereby bodies of knowledge were transmitted in oral and written form (Saettler, 2004). The printing press, textbooks, and the establishment of the public school system, were collectively noted by Hackbarth (1996) as important antecedents in educational technology, fulfilling the need to share knowledge through the diffusion of information.

While the invention of the printing press made the dissemination of knowledge to greater numbers of people possible, American schooling was originally grounded in the apprenticeship system: knowledge and skill was transferred by the apprentice watching and increasingly doing tasks under supervision of the master. Only the wealthy could hire

tutors or attend private colleges for more generalized studies in the liberal arts. Prior to the Industrial Revolution, families had complete responsibility for the education of their children, often sending them to "independent one-room school houses" established by residents within a town or parish (Collins & Halverson, 2009, p. 56). Teachers were autonomous and customized instruction to meet the needs of the child and the community, which employed them (Collins & Halverson, 2009).

The Industrial Revolution in the 19th century brought about a dramatic increase in urban and immigrant populations, factories, and the social reformation movement which provided the impetus for universal schooling (Collins & Halverson, 2009). In the mid-1800s, population growth in cities created greater bureaucratization of schooling, which led to graded schools, established academic subjects, and standardized measurements of student learning (Collins & Halverson, 2009). Horace Mann, a leader of the universal schooling movement, recognized the need for an educated populace and considered a free, public, universal educational system critical to assimilating citizens and immigrants to common democratic beliefs and societal expectations (Mann, 1848). In 1867, the federal government created a Department of Education to collect data on schools and support public education, which remained governed by each of the States, often administered through local school boards (U.S. Department of Education, 2012). That department was downgraded to an office only one year later. From the mid-nineteenth century to the early twentieth century, Mann's vision of educating the masses prevailed, resulting in a shift of responsibility for education from families to the states and the movement towards increasing standardization, which mirrored the scientific methods of industrial engineering increasingly used in business and industry of that day. Schools

stressed core competencies in reading, writing, and arithmetic as required knowledge for all citizens (Collins & Halverson, 2009). Compulsory attendance policies and manufactured textbooks further standardized and industrialized the K-12 public school, the structure and appearance of which has changed little in the past 90 years (Collins & Halverson, 2009).

During the same period of time in which the public education system developed, the science of teaching and learning evolved. In the early 1900s, two fields of educational inquiry emerged: (1) the systematic development of curriculum and (2) the science of cognitive learning. In the early 1900s, Franklin Bobbitt, a theorist who called for use of scientific techniques in educational design, and his successor, Ralph Tyler, who focused on the needs of the learners and societal values, in addition to the content, as important components of curriculum design, both promoted standardization through the development of specific educational objectives (Hlebowitsh, 2005). Programmed curriculum, the formulation of specific educational objectives to change an individual's behavior, embodied the vision of the Social Efficiency curriculum ideology developed by Bobbitt. This ideology found its psychological base in the works of behavioral theorists John B. Watson, Edward L. Thorndike, and B. F. Skinner (Schiro, 2008). Watson, considered the father of behavioral psychology, theorized that environmental stimuli shaped individuals' learning (Saettler, 2004). Thorndike extended Watson's theory and formulated three laws of learning, which he considered the foundation of the technology of instruction: (1) the law of exercise or repetition, (2) the law of effect, and (3) the law of readiness (Saettler, 2004). Using repetition, along with conditioning through responses, Thorndike applied his knowledge of human cognitive and physical

development in a systematic design of instruction and thereby established a leading scientific learning theory, which influenced future psychologist B. F. Skinner (Saettler, 2004). These scientists explained human behavior as a product of the interaction between external physical stimuli and response, a concept referred to as associative learning (Graham, 2000). According to this psychological theory, the process of linking together ideas and experiences through association provides individuals a way to make sense of their world (Graham, 2000).

The combination of Thorndike's formulated behavioral theory of learning, technological advances in radio and motion pictures, and the need to efficiently train large numbers of adults for specific jobs in a short time period generated an audiovisual instruction movement. The new technologies of audio recordings and film provided the means to train masses of United States soldiers for World War II and civilians for industrial war-related work (Reiser & Dempsey, 2002). Using Thorndike's programmed approach to instruction, researchers for the Department of Visual Aids for War Training developed audiovisual training films, equipment for instruction in foreign language, and flight simulators (Reiser & Dempsey, 2002). While never formally researched and analyzed, the audiovisual training materials were deemed so successful in training large groups of individuals with varied educational backgrounds that it led to an increased interest in using these forms of media in the educational setting (Reiser & Dempsey, 2002). By the 1950s, the perceived success of audiovisual materials, based on the use of Thorndike's behavioral approach, led to the production and integration of such media within teaching materials for application in K-12 educational systems (Molenda, 2003).

In his work, *The Science of Learning and the Art of Teaching*, Skinner (1954) extended Thorndike's theories on behavioral conditioning to student learning in the discipline of math. Skinner challenged the ability of universal schools to efficiently and effectively teach subjects, like arithmetic, which require repeated drill and practice and ongoing reinforcement. The lack of automatic reinforcements in school classrooms led Skinner to apply his theory of operant conditioning, which focused on immediate feedback following a learner's response, in his development of a "teaching machine," a mechanical device used to teach students math content in a structured, specifically programmed manner (Hackbarth, 1996). Skinner's boxlike mechanical device utilized a set of programmed sequences to present the student with questions requiring composed responses and then provided the student with immediate feedback. The device also employed prompting and fading techniques to help the student arrive at the correct response. Skinner suggested that mechanical devices provided the automatic, immediate, positive reinforcement required to effectuate the learning process and could be used to supplement teacher initiated instruction, as well as to provide additional individualized instruction (Skinner, 1954; Skinner, 1958). In his article, *Teaching Machines,* Skinner (1958) compared his device to a private tutor, in that: there would be a constant interchange between the student and the mechanical device; the student would be required to master content before progressing to new material; the material would be presented in an appropriate, sequenced format; the student would be appropriately and constantly prompted to determine the correct answer; and the student would be provided immediate feedback, which would maintain the student's interest. Skinner (1958) argued that ultimately the success of any technology tool or mechanical machine on learning

would hinge on the process of systematically programming and sequencing the content of the material to be taught. Skinner not only recognized the value of individual technology for cognitive learning and the use of audio visual media to support communication of content, but went beyond that. He predicted that such tools had the capability of changing the role of the teacher and allowing students greater opportunities to learn independently, at an individually controlled pace, and in a variety of educational settings (Hackbarth, 1996).

Influenced by the developing science of cognitive learning, leaders within the audiovisual field became interested in exploring theories of communication of specific content (Reiser & Dempsey, 2002). Early communication theories, developed in the early 1950s by Claude Shannon and Wilbur Schramm, had been focused on the process of sending information to a receiver through a variety of media (Hackbarth, 1996; Reiser & Dempsey, 2002). By the 1960s, people in the audio visual field began to consider and address each one of the elements within a communication process: the receiver, as well as the sender, and the medium being used (Hackbarth, 1996).

Behavioral learning theories based on cognitive learning research and communication theories continued to influence the development, design, and use of educational instructional media for K-12 education throughout the mid-1950s to mid-1960s (Reiser & Dempsey, 2002). The theory of cognitive development, further advanced by developmental psychologist Jean Piaget, also began affecting instructional design. Piaget asserted that children use the processes of assimilation and accommodation to connect prior knowledge with new information. He described four developmental stages

that provide a roadmap for understanding how children cultivate and incorporate new knowledge into existing knowledge (Coon & Mitterer, 2010).

In the late 1950s and early 1960s, the K-12 public education community began to integrate the technology available at that time (printed word, audio, and visual) into creation of a new standard educational curriculum for children, with an increasing recognition of child development theories. In 1956, Benjamin Bloom published the *Taxonomy of Educational Objectives,* which incorporated the knowledge of cognitive, psychomotor, and affective learning domains and the further systemization of curriculum (Reiser & Dempsey, 2002). In 1962, Robert Mager published *Preparing Objectives for Programmed Instruction,* which promoted development of instructional materials that identified desired behaviors, learning conditions, and criteria for mastery (Reiser & Dempsey, 2002). Collectively these popular books supported behavioral objectives and the systems approach to instructional design (Reiser & Dempsey, 2002).

By the early 1960s, there was a system engineering approach to curriculum development, which drew upon knowledge of communication processing, behavioral psychology, and cognitive development. *The Changing Role of the Audiovisual Process in Education*: *A Definition and a Glossary of Related Terms* published in 1963 by Donald Ely, president of the Department of Audio-Visual Instruction, then a division of the National Education Association (NEA), identified audiovisual communication as one element of education, in this description:

> Audiovisual communications is the branch of educational theory and practice concerned with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and

> weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any reason; and (b) the structuring and systematizing of messages by men and instruments in an educational environment. These undertakings include planning, production, selection, management, and utilization of both components and entire instructional systems. Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of the learners' full potential. (Ely, 1963, pp. 18-19)

Robert Gagné, a behavioral psychologist, similarly combined focus on communication and learning theory. Gagné produced an instructional design model that addressed the conditions for learning based on communication and information processing, which he presented in *The Conditions of Learning,* published in 1965 (Reiser & Dempsey, 2002). Gagné's systematic consideration of the delivery and communication system, as well as the instructional technique, in his description of the domains of learning, events of instruction, and process of task analysis, remain the foundation of many instructional design models (Reiser & Dempsey, 2002, Chapter 3).

Throughout the 1970s and 1980s, psychologists and instructional designers continued to explore the communication theories and the internal processes taking place within a learner and its importance to the process of learning, shifting the focus from inputs and outputs to how learners process, store, and retrieve information (Reiser & Dempsey, 2002). The period experienced a growth in systems design models for developing instruction, many of which were utilized by businesses and organizations, including the U.S. Army, to improve adult training programs (Reiser, 2001). By the

1980s, increasing interest in instructional design practices for instructional purposes emerged in connection with microcomputers (Reiser, 2001). Instructional design practices were changing as a result of the emphasis placed on "front-end analysis, on-the-job performance, business results, and non-instructional solutions to performance problems" and an increased interest in constructivism theory (Reiser, 2001, p. 62). Defined by Walker (2002) as "the theory of learners constructing meaning based upon their previous knowledge, beliefs, and experiences, and their application to schools," constructivist views of learning impacted the field of instructional design by emphasizing the role of the learner in solving authentic problems and assessing their own learning (p. 1). The notion of placing the learner in charge of instructional activities also redirected some instructional designers' focus from designing training materials for face-to-face instruction to designing electronic performance support systems (Reiser, 2001). Computer-based instruction systems, a type of electronic performance support system, presented instructional material and problem-solving activities customized for specific audiences (Reiser, 2001). This trend towards automated learning opportunities allowing for learner engagement in problem-solving scenarios, such as simulations, was seen most commonly in business in industry organizations. Only limited instructional design practices were then being utilized by teachers in K-12 schools (Reiser, 2001). Computer-based learning systems developed and used most frequently in schools during the 1980s and 1990s tended to include drill and practice software and tutorial software, both of which provided individualized instruction with pace adjustment, coaching, and specific feedback on performance (Marshall, 2002). Aligned with a student's knowledge level, the systems allowed a student to progress through instruction at their own pace without direct

intervention or assistance from a teacher (Marshall, 2002). While recognized for the ability to increase student achievement, these types of computer applications, which are still the type predominately used in schools today, provided limited recognition of the possibilities for developing students' higher order thinking skills within a technology-based learning environment (Cotton, 2000; Trinidad, 2003). According to Trinidad (2003), technology-based learning environments allow learners to take an active role in the learning process, develop a sense of purpose within learners, and encourage learners to construct knowledge within a collaborative learning community. In such a system, technology serves as the "vehicle for communication and collaboration, and the framework that mediates learning takes place between educators, peers, and the wider community, to produce and solve authentic tasks, projects or investigations" (Trinidad, 2003, p. 106).

Interaction, as offered through technology-based learning environments, is one piece of the next frontier available for educating students (Collins & Halverson, 2009). As a result of computer technology and the Internet, the learning environment is no longer limited by time and space. Information is no longer limited. Teachers can have greater responsibility for constructing instructional opportunities that harness the power of new technologies to facilitate learning in meaningful ways for each student (Marshall, 2002). According to technology enthusiasts, opportunities for interaction, just-in-time learning, customization, scaffolding, and learner control within the educational environment, utilize knowledge of how humans communicate and learn to provide highly engaging individualized learning experiences for all students (Collins & Halverson, 2009). Interaction can be situated within a technology-rich environment where computers

model the pedagogical practices of the apprenticeship system: students are involved in individualized tasks; the computer offers coaching, guidance, and feedback; and groups of interested individuals around the world can provide advice, support, and feedback (Collins & Halverson, 2009). Collins and Halverson (2009) presented this vision for the current era as one where the fields of communication theory, learning theory, and instructional design are woven together through the use of new technologies and as having the potential to truly allow individuals greater control over the content, methods, and means by which learning takes place.

The Forces Shaping Curriculum

While occasionally given opportunities to select the content and the methods of instruction, students generally have limited control over instructional decisions within the current educational structure in the United States. Curriculum, that is the content and processes of what is taught in public schools, is influenced by several powerful forces: federal, state, and local government; education commissions and committees; professional organizations; special interest groups; textbook publishers, colleges, and universities; parents; and school administrators and teachers (Sadker & Zittleman, 2010). Together, these social and political stakeholders place ongoing pressure on schools to perpetually revise and rethink what students should be learning in K-12 schools.

According to the U.S. Department of Education, the America's decentralized education system, consisting of the federal, state, district, and school organizational levels, is "based upon our federal Constitution, which reserves power over education to the states and local authorities" (U.S. Department of Education, International Affairs Office, 2008a, para. 1). Schools adhere to the educational laws and regulations

constructed at the federal, state, and district level, as well as specific rules and policies adopted within each individual school (U.S. Department of Education, International Affairs Office, 2008a). Direct oversight for policies, curricula, and standards are controlled by individual states (U.S. Department of Education, International Affairs Office, 2008b). States are also responsible for providing guidance and support to district boards of education. As the core of the educational system, locally elected school boards at the district level direct school policies involving operations, budgets, personnel, and curricula (U.S. Department of Education, International Affairs Office, 2008b). According to the U.S. Census Bureau (2012), there are more than 14,000 public school districts in the United States, providing educational services to roughly 55.5 million students across the nation's 98,706 public schools.

Other than providing "research, resources, and some guidance," the federal government had little influence or impact on K-12 public education until after World War II (Cross, n.d., para. 1). Since then, the role of the federal government has expanded from a minor player to a major force in establishing educational policies and directives, "shaped by a series of events and factors that can be grouped into several general categories, particularly; (1) national security and defense, (2) international economic competitiveness, (3) civil rights, (4) religion, and (5) the War on Poverty" (Cross, n.d., para. 2). The States Impact on Federal Education Policy Project published a brief synopsis on the role of federal education policy on state education from 1945 through 2009, noting the following mechanisms driving federal education policy: states as models, failures, and advocates; congressional initiatives; state responses to federal policy and state-federal negotiations; and personnel shifts (States' Impact on Federal

Education Policy Project, 2009). Within their political snapshots, the contributors to the project reflect their belief that "federal policy often follows state/local action" (States' Impact on Federal Education Policy Project, 2009, p. 7).

In 1965, President Lyndon B. Johnson signed the Elementary and Secondary Education Act of 1965 (ESEA), which provided federal financial assistance through its Title I program to schools serving disadvantaged populations (Hana, 2005, para1). The ESEA, which was considered to be the federal government's "first general foray into public K-12 education," also provided funds for professional development, language instruction for students with limited English proficiencies, impact aid for eligible federally connected children, school libraries, and state boards of education (Hana, 2005, para. 1). However, Section 604 of the ESEA specifically prohibited federal control over the curriculum or program of instruction (Hana, 2005).

During the Clinton administration, the reauthorized ESEA focused reform efforts on the creation of state standards to provide a means of monitoring progress towards specified goals (Hana, 2005). Again, the federal government placed responsibility for the setting of standards with each individual state (Hana, 2005). Throughout the late 1980s and into the 1990s, several national educational organizations published curricula standards, outlining the material to be taught in their respective subject areas. These voluntary standards, such as those created by the National Council of Teachers of Mathematics, the National Science Education, and University of California, Los Angeles's National Center for History in the Schools were adopted and modified by several states in the development of that state's curriculum standards (Nerison-Low & Ashwill, 1999).

A further shift from local control to state and national control occurred with the adoption of the No Child Left Behind Act (NCLB) of 2001, which, for the first time, provided for federal corrective action against individual public schools for failing to adequately meet the school's annual progress goal towards state mandated objectives (Jefferson-Jenkins & Hill, 2011). NCLB, which reauthorized the 1965 ESEA legislation, required states "develop and implement 'challenging' academic standards in reading and math, set annual statewide progress objectives to ensure that all groups of students reach proficiency within 12 years, and then test children annually in grades 3 through 8, in reading and math, to measure their progress" ("The new rules," 2002). NCLB has had tremendous impact on K-12 classrooms, revealing the extent to which the federal government now influences school policies and organizational practices (States' Impact on Federal Education Policy Project, 2009).

As with ESEA, NCLB prohibited a federally mandated curriculum. Concern over the lack of uniformity in state standards and inequalities in student proficiency on state administered assessments across the United States led the National Governors Association Center for Best Practices (NGA) and the Council of Chief State School Officers (CCSSO) to initiate a collaborative project to develop clearly defined educational standards for K-12 students for consideration and adoption by individual states. In June of 2010, these groups released sets of education standards, known as the Common Core State Standards, in English Language Arts and mathematics for grades K-12. Common Core State Standards establish the core competencies all students should have upon graduation from high school to be successful in higher education programs and within the workforce (National Governors Association Center for Best Practices &

Council of Chief State School Officers, 2010a). Adopted by 45 states, the Common Core State Standards now provide a uniform framework of grade-specific goals to be used by local district boards of education, schools, and teachers in their development of curriculum. Alaska, Nebraska, Texas, and Virginia chose not to adopt the Common Core State Standards. Minnesota adopted the English language arts and literacy standards, but not the math standards. Three of the states that rejected the adoption of the Common Core State Standards, Alaska, Texas, and Virginia, found the fiscal costs of implementing the initiative too great and preferred to continue their investment in their own state standards. Texas Governor Rick Perry shared his concerns regarding the initiative with U.S. Education Secretary Arne Duncan in a 2010 letter: "I will not commit Texas taxpayers to unfunded federal obligations or to the adoption of unproven, cost-prohibitive national standards and tests" (Burke, 2010, para. 5).

Use of technology is regarded as a key component of students' college and career readiness as set out in the descriptors of the Common Core State Standards for English Language Arts & Literary in History/Social Studies, and Science and Technical Subjects (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010b):

> Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals. (p. 7)

The Standards for Mathematics also emphasized students' ability to use technology strategically to visualize models; draw geometric shapes; interpret technology generated scientific notation; utilize technology for numerical matrices, graph equations, and inequalities; analyze statistics; and create mathematical models (National Governors Association Center for Best Practices & Council of Chief State School Officers, n.d.).

Technological proficiency is embedded within the Common Core State Standards with the expectation that educational technology will be integrated using instructional design principals into daily instructional practices, changing the content, process, and product of student learning. Leadership for the creation of the Common Core State Standards Initiatives remains with the National Governor's Association (NGA) and Council of Chief State School Officers (CCSSO), adoption of the standards is up to each state, but implementation of the standards resides in the hand of the district, the school, and classroom teachers. As instructional leaders, it is ultimately district and school administrators and teachers who must interpret the Common Core State Standards and design instructional lessons aligning teaching of the standards with school and district performance goals.

While most states have adopted Common Core State Standards, some educators and technology enthusiasts question the likelihood that technological transformations can occur while the focus of schools remain on teaching set standards and increasing pass rates on minimum competency tests (Carroll, 2000; Collins & Halverson, 2009; Richardson, 2012a). Education, according to Carroll (2000), must move away from "standard, one-size-fits curriculum to mass customization," a concept that allows for individualized, custom-made learning (para. 77). Will Richardson (2012b), author of *Why*

School? How Education Must Change When Learning and Information Are Everywhere, suggested that the traditional view of curriculum with specified standards and outcomes fails to embrace the truly transformative power of educational technology to reach students' individual needs and interests. According to a Dr. Saye, a professor of secondary social science education at Auburn University, the push towards holding teachers, schools, and districts accountable for students' mastery of set standards, as measured on state standardized tests, undermines efforts to develop students' higher-order thinking skills and the financial investment in technology (Intel Corporation, 2008).

Evolution of the Definition of Educational Technology

Accomplishing the task of incorporating technology requires an understanding of what integration of educational technology means in the K-12 context. The terms educational technology, instructional technology, information technology, and technology literacy attempt to make a connection between computers and education. The terms do not distinguish the four alternative attributes of technology integration: as a data management and accountability tool (National Forum on Education Statistics, 2003; U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, 2007), as an information and media communication tool (Levin & Wadmany, 2008; National Forum on Education Statistics, 2003), as a tool for developing computer literacy skills necessary to be productive in the 21st century workplace (International Society for Technology in Education, 2007; Niederhauser et al., 2007; National Forum on Education Statistics, 2003), and as a tool to provide student-centered instructional opportunities (Collins & Halverson, 2009; International Society for Technology in Education, 2007). The first attribute of technology integration is primarily used by teachers to in the

preparation of instructional material. Three of the four attributes of technology integration have distinct connotations within instructional use and can be identified and distinguished as: learning *with* technology (using technology for instructional delivery of traditional curriculum and student practice), learning *about* technology (familiarity with computers and basic communication and productivity software), and learning *through* technology (incorporating technology into self-selected, self-paced, project-based learning opportunities whereby users obtain content from a vast database of technological resources and use critical thinking skills to manage, analyze, synthesize, and evaluate information), each of which are vastly different and bring into question whether there is a shared understanding of the meaning of "technology integration" in K-12 education.

Before general access to computer technology, even before proliferation of individual computer workstations, President Richard Nixon's 1970 Commission on Instructional Technology, in their report, *To Improve Learning. A Report to the President and the Congress of the United States*, recognized the vast potential for the complex relationship between computers, information processing, instructional programming, and learning theories (Gentry, 1987; Saettler, 2004). In a prescient view of the future availability of personal computing technology and the Internet, the Commission defined instructional technology as "a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction" (Earle, 2002, p. 6).

Independently, within the educational community, the definition of educational technology was evolving. The Department of Audio-Visual Instruction, a component of

the National Education Association (NEA), was reorganized into an independent organization, the Association of Educational Communications and Technology (AECT) in 1970 (2001). In 1972, AECT produced their initial definition of educational technology, "Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organization and utilization of a full range of learning resources and the management of these processes" (AECT, 1972). The focus of this definition reflected the emphasis on content and access to information. Echoing the organization's membership at that time, the integration of educational technology was understood to be management of new forms of content; the responsibility for overseeing and supervising integration of audio and visual content was therefore often delegated to librarians, who historically had been managers of content.

In 1977, the AECT obfuscated the meaning by defining educational technology as "a complex, integrated process, involving people, procedures, ideas, devices and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning," ("In the 20th Century: A Brief History," 2001, Definitions Revisited section, para. 5). In that definition, instructional technology was regarded as simply one component of a larger field of educational technology ("In the 20th Century: A Brief History," 2001). Application of a systems view or approach is apparent in this definition (Luppicini, 2005).

From 1980 through the early 1990s, computer technology and Internet connectivity exploded in a digital revolution. Word processing, database management, presentation, and spreadsheet programs were created and disseminated in government,

private industry, and educational establishments for management, data collection and analysis, and communication. In 1994, the AECT again redefined instructional technology, now as the "theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning," (Seels & Richey, 1994, p. 1).

By 2003, it became clear that there was a dichotomy in the understanding of the definition of educational technology in the educational community (Molenda, 2003). The school community understood integration of educational technology as a matter of hardware, data management, access to informational material on the Internet, and digital communication. This is best illustrated by the definition of technology integration proposed by the United States Department of Education's NCES in 2003:

> Technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods. (p. 75)

In contrast, the definition of educational technology in the field of instructional design focused on the design of educational curriculum integrating computer capabilities within the learning process. In 2008, Januszewski and Molenda published their definition, which was sponsored and adopted by the AECT: "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using,

and managing appropriate technological processes and resources" (Association for Educational Communications and Technology, 2008, p. 1). Hlynka and Jacobsen (2009) identified four distinct components within their further elucidation of that definition: (1) the field is one of practice; (2) the emphasis is on performance; (3) the convergence of technologies allow the end user power over the tasks of creating, using, and managing; and (4) the focus is learning verses technological processes.

Luppicini (2005) theorized two reasons for the challenge of formulating a viable definition of educational technology: (1) as an applied field, no single theoretical base guides the discipline, and (2) varying notions of technology as either a product or a process exist. Different understandings of the meaning of educational technology have led to increased confusion about what it means to integrate educational technology into K-12 education. Given the challenges faced in the field for defining the term *educational technology*, it is no wonder that members of the educational community are often confused about what technology integration is and what it is meant to accomplish. To some, integration of educational technology means system and data management. To others, it essentially means greater access to information on the Web and faster avenues of communication by e-mail and in digital forums. To some, it means explicit teaching of computer literacy skills; to others, it means inclusion of technology in ways that transform instructional practices from teacher directed to student driven learning opportunities.

Framework for the Integration of Educational Technology in K-12 Classrooms

Standards for Educational Technology Integration. In an attempt to formulate a common understanding, which incorporates the four potential functions of technology

integration, the International Society for Technology in Education (ISTE) began formulating standards for integration of computer technology into the K-12 educational system. Thought by Niederhauser et al. (2007) to be grounded in the "reform-oriented technology integration policies" of the late 1990s, the National Educational Technology Standards (NETS) were intended to create a framework to guide and evaluate the use of educational technology in learning, teaching, and leadership practices (p. 484). From 1998 to 2002, the ISTE released NETS standards, initially for students, then for teachers, administrators, and thereafter for coaches, with the recognition that each of these components within the educational system was an essential link for the effective integration of technology into K-12 education.

ISTE NETS for Students (NETS-S) originally published in 1998 and later revised in 2007, addressed the following six areas: (1) creativity and innovation; (2) communication and collaboration; (3) research and information fluency; (4) critical thinking, problem-solving, and decision making; (5) digital citizenship; and (6) technology operations and concepts (International Society for Technology in Education, 2007). Built on instructional ideals of learning as an active process, NETS-S reflected the ISTE's view of technology integration as a way for students to prepare themselves for the productivity and collaboration needs of an ever changing world (Niederhauser et al., 2007). In the NETS-S, the ISTE placed emphasis on computer literacy skills and productivity, rather than defining any particular curriculum involving the use of technology. This is consistent with the reality that students have little influence on how they are taught, and student standards should instead address what students need to learn.

Many states established technology standards for students often based on the ISTE NETS (Technology Counts, 2007).

Released originally in 2000 and later revised in 2008, NETS for Teachers (NETS-T), expanded the role of teachers as designers of technology-enriched educational experiences, as role models of digital age work and digital citizenship, and as leaders in school-based reform efforts for educational technology integration (International Society for Technology in Education, 2008). Within the NETS-T, the ISTE established lifelong learning for students and teachers alike as an indicator of effective teaching in the digital age. Expressly stated within the standards for teachers is the expectation that teachers must infuse not only knowledge of content, but learning processes and technology in the design of innovative face-to-face and computer-generated classroom experiences (ISTE, 2008). There is an implication that teachers will serve as instructional designers and be responsible for developing instructional practices that encourage learning *through* technology, as well as learning *with* technology.

In ISTE-A, the standards for administrators, the ISTE requires visionary leadership, systemic improvement, digital citizenship, digital age learning, and professional practice as required proficiencies for administrators, who are charged with *transforming* the educational system (ISTE, 2009b). According to Anderson and Dexter (2005), the NETS for Administrators (NETS-A) emphasizes the need for strong leadership in gathering stakeholders to assist in the development and implementation of a shared vision of educational technology integration and instructional practices supportive of individual and critical thinking and collaborative learning opportunities. The ISTE identified such a shared vision of educational technology as an essential condition of

NETS-A, clearly placing the responsibility for transformation of the educational environment for the anytime learning associated with the digital age on administrators (ISTE, 2009b).

In 2011, the ISTE released NETS for Coaches (NETS-C) reflecting their belief that guidance and support from educational coaches will be instrumental to teachers' effective implementation of the NETS for teachers (ISTE, 2011). The standards presented in NETS-C identify coaches as: visionary leaders and advocates of technology innovations; mentors for effective use of technology for teaching, learning, and assessing student knowledge; troubleshooters for basic hardware and software problems; and evaluators of technology-related professional development needs. NETS-C standards are applicable to individuals serving in any support capacity assisting teachers in their educational technology integration efforts, regardless of job title (ISTE, 2011).

While the ISTE does not explicitly structure each of the NETS documents into the four senses of technology integration, from the initial NETS for students, which recognized the "skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world," to the most recently adopted NETS for coaches, which recognizes the "skills and knowledge technology coaches need to support peers in becoming digital educators," there is increasing inclusion of integration of technology into instructional practices in ways that create learner centered experiences and transform the school environment for what is intended to be life-long learning. Attached to each set of NETS standards in the NETS family are the following "necessary conditions to effectively leverage technology for learning:" (1) a shared vision, (2) empowered leaders, (3) implementation planning, (4) consistent and adequate

funding, (5) equitable access, (6) ongoing professional learning, (7) technical support, (8) curriculum framework, (9) student-centered learning, (10) assessment and evaluation, (11) engaged communities, (12) support policies, and (12) supportive external context (ISTE, 2009a).

Planning for the Integration of Educational Technology in the State of Georgia. In October of 1994, the Georgia Department of Education (GA DOE) Division of Instructional Technology published *Modernizing Learning Environments with Educational Technology: Technical Guidelines*. While the document did not specifically address educational standards involving technology integration, in addition to providing recommendations for planning and securing a communications network infrastructure, the guidelines presented considerations for designing technology-rich classroom environments (GA DOE, Division of Instructional Technology, 1994). Descriptions of classrooms equipped with technology reflected recognition of the role of educational philosophy and beliefs within the design process:

> Key issues which one must consider when designing a classroom with information technology include the consideration of changing teaching and learning modes for today and for the future. If students are primarily working on project-based tasks and in collaborative group situations, the lecture format of students sitting in rows will not support this learning mode. It may be necessary to develop a classroom which allows for a variety of activities, including class lectures, small group and individual work. (GA DOE, Division of Instructional Technology, 1994, p. 10)

The document specifically addressed the need for flexibility in planning facilities designed for technology integration and changing instructional methods, and expressly

recognized the importance of the "educational philosophy, curriculum needs, students' characteristics, instructional methodologies and uses of electronic technology" in the construction of an educational program within a school (GA DOE, Division of Instructional Technology, 1994, p. 11). As reflected in the document, by 1994 the state of Georgia also had recognized the opportunities afforded by distance learning for accommodating the needs of a variety of students (GA DOE, Division of Instructional Technology, 1994).

In 1996, the GA DOE Office of Technology Services produced a new 3-year technology plan. The vision at that time focused on supporting student achievement and technology literacy through technology resources. The vision statement was interpreted by some stakeholders as having a narrow focus on technology access. In reviewing the 1996 plan, the GA DOE staff later suggested broadening the vision to include specific expectations of technology integration that would improve instructional planning for supporting standards based initiatives (GA DOE, Office of Technology Services, 2003). Between November 2001 and June 2003, the GA DOE Office of Technology Services created the State of Georgia K-12 Technology Plan (2003), with input from public school system personnel, state educational agencies, higher education institutions, parents, and business representatives. The following essential conditions for successful integration of educational technology for improved student performance were recognized and addressed within the plan: vision, access, effective instructional use, effective administrative use, educator proficiency, system support, and equity (GA DOE, Office of Technology Services, 2003). In describing effective instructional technology use, the 2003 plan recognized the need for systematic integration of technology within the instructional

process, as well as learner centered opportunities founded in constructivist teaching methodology (GA DOE, Office of Technology Services, 2003). The revised plan linked changing instructional practices through vision development and system support, both of which involve administrative and technical staffing within the district and the school setting. The vision of the 2003 plan also included expectations for technology use in schools by teachers and students in ways that promote not only technology literacy, but self-directed learning and higher order thinking skills (GA DOE, Office of Technology Services, 2003). The K-12 Technology Integration Standards (TIS), defined by Official Code of Georgia Annotated § 160-4-2-.01 (2002) as "the inclusion of appropriate technology that facilitates, individualizes, enhances, and enriches learning of the Quality Core Curriculum," and defined by the Georgia State Board of Education (2005, para. 4) as "the ability of students to use the tools of their society with skill in an ethical, accurate, and insightful manner to meet the demands of the 21st century workplace and world," were developed and adopted in the state as a strategy for improving technology practices. Based on the data cited in the Georgia Technology Plan 2007-2012, the focus of technology integration and literacy as established by the TIS were not met (GA DOE, Office of Technology Services, 2008). In fact, the Office of Instructional Technology found limited implementation or assessment of the TIS across the state and recommended additional technology assistance to school systems in the development of a systematic implementation plan (GA DOE, Office of Technology Services, 2008).

The introductory statement of the Georgia Technology Plan 2007-2012, revised in 2006 and adopted in 2008, expressly identified seven goals: increased community support for educational technology; increased educators' proficiency with instructional

and administrative technology resources; increased instructional uses of technology to develop students' higher level thinking skills; increased administrative uses to monitor student achievement; increased technical, administrative, and professional development support for school systems; ensured equitable access to high-quality technology programs; and increased stakeholders' access to technology resources (GA DOE, Office of Technology Services, 2008). In addition to communicating a vision of technology use in which Georgia would lead the nation "in improving student achievement by ensuring that all educators and students have the knowledge and skills necessary to be successful in a global learning community," the state's 2007 plan provided objectives, benchmarks, strategies, timelines, and evaluation sources for district school system use (GA DOE, Office of Technology Services, 2008, p. 91). As part of the development of this plan, the Instructional Technology and Media Division of the State Board of Education evaluated the State of Georgia's technology integration and found marked progress across the state towards meeting data warehousing and management needs to support data-informed decision making, implementation of technology standards with K-12 curriculum, and access to informational and digital resources managed by the media specialist (GA DOE, Office of Technology Services, 2008). The Instructional Technology and Media Division recognized, however, that further investigation was necessary into the actual utilization of technology for instructional purposes to support student learning and develop students' technology literacy skills resulting in the administered of a state-wide survey to technology leaders from Georgia's 104 school districts whereby information was gathered on district technology programs (GA DOE, Office of Technology Services, 2008). When asked to consider the types of instructional technology use observed in K-

12 schools within their systems, 82% of the respondents indicated teachers' development, design of instructional materials, and student designed technological solutions to authentic problems were least frequently observed. Much less was seen in these areas than in teachers' use of technology for direct instruction and students' use of computer-based software, drill and practice software, and productivity software (GA DOE, Office of Technology Services, 2008). Several additional student-centered digital applications of technology use, such as participation in online projects, creation of Web-based publications, and self-exploration into standards-based topics, were reported by 86% of respondents as occurring less frequently than other types of technology use (GA DOE, Office of Technology Services, 2008). The primary barriers reported by the respondents to increasing technology integration within instructional practices were teachers' lack of time to integrate technology (28%); teachers' lack of integration skills (26%); and, lack of teachers' buy-in, instructional technology support, professional development, resources, and vision for technology use (13%) (GA DOE, Office of Technology Services, 2008).The respondents identified greater instructional technology personnel to support staff ratio (77%), professional learning opportunities (75%), and time set aside for instructional design efforts (72%), as the most effective strategies for overcoming these barriers (GA DOE, Office of Technology Services, 2008).

The GA DOE Office of Technology Services most recent three year technology plan released in May of 2013 maintained the previous strategic goals of access to infrastructure and student performance data. An additional goal of acquiring software systems with the intention of providing students with customized individualized educational experiences was added (GA DOE, Office of Technology Services, 2013).

The department's "Path to Personalized Learning," the heart of the plan, involves the development over a five year timeframe of a tunnel connecting school districts with the GA DOE's cloud of data resources. These instructional resources, including virtual textbooks, online training on digital citizenship and digital literacy, and online courses, in theory could be used by teachers to enable blending learning opportunities or to be individualized assigned within the state's Learning Management System (LMS). Digital access to longitudinal student data is intended to guide teachers and schools as they develop customized student learning plans. Additionally, the GA DOE network plans to provide online professional development resources and performance assessments for improving and measuring teacher's technology integration skills. According to the state's plan, this type of personalized learning environment endeavor for students and teachers will transform Georgia's classrooms into high quality 21st century classrooms (GA DOE, Office of Technology Services, 2013).

Prior to the expiration of the 2008 5-year technology plan, on July 8, 2010, the Georgia State Board of Education adopted the Common Core Performance Standards in English Language Arts and Mathematics (O.C.G.A. § 20-2-140). In April 2011, the Georgia State Board of Education adopted the NETS-S standards for students, designing a K-8 scope and sequence, without addressing or adopting the NETS for teachers, administrators, or coaches. Since students generally have the least control over either the instructional environment or instructional content, the ISTE believes the remaining NETS standards and expectations for teachers, administrators, and coaches are critical prerequisites for actually transforming the design of education in K-12 classrooms and instructional practices to prepare students for lifelong learning in a digital age. Effective

October 2011 the Georgia Professional Standards Commission (GPSC), passed Rule 505-3-.54 specifying "field-specific content standards for approving programs that prepare individuals to serve in instructional technology roles" in K-12, which included the following required areas of competencies: (1) visionary leadership; (2) teaching, learning, and assessment; (3) digital learning environments; (4) digital citizenship and responsibility; (5) professional learning and program evaluation; and (6) candidate professional growth and development (GPSC Rule 505-3-.54, 2011). The GPSC standards for the add-on service certificate of Instructional Technology standards reflect the GPSC's position that individuals in support roles for instructional technology integration must provide leadership, model and support effective integration of technology into instructional practices, coordinate and support digital learning environments, develop in-service professional development programs for staff, and embrace lifelong learning (GPSC Rule 505-3-.54, 2011). Although NETS for Students were the only standards adopted by the GA DOE, the competencies established in the GPSC standards mirror the ISTE's standards for technology integration identified within the NETS for Coaches. As a result of the 2011 rule, many higher level institutions are in the process of reevaluating their certification programs to emphasize the new focus of the standards, one which focuses on the use of instructional technology in ways that support student learning and productivity and the awareness that school-based support specialists are vital to teachers' integration efforts (Kennesaw State University Department of Instructional Technology, 2011).

While the new add-on certificate is intended to prepare individuals to provide school-based support, it does not prepare individuals to lead transformative change. The

responsibility for this type of systemic improvement has been placed by the ISTE with administrators, not school-based instructional coaches. As one of many district level administrators, the district coordinator of technology is perceived, in theory, by Moursund (1992) and Frazier and Bailey (2004) to be the individual ultimately charged with the task of leading purposeful change in instructional practices, whereby the power of technology is leveraged systematically and effectively, thereby transforming the current structure of the educational system.

Transforming Educational Systems with a Systems View of Educational Technology

Hodas (1993) suggested that "failures of technology to alter the look-and-feel of schools more generally results from a mismatch between the values of school organization(s) and those embedded within the contested technology" and "that organizational systems often view change, like technology integration, as disruptive and seek to dismiss the stress associated with it" (p. 1). The hidden curriculum of public education, like other bureaucracies, is often the desire to resist organizational change; while technology initiatives that support the hierarchy characteristic of schools may be adopted by districts, they may not be implemented by teachers (Hodas, 1993).

Cuban et al. (2001) recommended that major fundamental changes in the structure of the educational system take place. The cellular organizational nature of grade levels and subject areas found in most K-12 school districts and schools perpetuate the notion of separation, a key factor limiting the success of technology integration efforts (Cuban et al., 2001). The challenge, according to Culp et al. (2003) in moving beyond advancements in technical infrastructure and accessibility toward innovative, interactive, individualized instructional opportunities involves a uniform vision of what "high quality

use of technology" looks like and requires an adjustment in how school institutions function and grow (pp. 18-19). In other words, some systematic action is required to assist educators in using technological tools in ways that support constructivist, inquiry-based learning (Culp et al., 2003). A key finding from research conducted by Culp et al. (2003) is "the need for a better understanding among both researchers and policymakers of the systemic nature of educational change in general and of educational technology integration in particular" (p. 23).

Educational change, according to Domine (2009), first requires recognition of schools as an integral part of a complex system. This notion contrasts with the traditional view of organizational systems as linear, which was suited for the mindset of the industrial age (Munro, 2008). Munro (2008) suggested that the new demands of an information age require a new way of thinking, a more open approach, in which the internal and external factors effecting organizational performance are considered, as well as the interdependence of parts within the system. Creighton (2003), citing Rebore's model of the educational subsystems, identified the school board, the district administration, the principal, and the teacher as part of the supportive framework of public education. The active involvement of each of these subsystems was asserted by researchers Johnson and Chrispeels (2010) and Berrett et al. (2012) as a key component for sustaining technology integration initiatives.

Systematic planning, which integrates technology planning within the current and desired academic goals, instructional goals, and the overall school improvement plan, is critical (Creighton, 2003). While technology plans generally involve input from several external groups, the nature of the planning process frequently results in plans that provide

little change impetus to instructional practices in K-12 classrooms. Craig (2008) noted a frequent disconnection between written federal and state educational technology plans and actual school goals. District plans, perceived as permanent documents, often fail to embrace the ongoing and continuous planning process characteristic of schools focusing on strategic planning for school improvement (Craig, 2008). Johnson and Chrispeels (2010) found discrepancies regarding what constitutes effective practices for integrating educational technology between the district level central office staff and school administrators. The researchers also found "that without agreement on the means for raising achievement, teachers see instructional guidance as administrative directives rather than opportunities for professional development" (Johnson & Chrispeels, 2010, p. 768). Additional inconsistencies have been noted between the central office staff and school staff as to the appropriate methods required to achieve the district technology goals (Johnson & Chrispeels, 2010). This may be due in part to the manner in which the local plans are constructed. Teachers surveyed in research conducted by Langran (2006) perceived technology purchases as a top-down process with most of the long term technology planning occurring at the district level. The participants noted that meetings to discuss technology integration at the school occurred infrequently and usually in informal situations (Langran, 2006). Miranda and Russell (2011) similarly reported that the development of the vision statement, technology budgets, and technology planning often occurs at the district level, with limited input from educational stakeholders. Little regard is given to the goals and needs of individual schools, classrooms, teachers, and students (Miranda & Russell, 2011). Many researchers emphasize the need for systematic collaboration between district and school staff to establish and achieve district level and

school level educational technology integration goals (Davis, 2008; Lambert et al., 2002). Recognizing the misalignment of many technology plans with school improvement goals, Creighton (2003) argued for a management approach to technology planning that involves all subsystems within educational organizations: the school board, the district administrator, the principal, and the teacher.

Levin and Wadmany (2008) found technology adoption to be "a learning process for individual and organizations" involving multiple "pedagogical and technology related variables" (p. 237). Straub's (2009) review of key theories regarding the adoption and use of innovations, including Roger's innovation diffusion theory, the Concerns-Based Adoption Model, the Technology Acceptance Model, and the United Theory of Acceptance and Use of Technology, suggested that social systems, through their culture and environment, may influence the acceptance of technology innovation in schools. School culture has been shown to greatly influence teachers' beliefs, which in turn greatly influence their adoption and use of educational technology (Ertmer & Ottenbreit-Leftwich, 2010; Windschitl & Sahl, 2002).

Fullan (2010) considered the need for district-wide reculturing, rather than simple restructuring, as key to the systemic change necessary for transforming schools. Creating a culture and direction for organizational performance in regards to educational technology integration, whereby organizational goals take into account diversity in employees' personalities, beliefs about teaching and learning, experiences, and backgrounds, requires leadership (Anderson & Dexter, 2005). Leaders, as maintained by Berrett et al. (2012), must recognize and address the role of organizational culture in order to transform teaching practices.

In 1995, Howard Mehlinger wrote *School Reform in the Information Ag*e to present his vision for technology and schooling. Regarding technology and learning, the author placed administrators as the primary agents of school reform, serving as a bridge between the school board and classrooms; setting the vision, expectations, and support for innovation; and ultimately transforming instructional practices and placing individuals in charge of their own learning through technology (Mehlinger, 1995). The administrative individual charged with the task of leading organization reform efforts for educational technology integration, according to Frazier and Bailey (2004), is the district level technology coordinator or technology director. As perceived by the International Society for Technology in Education, to fully integrate technology in all of its functions, there must be some individual or individuals engaged at the district level, to fulfill the role and responsibilities of technology coordination. That person, often identified as the technology coordinator, is necessary to fully bring technology into the classroom; to plan and implement professional development for teachers and staff; to conceptualize and model effective integration practices; and most importantly to establish, to effectively communicate, to incorporate into actual practice the district's vision for technology integration (Frazier & Bailey, 2004).

The District Technology Coordinator

Roles and Responsibilities. The position of technology coordinator emerged in the 1980s, when schools began purchasing and using technology for administrative, management, and instructional purposes (Frazier & Bailey, 2004). Recognizing the need for a systematic management of expanding technological resources and information networks, districts began employing individuals in the role of district level technology

coordinator (Martin, 2004). Without a certification process in place, or a clear expression of the responsibilities of such a position many districts initially filled it with either an information technologist from the business sector or promoted an individual from within the educational field (Martin, 2004). As the number of computers in schools increased and the focus of computer technology shifted towards the systematic design of the instructional environment, individuals employed as technology coordinators or interested in pursuing leadership roles in the integration of educational technology sought resources defining the roles and responsibilities of the *position*. Two early publications published by the ISTE, one written by David Moursund (1992) and the other by Max Frazier and Gerald Bailey (2004), provided insight into the nature of the position.

The Technology Coordinator, written by David Moursund and originally published by the ISTE in 1985 and later revised in 1992, attempted to explain the roles and responsibilities of technology coordinators in educational subsystems. The work contains chapters with descriptions of various positions involving the coordination of technology, such as school-level technology coordinator, computer coordinator, computer-assisted learning specialist, and computer-integrated learning specialist. Within these descriptions, Moursund (1992) proposed a distribution of support services, some of which are to be provided by a coordinator at the district level and some at the school-level. The district level coordinator is responsible for the actual design and integration of technology into the curriculum of the district, to be a "curriculum leader- a curriculum generalist who can facilitate change at all levels and in all aspects of the curriculum" (p. 53). Part of the planning process undertaken by the district level technology coordinator

includes assessing various stakeholders' technology literacy and attitudes towards instructional uses of technology, as well as evaluation of the technological resources required for implementation of technology initiatives (Moursund, 1992). Moursund (1992) suggested several questions be used during the planning process, such as:

> Who decides whether the school and district libraries should subscribe to computer-related periodicals or purchase computer-oriented books? Is in-service money available to offer computer-oriented courses? Is travel money available so that some educators can visit schools making good use of computers or so educations can attend computer conferences? (p. 53)

The questions reflect Moursund's belief that district level technology coordinators must be an instrumental part of district level leadership in establishing education policies and budgets. Recognizing the function of technology in supporting teaching and learning goals, Moursund (1992) placed curriculum knowledge and technical knowledge as necessary skills of district level technology coordinators, as well as training in the processes of educational change. As part of the responsibilities set out by Moursund (1992), the leadership role of a district level technology coordinator entails regular conversations with school level staff and school leaders to aid in the development and implementation of school-based technology plans, financial planning for the acquisition and replacement of technological resources, creation of a district computer resource center and in-service staff training plan, formulation of technology integration initiatives based on research, dissemination of information on emerging instructional practices involving educational technology throughout the district, input in technology competency requirements for new hires, and continuation of learning to meet the ongoing challenges

of changing technology (Moursund, 1992). The focus of the school-based technology coordinators, as presented by Moursund, is the actual implementation of technology integration efforts in the school and classrooms.

Within their book, *The Technology Coordinator's Handbook*, which was published in 2004 by the ISTE, Frazier and Bailey (2004) referred to the role of a district technology coordinator as a "position without a protocol" (p. 1). Using the Technology Coordinator Issues Model, a model they developed to address the five essential functions of district level technology coordinators, Frazier and Bailey (2004) presented their protocol for individuals interested in successfully coordinating and integrating technology resources within school organizations. The general areas identified in their model include budgeting and planning, administrative computing, network operations, desktop support, and teaching and learning (Frazier & Bailey, 2004). Like Moursund, Frazier and Bailey (2004) characterized the ideal candidate for this position as someone with strong technical knowledge of educational technology products; instructional experience in the K-12 classroom setting; information-management and network knowledge; budget, planning, and resource management skills; and communication and leadership ability. As a teaching and learning leader, the technology coordinator is responsible for managing the selection and purchasing procedures for securing educational software, supporting teachers in their integrate of technology into instruction, evaluating educational technology use across the district, facilitating professional learning opportunities for teachers, and utilizing Web-based resources to advance communication and collaboration across the county (Frazier & Bailey, 2004).

Drivers of Educational Reform. Research on district level technology leadership and the role they take in driving educational reform is limited. Searching 55 databases within ProQuest for the phrases (*district technology coordinator or district technology director) and leadership*, *leadership and district technology specialist*, (*district technology coordinator or district technology director) and change*, *district level technology coordinator*, *technology coordinator and technology leadership and education*, *technology coordinator and technology leadership and characteristics, and chief information office and schools* returned a total of 17 results applicable to this study. Research focused on the individual responsible for systematically coordinating and supporting technology integration into teaching and learning in K-12 classroom appears to be emerging.

A mixed method research study of district level technology coordinators conducted by Cox-Cruey (1998) gathered descriptive demographic information from 112 district technology coordinators. The survey results indicated that: over half of the respondents had teaching experience in middle school, high school, or both; teaching certification was not required for employment in the job; a third of the districts relied on the position primarily for technical support; and half of the coordinators were considered full time with no other duties assigned. Respondents also specified the need for more knowledge on ways to integrate technology into instructional practices and ways to provide professional development for adult learners (Cox-Cruey, 1998). A great deal of variance among respondents was noted in regards to the amount of consultative time they spent with staff and their perception of their role in curriculum development (Cox-Cruey, 1998). Reilly's (1999) reflection of his personal role as a district technology coordinator

presented a unique view of the difficulties associated with identifying the job title and role of a district level technology coordinator position. Reilly (1999) recognized two independent roles of many district level technology coordinators, one of technology technical specialist, essentially responsible for data and communication management, the other of technology integration specialist.

Tomasso (2003) provided a comprehensive examination on the responsibilities, professional background, educational background, and perceived professional and personal competencies of individuals serving in the role of educational computing coordinator in New York State. Tomasso (2003) found that educational background and professional experiences had an impact on the level and type of responsibilities performed. Competencies perceived by coordinators as essential to job performance included technical, curriculum, pedagogy, communication, leadership, and administrative knowledge. In a another study conducted by Lesisko (2004), the findings indicated that Pennsylvania's district technology coordinators had, on average, 14 years of work experience in education. Sixty percent of the district technology coordinators had earned their Bachelor's degree in the field of computer science and technology, 80.4% had a professional teaching certificate, and 74% of coordinators with a Master's degree earned in the fields of management and technology (Lesisko, 2004). Inconsistency in the job titles and responsibilities were noted by Lesisko (2004), who found 46 different position titles for the job and additional responsibilities besides technology coordination assumed by 27 out of the 87 respondents. The respondents' primary responsibilities mirrored their perceived role within the district, namely that of technical support (Lesisko, 2004).

Wagner (2004) used a phenomenological case study approach in his research conducted with nine finalists in the Ohio SchoolNet 2004 Technology Coordinator of the Year competition. Of the nine participants in Wagner's study (2004), none perceived their role as instructional, much less as leaders in integration of technology into instructional practices, but rather considered themselves to be technical or administrative IT support personnel. Variations in the backgrounds, job responsibilities, and perception of support from upper level administration were noted by Wagner (2004), yet the majority of participants recognized the expanding leadership role technology coordinators would have within the educational organization in the future.

Smith's (2006) qualitative research conducted in 2006 on the responsibilities of technology directors in Wisconsin public schools identified four categories of daily tasks performed by district level technology directors: Leadership and Organizational Planning, Management and Administrative Tasks, Routine Technical Tasks, and Teaching and Learning (p. 55). Within the category of Leadership and Organizational Planning, Smith (2006) included tasks such as budget development, personnel supervision, administrative tasks, technology planning, meetings, and community and political matters. In general, the five study participants spent between 8-31% of their time on these types of tasks. The majority to their time at work was spent on Management and Administrative tasks, between 36-58%, which were perceived by participants to have the least impact on instructional practices in K-12 classrooms (Smith, 2006). Overall, the least amount of work time was spent on Teaching and Learning Tasks, which included coordination of professional development, data analysis, and modeling of educational technology uses within the classroom setting (Smith, 2006).

Webster conducted her research in 2010, in part, to address the lack of research conducted on the role of technology coordinators nationally and within the state of Mississippi in particular and focused research efforts on examining the professional and educational background of the individuals in the district level position of technology coordinator, the responsibilities of their job, and their identified training needs for improving their job performance. Webster (2010) emailed 138 district level technology coordinators listed on the Mississippi Department of Education website a survey to collect demographic data and found great variety in the educational background, teaching experience, certification credentials, experience with educational technology, and job responsibilities of individuals serving in the role. Forty-six percent of the participants were responsible for other administrative responsibilities, such as assistant superintendent, curriculum developer, and principal (Webster, 2010). The results of the survey supported similar findings: that district technology coordinators serve in varied roles and have varied responsibilities, many of which focus efforts on technical and administrative IT support rather than instructional or leadership support.

Superintendents' and district level technology coordinators' perception of the importance of job performance and knowledge indicators expected of individuals serving in the role of district level technology coordinator developed by Illinois State Board of Education was the primary focus of Lewis's 2005 research study. While there was no statistically significant discrepancy found between the ratings of the superintendents and the technology coordinators, the ratings given on the performance indicators by the superintendents placed *Managing the Change Process within Educational Reform Efforts* first as an essential skill for a district level technology coordinator both now and in the

future; whereas, technology coordinators ranked *Hardware/software Installation and Maintenance* as the primary essential skill of the job both now and in the future (Lewis, 2005). Both groups ranked the instructional knowledge indicators of *Instructional Design*, *Professional Development*, *Teaching Methodology,* and *Research and Theory* in the bottom third of performance and knowledge indicators required by district level technology coordinators (Lewis, 2005).

Recognizing the complexities of jobs within educational organizations, Ausband (2006) investigated categories of instructional technology support provided by district level technology specialists within the Instructional Technology Service departments in central South Carolina. As part of a larger instructional support system also consisting of school media specialists, the four district level individuals, who were identified as instructional technology specialists selected for participation in the study, recognized their primary role as providing curriculum support for teachers, which was largely accomplished through staff development courses they taught and their participation on district level department and content area leadership teams (Ausband, 2006). Based on her findings, Ausband (2006) suggested a greater need for connection between instructional technology integration and curriculum work either by one individual who was familiar with both areas or by two groups of people working collaboratively.

Few of the results focused specifically on educational technology leadership (Davis, 2008; Dessoff, 2011; Pate, 2006). Leadership and technology integration within rural school districts was the primary focus of research conducted by Pate (2006). As part of the qualitative study, Pate (2006) conducted interviews with three superintendents, two principals, three district technology coordinators, and six teachers to examine the

educational technology leadership functions performed by each. In the research findings, Pate (2006) referenced the leadership role of district level technology coordinators as primarily responsible for obtaining technological resources and program evaluation. Davis (2008) focused his research efforts on the development and validation of a survey instrument to assess the ISTE technology leadership standards of various educational stakeholders. While a select group of district technology coordinators assisted with the study as part of an expert panel, the instrument was only administered to principals, teachers, and building level technology specialists providing no insight into the leadership role of district technology coordinators (Davis, 2008). The need to transition from a position providing technical support to a position providing curriculum leadership for integrating technology into instructional practice in K-12 public schools was noted by Dessoff (2011) in his article, *The Changing Role of Chief Information Technology Officer*. Dessoff (2011) described the need for collaboration between the district level academic coordinator and the district level technology coordinator as part of the curriculum development process, both considered to be leadership positions.

There clearly have been some prior studies on district level personnel assigned the task of coordinating educational technology efforts within K-12 classrooms. What is obvious from the research is that the responsibilities of district level coordination of technology vary greatly from state to state and the role may be transitioning from a focus on technical support to instructional support. What also appears evident from most of these studies is a lack of research on the topic of technology leadership and the support required for transforming instructional practices whereby the power of technology is used to enhance teaching and student directed learning. In a content analysis of published

literature on NETS-A from 1997 to 2010, Richardson, Bathon, Flora, and Lewis, (2012) confirmed this premise by finding "a glaring lack of in-depth research" around the topic of technology leadership, especially in regards to Standard 4: Systemic Improvement (p. 131).

Summary

We have not fully utilized the capabilities of the available technology within the K-12 educational system. The educational system's historical framework, from which varied definitions and perspectives of the function of educational technology in teaching, learning, and communication processes developed, has influenced the integration of technology within instructional practices. Four attributes of educational technology were identified through the review of literature: as a data management and accountability tool, as an information and media communication tool, as a tool for developing computer literacy skills necessary to be productive in the 21st century workplace, and as a tool to provide student-centered instructional opportunities. Yet, confusion appears to exist within the educational community regarding the field of instructional technology, as a field of theory or practice, and what integration of technology in K-12 classrooms really means.

Technology standards for students, teachers, administrators, and coaches have been developed by the ISTE in an attempt to aid districts as they plan, develop, and evaluate technology integration instructional practices. Many states have adopted the ISTE NETS for Students; Georgia being one of them. Efforts taken in recent years by state governors and boards of education have also established technology proficiency as a key component embedded within the uniform grade-level specific academic goals for

students in grades K-12 and as presented in the Common Core State Standards. The expectation communicated with the standards is that educational technology will be used thoughtfully by teachers and students daily in ways that enhance knowledge of core content material and critical thinking and problem solving skills. These policies that drive daily instructional practices in K-12 classrooms for teaching set standards stress student mastery and competency in core content areas that may ultimately conflict with technology integration initiatives.

The organization of curriculum under state plans is at the district level. In our system of public education, policy may be set by the state, but decisions are made and implemented at the district level, by district boards of education, a superintendent and his staff, then to school principals, and through them, teachers. The research suggests that to reach the goal of transforming the educational systems in the way desired it takes participation by a number of individuals including someone at the district level who can translate the promise of such technology integration into reality within the school district. The individual identified as having this responsibility at the district level is referred to as the district technology coordinator. Yet, as the literature reflects this leadership role is often low on the priority list.

Transforming educational systems takes visionary leadership and systemic improvement, both of which responsibilities are reflected in the NETS for Administrators. Even though the state school board in Georgia only adopted the NETS for Students, the Georgia Technology plan clearly envisions that there will be a district level position, by whatever preferred title, and that the person in the position will provide leadership and technology support for the integration of technology into instructional

practices. In some states, where the limited research on the topic of district level technology coordination has been done, this position has been denominated as the district technology coordinator. The available data from OpenGeorgia.gov (2012) on school personnel shows that there is no position so denominated in this state, but according to the site, local district boards of education in the State of Georgia reported 180 individuals with the title Technology Director and 1,619 individuals with the title Technology Specialist employed during the 2012 school year (OpenGeorgia.gov, 2012). Based on the salary information available from the same source, it appears that the 180 individuals serving as Technology Directors are high up on the pay scale, suggesting significant responsibilities for technology related duties. To date, little research has been conducted on technology leadership at the district level, especially in regards to Standard 4: Systemic Improvement of the NETS for Administrators. So, it was unclear if the individuals who hold such district level positions, however denominated, are perceived by the district superintendent and themselves as having any responsibility for leading the changes required to integrate technology into instructional practices within the districts they are employed. It is for this reason that I proposed this research study.

Chapter III

METHODOLOGY

Description of the Research Methodology

The purpose of this study was to augment the literature base on the role and responsibilities of district level technology coordinators, the leadership role they take in promoting technology integration within instructional practices, and their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration. Based on my literature review, I recognized that interest in the field of technology coordination was emerging. Many of the studies on the topic gathered basic demographic information on the participants including their age, gender, title, years of service, and educational background. Some examined various aspects of the roles and responsibilities of the position. One even researched the level of educational technology leadership performed by teachers, principals, technology coordinators, and superintendents. None of the studies reviewed tied the concepts of background, responsibilities, leadership role, and perceptions together in a way that involved in-depth investigation for a deeper understanding of the personal experiences and reality of those charged with coordinating technology at the district level. What were their backgrounds? What type of teaching experience did they have before assuming their current position? How is their department structured? What interaction do they have with other district level departments? How involved are they in coordinating professional development opportunities for teaching staff on the integration of instructional technology? What

vision do they have for educational technology integration within their school system? What hindrances do they face in accomplishing their vision? These were but a few of the questions I wanted to explore to better understand the complexities related to coordination of technology within the educational environment. In considering the questions I had about what was taking place at the district level regarding educational technology coordination and my research goals, I determined that qualitative research was the preferred approach for this study.

Recognizing that human reasoning and actions are often complex and unpredictable, qualitative studies seek to investigate, understand, and explain events as they take place in real world settings (Merriam, 1998; Patton, 2002). Understanding the participants, the event, the context, and the process is a fundamental goal of qualitative research (Maxwell, 2005). Merriam (1998), Maxwell (2005), and Patton (2002) agreed on several identifying characteristics of qualitative research: (1) the researcher is an ongoing participant in the research process and uses narrative reports to share findings and draw conclusions, (2) the design format of qualitative research is flexible, allowing the researcher greater control to explore in depth an event or experience, and (3) the naturalistic inquiry and emergent design features of qualitative research allow the researcher to make decisions regarding the construct of the study as the information unfolds. While these features permit the researcher the, "openness to adapting inquiry as understanding deepens and/or situations change" (Patton, 2002, p. 40), Maxwell (2005) suggested that determining the degree of organization necessary or desired for the phenomenon in study must be considered when designing a qualitative research study. Unstructured approaches are highly inductive and allow the researcher to individualize

data collection procedures and instruments as needed to explore a specific phenomenon, while structured approaches permit the researchers to focus data collection efforts in ways that "ensure the comparability of data across individuals, times, settings, and researchers" (Maxwell, 2005, p. 80). Although structuring a study may appear to limit a researcher's flexibility and seem contrary to the nature of qualitative research, it can be especially beneficial when exploring the commonalities and differences among multiple-research sites and for reducing the quantity of data collected (Maxwell, 2005).

There are several ways presented by Patton (2002) for structuring a qualitative study, all of which depend on the fundamental goal of the research and the theoretical and philosophical perspectives of the researcher. Since the goal of this research was to understand how leadership by the district level coordinators of technology influenced educational technology integration within teaching and learning and facilitate educational improvements, pre-structuring the study to include purposeful selection of participants, data collection plans, and data analysis strategies was perceived as appropriate to generate both meaningful and manageable results. The theoretical perspective guiding this research study was based on the constructivist notion that individuals make sense of a phenomenon in multiple ways, leading to diverse constructions of reality. To understand these experiences requires collection of in-depth information from individuals within the natural environment. The case study approach, a process by which in-depth information is gathered within a bounded system in a systematic structured approach, was deemed particularly well suited for this study.

Case study, as defined by Stake (1995), is "the study of the particularity and complexity of a single case, coming to understand its activity within important

circumstances" (p. xi). Creswell (2009) defined case studies as "a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals" (p. 13). According to Dooley (2002), the case study approach "excels at bringing us to an understanding of a complex issue" and "emphasizes detailed contextual analysis of a limited number of events or conditions and their relationships" (p. 335). Robert Yin (2003), a scholar of the case study method, recommended its use as an appropriate research method when attempting to understand both descriptive and explanatory concepts and suggested that the methods of inquiry used to gather data in case studies are capable of revealing a situation or problem in a way not possible through quantitative means.

While commonalities may be found within many researchers' definition of case study, the attention given by researchers to various design components differs greatly. The description proposed by Robert Stake (1995) was used to guide this study. Stake (1995) focused on the object of study in his conceptualization of case study design and founded his approach on the interpretivist paradigm. According to Stake (1995), researchers come to understand and make sense of an event, situation, or circumstance by exploring the experiences and understanding formulated by the participants in that event. Through this role, one of interpretation, the researcher is able to identify patterns, explore complex relationships, and create a readable picture of the phenomenon under study, allowing readers the opportunity to construct their own interpretation and generalizations about what is taking place.

Stake (1995) described three types of case studies: intrinsic, instrumental, and collective. The purpose of intrinsic case study is to gain an understanding about a

particular unit or individual subject (Stake, 1995). Instrumental case studies employ a particular case or unit, not to study the particular subject, but to generate an understanding of a particular event or phenomenon (Stake, 1995). Collective case studies provide information-rich, narrative descriptions from multiple subjects, to study an event or phenomenon, seeking to identify commonalities and differences, using lateral analysis techniques to strengthen the research findings (Stake, 1995). This study used a collective case study approach to explore the experiences of two individuals serving in the capacity of district coordinator of technology.

Site and Participant Selection

Maxwell (2005) advised researchers to consider how they intend on developing relationships with the subjects in their qualitative study. Individuals serving in the role of "gatekeeper" as referred to by Maxwell (2005, p. 82) authorize or reject that proposed research studies be conducted. As a school system employee, I was aware of the protocol in many districts requiring board level approval of any requests made to conduct research within the district. Research proposals of employees are often given preference. I realized that a gatekeeper would not be required if I conducted the research in the district where I teach and felt confident that my research request would be approved by my county's superintendent. I was, however, concerned that my familiarity with the technology department and district leadership could possibly interfere with my ability to critically examine the statements made by the participants. During my graduate coursework, I developed relationships with students, professors, and colleagues who expressed interest in the topic of technology integration. One of my contacts had developed a professional relationship with a coordinator of technology as part of her consulting work for

facilitating instructional improvement within a nearby school district. Based on her three year involvement with all departments of the district leadership team and more than 20 years of experience as a principal, she recognized the district level coordinator of technology as an innovator leader of technology integration and recommended her as a participant in my research. A different colleague informed me of a professional relationship with a curriculum director in a nearby county who could be of assistance in gaining initial entry into another research site.

An additional factor I had to consider in regards to participant selection related to the constraints placed on the research process by my work schedule. School system calendars share similar holidays and school breaks, which limited my ability to conduct interviews during non-work days. With only 3 days allotted per year for personal use, I had to ensure that the travel time and interview time when combined took no longer than half a day per interview session.

After speaking with my professional contacts, I spent some time researching the demographics of the two sites in question. Both of sites were located within the First Congressional district and were a manageable distance from my residence. According to the National Center for Educational Statistics (2014), the 17 school districts comprising the First Congressional district serve anywhere from 790 students to 35,246 students. The districts could easily be classified into three groups based on the number of students served: (1) fewer than 5,000; (2) 6,000-15,000; and (3) over 15,000. The sites I was considering for my research represented two out of the three groups: one was considered a rural territory on the fringe of an urbanized area and the other was considered to be a small territory inside an urbanized area. I was intrigued by the possibility of exploring the

perspective of technology coordinators from these seemingly different communities and even considered including a site to represent the third group within my study. While a third site representing a midsize locale would have been enhanced my findings, I ultimately decided to focus my efforts on the two sites where access could be gained through my contacts and travel time could be accommodated within my work schedule.

With these two factors in mind, I decided to use the support of my professional contacts who expressed a willingness to introduce my research, a process referred to by Patton (2002) as the "known sponsor approach," to gain initial entry into the two sites (p. 312). Maxwell (2005) recommended connecting with the gatekeeper and the potential participants to establish the subject's actual desire to be a participant in the study, so upon securing Institutional Review Board (IRB) approval (see Appendix A) my professional contacts introduced my research proposal to the district technology coordinator at the site referred to hereafter as Case One and curriculum director at the site referred to hereafter as Case Two. I then made contact with each of two gatekeepers via email and requested their support in receiving verbal confirmation of willingness to participate in my study from the district superintendent at both sites and the district technology coordinator for Case Two. Once confirmation of interest was received, an email was sent to the superintendents of the districts (see Appendix B) to secure written authorization to conduct the research study. After permission was granted, I sent an email to the district level technology coordinators (see Appendix C) requesting written consent for their participation in the study. Both individuals serving in the role of district level coordinators of technology willingly agreed to participate in the study, at which point the initial interviews were scheduled.

It was my hope that participants would see me as a colleague, a member of their educational community, and someone who was interested in improving instructional practices. As part of the research relationship, I provided background information on my professional experiences and motivation for conducting this particular research study in the hopes of establishing an interview climate, which promoted openness and honesty. I employed Maxwell's (2005) recommended strategy of "putting yourself in their position" (p. 85) to ensure that I remained considerate of the participants during the course of the research study and to avoid appearing judgmental in my responses to comments made during the interviews and in my narrative descriptions in my data analysis.

Assurances of confidentiality were made to the participants and described within the initial emails prior to data collection. As the sole researcher, I alone collected and had access to the data. During the data collection and analysis phases, the data were evaluated to ensure removal of possible identificating information. To protect participants' privacy, each county and participant was assigned a pseudonym identifier for use during data collection and analysis and reporting of findings. A master list of the site and participant pseudonyms, along with hard copies of the transcripts, contact summary sheets, and document summary forms were kept electronically on a password protected computer and in hard copies in a locked cabinet in my home office.

Originally, I intended on extending my research within the site beyond the district technology coordinator. In the school system where I teach, the director of special projects is instrumental in securing additional technology through grants and overseeing the coordination of professional development as part of grant projects. Based on my personal observations and experiences regarding technology coordination within my

district, I anticipated finding similar circumstances within my two research sites. I planned on following up these leads within the district level staff to increase my understanding of the leadership behaviors of the selected participants and to corroborate participants' statements. Unfortunately, my work schedule and distance from the sites limited my ability to gather multiple perspectives of the district technology's efforts to lead transformative practices in technology integration. In retrospect, I might have considered sending out a questionnaire to these individuals regarding their perception of the district's vision for technology integration, the coordination of professional development and instructional support for the integration of technology into teaching and learning, and the leadership necessary to transform the educational system for the digital age.

Data Collection and Recording Procedures

Data collection methods in qualitative research, which may include direct observation, interviews, focus groups, field notes, and document analysis, provide broader, deeper, more comprehensive account of beliefs, perceptions, attitudes, and behaviors of the subjects under study beyond those generally collected in a survey (Patton, 2002). By collecting diverse data from varied sources, which Maxwell (2005) referred to as "triangulation," qualitative studies are able to develop a greater understanding of the events under investigation. In this study, the data were collected from: (1) three semi-structured face-to-face interviews with each participant, (2) researcher notes, and (3) technology and curriculum policy and planning documents.

Interviews. Three interviews were conducted with each individual following a modified version of Irving Seidman's (2006) thematic approach to interviewing. The

three-interview series approach to interviewing described by Seidman (2006) involves first the exploration of the participant's life history (interview one), then exploration of their present experiences (interview two), and finally exploration of their reflection on the meaning of these experiences (interview three). Seidman (2006) recommends this approach as particularly suited to illuminating the experiences of others within the stories they share and the context of their lives. Three, 1-hour long one-on-one interviews were conducted with each participant from October 2014 to December 2014. The first interview session gathered data on the participant's experiences that led to their service in the field of education, their interest and proficiency with educational technology, their educational background and professional experience, and their roles and responsibilities as district level technology coordinators. The second interview gathered data on the participant's vision and goals for educational technology use and integration within the district. The third interview gathered data on the types of district support perceived by the participant as necessary for promoting and supporting effective instructional use of technology and the conditions perceived by the participant that facilitate or impede the process of transforming instructional practices. Interviews were spaced over a 3 month period to allow ample time for transcription and initial analysis of each interview. The interviews were scheduled at a location specified by the participant. This varied depending on the site and responsibilities of the participant. The three interviews with the Case One participant took place in her office located with the board of education building. The first and third interviews with the Case Two participant took place in her office located within the media center at one of the district's elementary schools. The second interview took place at the board office in the server room. A semi-structured

interview guide with open-ended questions (see Appendix D) was used during the interviews to ensure that the process of data collection was done systematically. Using the semi-structured approach as suggested by Patton (2002) provided the necessary flexibility to follow-up on points of interest specific to each site as the interview process progressed. Upon the conclusion of the initial interview, a request for technology related documents was made. Following a review of the available documents, additional questions were added to the semi-structured interview guide for the second and third interviews. These probes allowed me to direct the participants towards specific areas of interest specified within the documents and provided an opportunity for participants to rearticulate or clarify the statements within the document for greater understanding.

All interviews were audiotaped, which allowed me to take notes and to focus my efforts on guiding the interview session. After each interview, I transcribed the recording and noted any areas requiring reexamining during the subsequent interview. An ongoing process of reflection and examination on the collected data was repeated through the data gathering phase.

Researcher Notes. Memos were made during each interview and included within data contact summary sheets (see Appendix E for examples). Miles and Huberman (1994) recommended the creation of a contact summary following field experiences to capture the main themes about the contact. Throughout the data collection process, I returned to my documentation within the contact summary sheets to determine new or remaining questions to ask participant. I found this tool to be extremely helpful during the initial phase of my data analysis and as I composed the narratives of each participant.

Reflective remarks (see Appendix F) were also included within the transcription write-ups. These remarks captured my thoughts on the significance of what the participant was saying, my own feelings about the statements, and explanations about what was happening within the site.

Documents. Patton (2002) recommended collection of documents to reveal organizational processes and information otherwise unobservable. During my initial interview with each participant, I asked to have access to technology planning documents. I found many documents, such as the district level technology plan, the acceptable use plan, media plan, and individual school-improvement plans available online through the district website for Case One. Comparable documentation was not available on the website for Case Two and was not made available by the participant. Based on the responses gathered during my interviews with the participant from Case Two, it is my understanding that the participant was not responsible for the creation of similar district level documents. Other documents relevant to technology integration, such as professional development materials and evaluations, were requested from Case One during the initial interview but were not made available. Access to the 3-year technology plan and acceptable use policy was available online for Case Two, but the participant in Case Two did not conduct professional development in a manner that permitted written documentation.

Documents were reviewed prior to the second interview and document summary sheets (see Appendix G for examples) were created, as recommended by Miles and Huberman (1994), to capture the significance of the document in the context of the study. These one page summaries were extremely helpful in revealing the depth of technology

integration support coordinated at the district level and for substantiating statements made by the participants.

Data Analysis Procedures

Single-Case Analysis. In his book, *The Art of Case Study Research*, Robert Stake (1995) described the process of analysis as "a matter of giving meaning to first impressions" and essentially as "taking something apart" (p. 71). The process of analysis and interpretation required the systematic breaking down of large amounts of data into smaller units to discover varying perspective and interpretations of the event under study. This process, according to Stake (1995) helps researchers to build greater understanding of the data while it is being collected so that subsequent data collection is more focused.

As I began analysis, I realized my need to have a deeper understanding of procedures for content analysis, coding, data aggregation, and interpretation so I studied *The Coding Manual for Qualitative Researchers* by Saldaña (2009). Saldaña suggested a "generic" coding method when initially approaching data analysis with the understanding that the process and techniques used may be modified as the study progressed. The generic method developed by Saldaña, which includes four First Cycle coding methods (attribute coding, structural coding, descriptive coding, and In Vivo coding, initial coding, or values coding) and one Second Cycle coding method (pattern coding and/or focused coding), provided me with an initial structure to the process while leaving room open for restructuring as necessary to meet the needs of the study. Using Saldaña's recommended approach for First Cycle coding, I coded each data set for basic attribute characteristics (see Appendix H) that would be used for data management and the initial description of the case and setting within my findings section. This information, written

in narrative form , included a description of the participants' gender, title, years of experience in the position, the setting and time of the interview, the purpose of the interview, and any events or activities observed prior to or during the interview that would be of importance for further analysis. Creation of the attribute codes occurred after each interview using notes taken during the interview and cross-referenced as necessary against the interview recording. The interview was then transcribed into a Microsoft Word document. After the interview was transcribed, I created a modified version of Miles and Huberman's (1994) contact summary sheet to include points identified as the main themes, the responses received to my targeted questions, interesting observations noted from the contact, and new questions to consider asking in the next interview. Miles and Huberman (1994) recommended the creation of contact summary sheets in the early phase of data analysis while data collection is still ongoing to summarize a particular contact. Since the interviews followed a semi-structured approach, there were times when I deviated from the interview guide to allow the participant an opportunity to extend comments related to the general topics under discussion as they occurred. The contact summary sheets were particularly helpful in identifying questions that were either not asked or answered completed during the interview session. As I recorded information within the contact summary sheet, I identified key words that could later serve as potential headings for themes identified during subsequent coding sessions. These key words, referred to as Structural codes by Saldaña (2009), provided me with a quick way to index data within my larger data set for easy retrieval and helpful when writing the narratives for the two participants.

The next stage in the First Cycle coding process involved descriptive coding. Saldaña (2009) attributed this method of coding to Miles and Huberman (1994) and Wolcott (1994) and found it to be an exceptionally useful method of analyzing a data set for novice researchers. To get a more comprehensive understanding of this process, I decided to review Miles and Huberman's (1994) description and illustration of the method. Neither the term descriptive coding nor the alternative term, topic coding, was included within the subject index. The chapter on early steps in analysis, however, provided a brief description of a strategy for inductive coding that was similar to the description for descriptive coding presented by Saldaña. Miles and Huberman (1994) communicated the importance of reviewing the data through the conceptual lens or framework that served as the foundation of the study and recommended three strategies for identifying codes. The first and preferred method of Miles and Huberman (1994) involved the formation of an initial code list from the conceptual framework, research questions, and hypotheses. This suggestion is based on the notion that not all data collected are relevant to the purpose of the study and that it is helpful to keep one's focus on the conceptual framework guiding the study. With this step in mind, I revisited my literature review and research questions and was able to identify three main concepts under study: leadership, systems thinking, and mental models. In my literature review, I touched upon the standards developed by ISTE for administrators noting the adoption of the student standards by many states. The ISTE (2014) identified specific standards or criteria, which included visionary leadership, digital age learning culture, excellence in professional practice, systemic improvement, and digital citizenship, perceived as necessary to "support digital age learning, implement technology and transform the

education landscape"(ISTE Digital Age Leadership section, para. 1). Using Microsoft Excel, I constructed an initial code list starting with the five ISTE standards for administrators and then by pinpointing the performance expectations detailed within each of the standard's descriptors. The first column of the excel document captured the ISTE standard. The second and third columns identified the verbs and noun phrases found within the standard's descriptors. For example, the standard of visionary leadership had three descriptors clarifying what administrators would do when carrying out the standard. The descriptors used the following verb and noun combinations: (1) inspire and vision; (2) facilitate and vision; (3) engage and planning process, and (4) advocate and policies, programs, and funding. In total, the process of unpacking the ISTE NETS for Administrators yielding a total of 40 specific skills and understand expected of leaders to lead digital age learning (see Appendix I).

Although the list aligned with one aspect of leadership addressed within my framework, I was concerned that it failed to include major elements of leadership behavior explored in my previous graduate work. I reviewed the meta-analysis conducted by Marzano, Waters, and McNulty (2005) on theories and theorists on leadership. The researchers' review of the research base yielded 21 behaviors of school leaders, all of which appeared applicable to any administrative leader. I initially attempted to associate each of the 21 behaviors within the five main ISTE NETS-A standards and descriptor categories. Concerned that I might be unintentionally narrowing my findings in the early stages of data analysis, I decided to place my initial coding list based on the ISTE NETS-A and the theories on leadership aside and follow another suggestion by Miles and Huberman (1994) based on the work of Strauss (1987) for establishing codes inductively.

This method of content analysis involves detailed analysis and labeling of each line of transcribed text in a descriptive way. Using the table properties within Microsoft Word, I converted the transcribed text to a table, numbered the paragraphs, and inserted two columns, one for documenting labels or codes and the other for capturing my reflective remarks. Descriptive codes and sub-codes were generated and revised as the texts from the three transcribed interviews from the site were read. Each of the codes and sub-codes were then later marked with a citation for quick retrieval. Using the table of authorities feature within Microsoft Word, I produced a new start list of codes, many of which utilized similar words described as a "responsibilities" with the 21 Responsibilities list constructed by Marzano, et al. (2005).

The table for each interview data set from the site was then transferred to a master Microsoft Excel document. Columns were added to the database to record the site location and session number. The data set was then read a fourth time applying the final First Cycle coding method, that of In Vivo coding, recommended by Saldaña (2009) as particularly useful for capturing the voice of the participant. As I read through each of the texts, I identified language or wording that represented distinct ideas expressed by the participant and copied them into an additional column that was added to the Master table beside the Level 1 code column. This process of reviewing my initial descriptive codes and sub-codes as compared with the In Vivo codes derived from the participant's words provided yet another opportunity to reflect on the meaning and coding I initially placed on the data set. At times I found it necessary to delete or recode passages based on my reanalysis. Throughout the process, I continued to make reflective remarks within my table on the meaning I attributed to the participant's statements, as well as continuing to

memo on a separate document about the perceived relationships and patterns that were emerging among the codes.

At this point in my data analysis, I had identified 70 codes, which included both primary codes and sub-codes, to be reviewed during Second Cycle coding. Second Cycle coding methods, according to Saldaña (2009), consists of inventorying and reviewing the data collectively based on the initial First Cycle codes. In doing so, the researcher is able to conduct additional analysis on the data in a different format, one based on concept similarity, and review the initial codes for both unity and distinctive themes (Saldaña, 2009, p. 150). Saldaña (2009) described several methods for the Second Cycle coding. Pattern coding, a method ascribed to Miles and Huberman (1994) was selected as the method most suitable for this study. While referenced by Saldaña (2009) as a Second Cycle coding method, Miles and Huberman (1994) suggested that this form of meta-analysis actually occurs throughout the initial coding process as the researcher attempts to make sense of the data collected. In generating pattern codes, researchers are able to reduce the data to broader themes, maintain focus while obtaining data in the field, develop conceptual understanding of the phenomenon under study, and provide a means for further cross-case analysis (Miles & Huberman, 1994, p. 69). I saw this happen as I reviewed each transcribed data set as positioned within the four basic pattern types identified by Miles and Huberman (1994): Themes, Causes and Explanations, Relationship among People, and Emerging Constructs. Utilizing the filter feature in Microsoft Excel, I was able to selectively view content based on my First Cycle codes and analyze them in terms of these four common pattern codes. As I studied the participants' statements as situated within the First Cycle categories, I noticed several

instances where the responsibilities or behaviors identified by the participant correlated with the standards identified in the ISTE NETS for Administrators. I decided to capture these instances by assigning them codes based on the five strands identified in the ISTE NETS-A: Visionary Leadership, Digital Age Learning Culture, Excellence in Professional Practice, Systemic Improvement, and Digital Citizenship. I also realized at this point that it would be helpful to determine whether the responses helped to answer one of my three research questions.

Information contained within the documents were used to generate additional questions that were asked during the second and third interview sessions, supplement research data collected during the interviews, and to corroborate statements made by the participants. For the purpose of this study, agendas, minutes of meetings, school action plans, technology plans, and webpages were included as part of the document analysis. Several documents were available for Case One: the district's media plan, acceptable use policy, the American Association of School Librarians resource document for media specialists, the district's 3-year technology plan, the district's webpage, the technology and media services webpage, the media handbook, the district's lesson plan template for creating lessons that integrate educational technology into instruction, training agendas for meetings with teachers, online lesson plans, school webpages, individual school action plans, and web-based teacher developed instructional resources. The documents available for analysis for Case Two included the district technology plan, acceptable use policy, computer disposal plan, technology disaster plan, and district website.

Each of the documents were examined initially to determine the overall purpose and value to the research study. A modified document summary sheet (see Appendix G),

as recommended by Miles and Huberman (1994), was created to record the summaries of collected documents including how the document was retrieved, responsible department, target audience, purpose of the document with supporting descriptors, individual or group responsible for monitoring the goals established, and criteria for evaluating the effectiveness of the goals. During the second examination of the documents, a spreadsheet was created in an Excel workbook to capture the purpose of the document and textual evidence considered to be particularly helpful in supporting the data collected from the participants (see Appendix J). The documents for Case One were useful at reflecting the emphasis placed by the participant on using technology as a medium for communicating organizational policies and procedures, planning documents, instructional resources, and upcoming events and news with stakeholders. The documents also reaffirmed the participant's statements regarding coordinated efforts to provide professional development and instructional support for integrating technology into teaching and learning practices. The document analysis for Case Two illustrated the participant's primary challenge of serving as the sole individual working within the technology department. Supplemental documentation showcasing the department's efforts to provide instructional support and professional development opportunities was not retrievable because it either did not exist or was not a component of the participant's job.

The final phase of data analysis occurred when I wrote the descriptive narratives of each case. The narratives were constructed to provide background on the context of the study, the role of the participants within their organization, and their vision for the integration of technology within instructional practices. As the narratives were

constructed, the data were reviewed first within the assembled database of First and Second Cycle coded material and a then again as presented in the transcribed interviews. In Vivo statements, contact summary sheets, document summary sheets, and the document analysis worksheet were reread to confirm and support the credibility of the participants' statements regarding their professional practices, beliefs, and organizational processes. Direct statements made by the participants during the interviews were incorporated within the narratives for further clarity. Case summary sheets and document summary sheets were studied as the narratives were written to support and corroborate information presented verbally by the participants. Each of the narratives was read multiple times in an attempt to better understand and explain the cases under study.

The decision to conduct research in two, bounded cases was made based on the knowledge that school systems function in similar, yet unique ways. Exploring and describing similarities and differences across multiple cases allows for the development of a more in-depth understanding of the event or phenomenon under study. For this study, I decided to analyze the data and identified themes for each participant as they related to the guiding research questions.

Validity

According to Maxwell (2005), the final step involved in conducting a research study is the identification and acknowledgment of factors that might threaten the study's validity. Validity is referred to by Maxwell (2005) as "the correctness or credibility of a description, conclusion, explanation, interpretation, or other sort of account" (p. 106) and involves the recognition that given the collected data, another interpretation or explanation might exist. Validity is dependent on the researcher's observational and

analytical abilities during data collection and analysis, as well as the researcher's ability to recognize and control their subjectivity and think objectively (Creswell, 2009; Patton, 2002). Patton (2002) emphasized the bond between the researcher and the quality of information obtained during the interview, noting that the researcher is responsible for ensuring that the processes of data collection and data analysis have been constructed in a manner that ensures the accuracy and credibility of the findings. Maxwell (2005) advised researchers to recognize and consider specific threats to a researcher's hypothesis that might occur throughout the research process. Two of the most commonly cited threats involve researcher bias and reactivity.

Miles and Huberman (1994) and Patton (2002) placed the researcher in a prominent role as the primary instrument of data collection in qualitative research. Accordingly, the researcher's personal characteristics and experiences play a prominent role in determining what data are collected and how it is interpreted. Research bias is a term used to describe the subjectivity of the researcher, which is often rooted in the researcher's personal beliefs, cultural background, experiences, and perception of the world (Maxwell, 2005). It is not necessary to attempt to negate the effects of research bias, but rather to acknowledge researchers' biases and how those biases may influence their subjectivity throughout the research process. Maxwell (2005) explained,

> Qualitative research is not primarily concerned with eliminating variance between researchers in the values and expectations they bring to the study, but with understanding how a particular researcher's values and expectations influence the conduct and conclusions of the study (which may be either positive or negative) and avoiding the negative consequences. (p. 108)

Maxwell (2005) suggested that researchers communicate their personal and professional experiences, as well as explaining their possible biases, to improve the validity of their research. For this reason, I present my experiences and beliefs about the state of technology integration in the educational system.

As a public school employee, I have personally experienced challenges related to the development and implementation of school reform and school improvement initiatives, especially in regards to educational technology. Many of the strategies developed and implemented in my school's action plan reflect the desire to raise academic achievement as assessed on the yearly administered state mandated criterion referenced competency test. The school where I teach, like many others, attempts to teach these required skills within the confines of the current educational model, which consists of grade level classrooms with varied numbers of students, housed in brick and mortar buildings, with traditional meeting hours, that limit when, where, and how instruction and learning options occurs. Educational leaders, policy makers, and technology enthusiasts pronounce that changes are needed to incorporate a variety of learning environments permitting the systematic integration of authentic student centered educational technology. My personal view is that this type of change requires leadership at and beyond the district level. I believe that many administrators in school and central office positions associate technology use with technology integration. I believe that many district level technology departments establish and maintain infrastructure and access to technological devices, as well as providing administrative and information technology support, with a limited focus on how the technology is ultimately used by teachers and students for instructional purposes. As the researcher, I realize this subjective view may

influence my interpretation, therefore I limited the impact of bias by using a structured design approach, purposefully selected participants likely to deepen my understanding of technology coordination that is taking place at the district level, standardized my data collection procedures, and repeatedly confronted my initial beliefs and opinions against the data collected. When reporting my data, I continually kept what I recognized as the participant's intent at the forefront of my mind and reviewed my findings as if I were the participant to ensure I had reasonably interpreted the data.

Reflectivity, the second validity threat commonly addressed by researchers, is a term used to describe the impact and influence of the researcher on the research participants (Maxwell, 2005). It is grounded in the concept that through interactions the worldview of both the researcher and the participant are shaped and transformed (Maxwell, 2005). Qualitative research requires that contact be made between the researcher and the subject under study, making it impossible to eliminate the *actual* influence of the researcher (Maxwell, 2005, p. 108). The presence of the researcher, according to Patton (2002), may affect the participants' responses and limit the scope of data available for interpretation. Therefore, the focus of the researcher in qualitative research is on understanding the influence of the researcher on the subjects, not necessarily eliminating her influence (Maxwell, 2005). As I collected data during the one-on-one interviews and reviewed and analyzed transcriptions of interviews, documents, and notes taken, I was particularly mindful of how my questioning or comments may or may not have influenced the subjects' responses.

Lincoln and Guba (1985) identified a third element of validity, that of trustworthiness, that must be addressed by researchers when evaluating the significance

of their research. Credibility, transferability, dependability, and conformability are aspects of trustworthiness included within their evaluation criteria (Lincoln & Guba, 1985). Credibility considers the reasonableness of the data collected; transferability seeks to establish the applicability of the findings in other situations; dependability refers to the consistency and replicability of the findings; and conformability denotes the degree to which the findings are representative of the participant perceptions and views verses those of the researcher (Lincoln & Guba, 1985). Several techniques were recommended by Lincoln and Guba (1985) for establishing the credibility of the phenomenon under study. The provisions selected to ensure that an accurate portrayal of the phenomenon under study in this research included the use of appropriate research methods, iterative questioning, method triangulation, and peer debriefing. Lincoln and Guba (1985) do not place the actual burden of generalizing the research findings on the researcher; rather they recommend that sufficient details of the sampling method, data collection procedures, and context of the study are provided to enable transferability of the findings to other circumstances and settings. To gather "rich" data, each interview was recorded and transcribed verbatim. Rich descriptions of the data were written in narrative form and included direct comments from the participant. In regards to dependability, Lincoln and Guba (1985) suggested researchers identify sources of potential deviation that might account for possible variations in the findings if the research is replicated. Potential sources of variation for this study include alterations in the funding methods used to support technology integration, modifications in the organizational structure of the participating school systems, shifts in the responsibilities undertaken by participants, culmination of technology related initiatives currently in progress, and adaptation of

educational policies at the federal, state, and local level. The unique experiences and responsibilities of these two district level technology coordinators present another facet for variability. Conformability, the final element of trustworthiness, seeks to ensure that the findings accurately represent the ideas of the participants rather than the views of the researcher. To address the criteria of conformability, Miles and Huberman (1994) recommended that researchers acknowledge their own predispositions, continuously reflect on the research throughout the data collection and analysis process, provide a detailed account of the procedures used to gather and analyze data, and triangulate data from multiple sources. Efforts made to provide an audit trail starting with the paradigms underlying the research methods concluded with the steps employed to collect, analyze, and interpret the data.

Summary

This chapter provided my rational for the selection of qualitative and case study as the most appropriate methodology and research design for exploring the experiences and perceptions of district level technology coordinators. I also identified within this chapter the ways in which these design decisions grounded my selection of participants, data collection , recording, and data analysis procedures. I concluded the methodology section by presenting the strategies I used to enhance the credibility and trustworthiness of my findings.

Chapter IV

RESEARCH FINDINGS

Case One Analysis: Context of the Study

Located in southeast Georgia, the district of the first case study contains several cities situated within 500 square miles. According to the federal government's census in 2010, the estimated population of the county was around 63,000 (U.S. Census Bureau, 2014). The county has a growing, yet transient, population and manages 14 schools serving over 10,000 students. The county ranked 81 out of 159 in per capita income, reported a median family income of $46,818 and identified 17.6% of the population as falling below the poverty level (U.S. Census Bureau, 2014). Although the county is not considered to be one of the poorest counties in the state, the total percentage of students who were eligible in the county for free and reduced lunch in 2013 was roughly 68%, which is above the state average of 59.7% (KidsCount Data Center, 2014). Nearby post-graduation educational facilities work in partnership with the school system and the several industrial and manufacturing companies located in the county provide students with opportunities to earn credit and experience toward technical, associate, or advanced undergraduate and graduate degrees.

Each of the meetings with the case study participant, who will be referred to as Alice, took place within the newly built board of education office. In addition to housing workspace for administrative department heads and support staff, the facility contain ample space for conducting meetings and a variety of professional development

activities. Before the move, the technical and instructional technology support staff was housed at one of the middle schools in three classrooms. Making the transition to being part of the central office staff was not easy. Alice explained, "Our folks had kind of done their own things. They had been in a school environment. It was weird. Even though we weren't part of the middle school, we kind of were. We weren't part of central office, even though we kind of were." Although Alice attended committee meetings at the central office prior to the move, she never considered herself a true participant in the conversations taking place. She noted, "I would have to drive over to the central office, which wasn't even here. It was across town. And they would talk about things. I wasn't even in the loop. But I was expected to be." When the department moved to the new facility, shortly after Alice's promotion to the role of director of technology and media, it took about 6 months to a year before the central office staff really felt part of the central office. Alice jokingly referred to the office as her space, yet continues to remind herself that her name is not on the door.

Alice's Professional Background and Educational Experiences

For each meeting, Alice and I sat together at the round table located in her office. The decision to sit with me, as a colleague might, was one of many noticeable ways Alice fostered a sense of openness throughout the study and maintained her focus, despite the many tasks requiring her attention. While very professional in her appearance and manner, Alice's warm disposition and jovial personality promoted a relaxed atmosphere during the interviews. As a professional, Alice's answers reflected an appreciation for her role as a district level administrator and as a representative of the county.

Alice had resided in the community since she was 13 years old. After graduating, she went to a local public university where she majored in elementary education, returned to the county in 1994, and taught kindergarten while pursuing her media degree. She worked for a period of time as a media specialist and later joined the county's group of instructional technology specialists. That job required a lot of extra evening and weekend hours. When she and her husband, who is also an educator, decided to have a family, she left that position and resumed her work as a media specialist. Four years later, when a media coordinator position was advertised at the district level, she applied and was hired. Later when the individual who had been serving as the technology director at the time retired, Alice sought the position. She was selected to fill the role as the Executive Director of Technology/Media and has been serving in the position for the past 7 years.

The former director, who was the first individual to hold the position in the county and had served for 11 years, also came from a media background. She was considered forward in her use and interest in incorporating educational technology into activities within the media center. As the county's inventory of computers increased, a need arose for systematic management of the technological resources beyond what was then being done by the purchasing department. When the state decided to allot funds for a technology position at the district level, Alice's predecessor was approached.

Alice credits her predecessor with creating the groundwork of the district's technology department and preparing Alice for a number of administrative responsibilities related to the position. Alice does not have any information technology certifications; she does have advanced degrees in Instructional Technology and Media and Instructional Technology in Distance Education. She considers her greatest

preparation for the responsibilities of the job to be her instructional background as a classroom teacher, a media specialist, and an instructional technology trainer. The only area in which Alice's education and experience did not fully prepare her for this position was as manager of network operations. Despite serving as the first line of trouble shooting in her roles as the media specialist and as an instructional technology specialist, Alice had limited knowledge of network infrastructure, Intranet management, user-account management, communication management, and backup procedures. The presence in her department of a technical coordinator and network engineer resolved this issue. Alice obtains input from these individuals and performs independent research on networking products and solutions before making decisions in technical infrastructure matters. Alice explained, "If I can ask the right questions, I will get the right answers. It may not be what I want to hear or what they want me to hear, but if I ask it in the right way I am going to get the nitty-gritty, here is what it is. And I have had to learn that because I was not as familiar with the technical side."

Alice recounted her personal experiences with educational technology. As a kindergarten teacher, she and her seven colleagues shared one computer on a rolling cart. Later, the county moved from rolling carts to one or two stationary desktop computers per classroom. Media centers generally had more computers. When asked about her role in promoting technology integration, she focused on the years she spent in the media center from 1998 and 1999 and then again in 2001-2002 when support efforts for integrating technology into school offices and classrooms were not as dominate or prevalent as they are today. During this time, the county began purchasing SMART boards for classroom use, but access throughout the county and within a school was still

very limited. Alice would help teachers set up their systems, but was not required to provide technical or instructional support. One suggestion that Alice made to her colleagues for use of technology in instructional activities during that time involved student production of a media presentation for submission in the Georgia Media Festival. That event, which celebrates exceptional student-produced media projects, had been moving toward computer generated multimedia pieces at the time and provided an ideal opportunity, in Alice's opinion, for teachers to incorporate a project-based learning activity with technology. Alice also organized a media showcase bringing vendors together with media specialists across the county to showcase technology related educational products.

Alice's Department

Several administrative changes involving school leadership in Alice's district have taken place during the past few years. The county hired a new superintendent, replaced a high school principal, closed an elementary school, and made other organizational changes. Alice has been the "mainstay" throughout the transition; the organization of her department remained the same. In total, Alice is responsible for managing 16 support personnel all of whom, except for the media specialists, are housed at the board. The choice was made early on by the county to provide both *technical* and *instructional* aspects of educational technology support. This decision was perceived by Alice as giving the system a substantial advantage over other districts that only invested in technical support. She stated, "We chose to not filter all of it [the state allotted funds for technology] on technical. Another system close to us at one point chose to fund all technical. Well, now they have to backtrack because you need the instructional as well."

Alice is glad that her county has structured the department to include three areas: technical, instructional technology use, and media. Each of these areas has a coordinator that reports directly to Alice. According to Alice, the organizational structure of the department ensures that the "right hand knows what the left hand is doing." When errors occur as a result of a software update, the technicians are able to communicate troubleshooting strategies to instructional technology staff who relay the problems and solutions to teachers. Alice has found that some tasks are not as clearly identifiable as solely technical, solely instructional, or solely media. A gray line exists at times where the technician and the instructional support and media personnel must cooperate to resolve a problem. Alice believes that housing the three aspects of support in one department ensures that a cohesive effort is made to support teachers in a timely manner. Alice perceives the department as a cohesive team where individuals are given opportunities to collaborate on technology issues. This is evident in her frequent use of the pronoun "we" when referring to decisions made by the department.

Alice recognizes that there are business aspects to running a school system. But Alice stressed that it is crucial to remember that a prekindergarten to twelfth grade school system is a different environment. "You can't treat it like…it is not a business function…your clients are students and your clients are teachers," Alice emphasized. Profit and efficiency are not the primary goals, and there are challenges in working with children who do not exist in an adult business environment. Her staff must work within the constraints of the school environment to provide both technical and instructional services.

For the most part, the support staff members in the department, even the network engineer, have instructional backgrounds and were hired from within the system. They are described by Alice as "go-getters" and "out of the box people." As teachers and media specialists, they were already active users and embracers of technology and demonstrated a desire to learn more than just the "ins and outs" of the technical side. At times, Alice hired individuals from outside the school system, mainly from the business sector to fill technician positions. The results were not always successful. Alice explained,

> And just because they say it doesn't work or can't articulate to you what's wrong, it is still broken. You need to fix it. And sometimes we have had folks who have been so techy minded [that] their place is really in a cubicle. Not out having to be a people person. You can have all of the technical knowledge you want, but if you have not been in the classroom to have that experience of the end user, who ultimately is a classroom teacher addressing children, then you are not going to be able to, in my mind, effectively relate on the decisions made up here.

Alice also hired individuals with a Masters degree in Instructional Technology but without teaching experience. The problem was that these individuals had a really hard time identifying with the teachers and often proposed an activity encompassing the use of educational technology that was not possible with 30 students in the classroom. Alice contends that understanding the K-12 environment through practical experiences is a key to successfully supporting school personnel in their efforts to use educational technology in the classroom environment. Familiarity with the educational system, daily school routines, instructional practices, and assessment procedures makes it possible for Alice's

instructional staff to analyze, design, develop, implement, and evaluate professional development programs that support the use of educational technology. Individuals who are perceived by Alice as most effective at the job are able to "walk the line very easily" between the technical and instructional aspects of the job.

Alice monitors all members of her team. In addition to impromptu meetings with staff, daily morning updates from her tech support coordinator keep her informed about operational issues like software updates, in-county repair requests, and the status of infrastructure upgrades. Weekly meetings are scheduled on Friday with the instructional technology coordinator and the instructional technology staff. These meetings provide a consistent time for the group to share their plans, progress, and evaluation of various professional development programs and initiatives. In addition, Alice has an "open door" policy. "This is just the way I work and I guess I don't know any different," she expressed when discussing communication practices within the department. I observed this during my second meeting when a staff member entered the director's office for guidance on a presentation that was being created for an upcoming meeting held by the county superintendent. Alice encourages her staff to approach her with ideas and suggestions to improve technology infrastructure, delivery, and support.

Alice's team similarly maintains consistent contact with the teachers and media specialists in the schools that they serve. Technicians respond directly to work requests that are received by the department's technology help desk software program, accessible through the county's website. Quarterly meetings are held by the instructional technology coordinator with computer lab teachers at the elementary schools. The media coordinator oversees the monthly meetings for media specialists. Alice reviews the agendas in

advance and attends every other media meeting. As a result of this communication structure, Alice's team keeps her informed of how people are being served in the county. Although her office is no longer located in a school, Alice's staff assures her knowledge of how technology is actually being used in classrooms and media centers within the district.

Alice perceives her county's organization of the technology department to be different from other counties within the state and believes that the role and responsibilities of the person performing the position of district coordinator of technology in Georgia, "is all over the map." Alice knows directors whose role is simply infrastructure and data management. She said, "I mean, I still think there is lots of work to do because sometimes it may just be all they care about is infrastructure....We still have folks like that who are directors and maybe they don't have any other people." Recently at an event she attended, Alice had the opportunity to share her thoughts with members of the Georgia legislature, community members, and other individuals outside her school system. She discovered individuals at the state level can be unaware of the need to have instructional as well as technical support at the district level. Alice was surprised to hear a Georgia legislator question the county's decision to employ both technical and instructional technology staff. He kept saying, "I am seeing your staff and seeing how you work with the teachers and, well couldn't you get just somebody who works on computers?" Alice told him, "Well, no! You can't! You're missing the boat."

Alice's Role in the County

Alice's district has adopted a 3-year plan, which is a comprehensive picture of the county's blueprint to reach their vision a of 21st century learning environment: the goals

of that plan are to (1) provide all staff and student equitable access, (2) provide all instructional personnel continued high quality professional learning in the effective use and integration of technologies, (3) ensure the integration of technology in the standards-based curriculum and assess students' technology literacy, (4) establish an ongoing process of assessing the use of technology to improve instructional planning, (5) utilize technology as a medium to create an interactive partnership between the school system and stakeholders, and (6) continue to enhance, maintain, and support the network infrastructure. The plan was developed by a committee consisting of members from the central office, principals, media specialists, community partners, parents, and a student before being submitted for review to the superintendent and to the board for final approval. Ultimately, Alice is placed in a leadership role as the primary individual responsible for monitoring and meeting the goals established in the plan. District goals and strategies for improving access, infrastructure, and instructional and administrative uses of technological devices appear to guide Alice's decisions and influence her management of the technology and media department. Although Alice knows that the job title and responsibilities vary across the state, Alice believes that individuals holding her type of position, however labeled, are needed as leaders now more than ever. In her district, Alice has become the "go to" person for anything involving technology in the county. Alice reported that no two days are ever the same and that her job varies depending on the needs of the county at any particular time. Alice considers her responsibilities as the Executive Director of Technology/Media, to include management of the county's digital resources and equipment, coordination of technology related professional development programs and instructional support for staff, formation of

district policies and procedures pertaining to educational technology use within the system, establishment and maintenance of the district's Intranet and Internet sites, participation in system meetings at the local level, and the building of relationships with state and federal networks that support technology initiatives.

In Alice's opinion, access and infrastructure remain the number one hindrance to fulfilling the goal of reaching a digital age learning environment. This past year the county focused on improving the network infrastructure. Alice does not have a background in information technology management and looks to her technical coordinator for guidance through this process. The task of coordinating the upgrade of the district's wireless infrastructure consumed most of Alice's energy the past year. While the wireless network upgrade will ultimately strengthen the system's access to the Internet, giving staff and students a more reliable wireless connection, problems with the upgrade made it difficult for Alice to attend regular meetings with her media staff and make site visits to schools, tasks that help her keep in touch with the status of technology use in the schools and the professional development needs of teachers. Alice feels a huge sense of responsibility for the effectiveness of this technological innovation within the county. When the technology equipment and networks are not working correctly in the school, she takes the responsibility on herself. She explained, "It is a huge weight on my shoulders to know that we are spending all this money, we are doing all this, and it is not working right in the school." What helps Alice navigate through these trials is her recognition that moving towards a digital-age environment within the educational system is a transition, a process. As she sees it, "We are still in the prehistoric days of a lot of this. We are getting there. We will be there."

The county has made considerable improvements in educational technology access as compared to the infrastructure Alice initially utilized as a classroom teacher and media specialist. According to Alice, the county has made a very conscious effort to put local dollars towards technology hardware when fiscally able to do so. When she first started as director 7 years ago, $90 per student per year was spent on technology. As the economic times changed, the money spent per student on technology gradually decreased. Through strategic planning, the county purchased technology devices for the bulk of teachers in the county, including laptops, a projector, a SMART ™ board interactive whiteboard, and between three to five computers per classroom for student use. Through two grant funded initiatives, one secured through the curriculum department and the other through Alice's department, the system purchased 4,300 iPads for use in middle-school math and science classes and some Netbooks for use at the high school.

Notwithstanding these acquisitions, Alice considers the data reporting on access to be accurate but completely misleading. The number of devices in the district reported yearly to the state suggests greater access to technological equipment than actually exists and does not present a realistic picture of the usability of the technology. Alice explained, "So when you look at our inventory, our state inventory, if you go and pull it up, it says that we are two to one. Do you know how many computers that are dinosaurs? That can't hold a video…that can't stream it. There's a bunch. But the way we have to report it, it makes us look way better than we really are." The age and functioning of the devices are questionable. Integration of new equipment with older devices is more difficult because

of the lack of manufacturer support in rural areas. Alice commented, "Unless you are in Atlanta, they don't really want to deal with you."

The adoption of the new teacher evaluation system by the state, which specifically identifies effective use of instructional technology as a factor of teacher assessment, has caused teachers to question the status of available devices in their classroom. Teachers' effectiveness at "determin[ing] available technology resources and integrat[ing] technology into instruction when it is value-added" is a component evaluated as part of the Standard 2: Instructional planning (GA DOE, Teacher Keys Effectiveness System Fact Sheets, 2012, p. 19). The fact that not all of the teachers in the county have the same quantity and quality of technology equipment available concerns Alice and makes it difficult for her to fairly evaluate the overall level of technology integration countywide. Alice stated,

> We've not really looked at it from a K-12 standpoint because we don't have the, we don't have a standard, standardized kind of model. I mean they all have SMART boards, but how much are the students using them versus the teachers? And we have, we are in the process right now where we are looking to refresh our equipment. So we are not, everyone is not kind of equal for me to be able to fairly pull data.

Ultimately, a one-to-one equivalent device to student ratio is what Alice would like for her county. She believes that providing students with the opportunity to have the tools, the technological devices, within their own hands gives them a sense of ownership for their learning, a sensation not experienced when teachers control the use of technology for direct instruction. Like many other local and national school systems, her

county is exploring other ways to achieve that goal, such as a Bring Your Own Device (BYOD) initiative, to increase individual student access to technology. Alice recognizes major challenges in that proposal. The economic status of a community impacts the success of this type of technology endeavor. Rural counties with a higher proportion of free and reduced lunch count will not necessarily have the same number of kids with devices at home as more affluent counties. In urban areas, there are business partners that help provide devices to their customers. There are simply not as many potential business partners in rural areas. Comparing counties, as if equal, was a frustration noted in Alice's comment, "And the whole thing is like, Forsyth County in northern Atlanta, they do it. They do a great job. But you know what? I have to look at what their free and reduced lunch count is. We are not even close. I mean, it is just a whole other [story]." Alice is keenly aware of the prosperity in Forsyth County as reflected in the number of students receiving free and reduced lunch, which was reported by the GA DOE Office of Data and Reporting (2014) as 18.67% for the 2014 fiscal year, ranking the county as the third lowest in the state. Forsyth County was also ranked by Forbes in 2010 as one of America's 25 richest counties. There are other problems noted by Alice as associated with a BYOD initiative. Policies would have to be initiated to manage acceptable devices, to limit students' access to the schools' network on private devices, to protect private district information, and to monitor students' use of devices and access to inappropriate Internet sites. An additional problem would be the issue of applications on different device systems. Not all devices are compatible with all applications. Providing sufficient instructional training for teachers in the use of one type of technological device is in itself challenging; multiple devices would increase that challenge exponentially. For

Alice, solving the dilemma of achieving equivalent device access across the district is an ongoing problem.

Both in the 3-year plan and as repeatedly expressed by Alice during the interviews, the second most important facet of her job is coordination of professional development programs and support for staff. As stated in the plan, it is her goal "to provide materials, equipment, software, and most importantly, training that allows all stakeholders to benefit from current and new technology and the advantages it gives in enriching our established curriculum."

Alice recognizes the role principals have in establishing and sustaining a school culture that embraces technology and the need to lead their school through the adoption process of integrating technology into the classroom and media centers. Just recently Alice was part of a committee interviewing principals for an elementary site. While not asked to prepare specific questions for the interview, Alice was pleased when a colleague asked the interviewee about the role technology plays in an elementary school with regard to teaching and learning. Alice said, "It goes back to that administrator. All the time in that, where is the [principals'] priority? How important is it to them? The ones [schools] that really thrive [with technology integration], that principal is all about it. The ones [schools]who as soon as one or two teachers start squawking, as soon as they start squirming and getting a little uncomfortable, then we [the principals] put the hammer down and we're [the school] done. It's just the whole climate. I mean, it boils down to, they can be doing some really awesome things and really having the access for their kids, if they would have just said, 'Let's try it, let's follow through, let's hold fast.'" According to Alice, the principal's acceptance, embracement, and push for technology integration

into instruction determine to a great extent whether or not it will be sustained in the school. Alice reiterated that principals need more training on building a technology age learning culture starting with the hiring process, development of school action plans, professional development needs, and regular opportunities for staff to collaborate outside of the classroom. She has found that principals may be supportive of technology initiatives but have no clear image of what comprehensive integration practices would look like in the classroom, an insight discovered during the implementation of recent grants. Alice explained, "Well, and that is where I think we need to do a better job with the principals. That is one part of that grant where we really had the 6th through 8th [grade] principals. I think we didn't do as well of a job getting them ready. I mean, they were so supportive. They were extremely supportive. They think it's been great. But really, then really pushing it and continuing to push it, I think that's where we, I think that if we have the opportunity to get more money and more equipment and roll it out, the principals will have to have a component."

Advancing administrators' knowledge of instructional uses of technology to support standards based instruction was a component of the 3-year technology plan. In the past, Alice coordinated a technology advisory board, which was a training program for principals. The new superintendent has advised Alice that she intends to have monthly meetings with the principals in the district and expects Alice to lead breakout sessions directed at addressing the integration of technology in schools. Alice will receive input and guidance from the superintendent on the topics planned for the professional development breakout sessions.

There are two primary approaches used by Alice in providing professional development and support to teachers. Guided by their background in the use of information technologies and presentation programs, Alice's media specialists focus their attention on the need to assist teachers to develop instructional plans that integrate informational resources and information literacy skills into their curriculum. Using technology literacy standards for the 21st century learner as identified by the State of Georgia Performance Standards, the American Association of School Librarians, and the International Society for Technology in Education NETS for students, Alice and her media specialists have formulated a media center plan, which is available online, outlining how this will be done. Under the plan, media specialists: collaborate with teachers on instructional lessons, especially in regards to technology literacy; provide technology mini-workshops with staff and students; increase the awareness of cyber safety and new and current issues in technology and information access; assist staff and students in media production; and promote technology related events. Influenced by Alice's previous work in the Georgia Media Festival Project, the media specialists developed a special series of workshops for interested K-12 teachers on information literacy skills. Teachers attending these workshops collaboratively designed instructional modules, implemented them in their classrooms, and assisted students as they created products for submission in the Georgia Media Festival project.

According to the media plan, the instructional technology specialists are responsible for providing on-site assistance and off-site professional development programs in the use and integration of educational technology into instructional practices. A needs survey is sent out annually in the spring to allow teachers an opportunity to

provide insight into their desire for training and professional development needs. The collected data are used to develop countywide professional development training sessions. Alice identified the current top priorities for professional development in her county as the integration of technology to support the Common Core Performance Standards and the management and maintenance of mobile devices in classrooms.

Alice and her staff normally schedule the training sessions at the central office. They have found that teachers' experiences within the training are stronger when they are removed from the frequent interruptions and responsibilities associated with their buildings. If the teachers are at the central district office, there are fewer interruptions allowing the training session to run more smoothly and productively. Alice noted that providing professional development training in the pull-out model employed by her county appears to rejuvenate and motivate the teaching staff. Alice said, "I wish you could have seen these teachers too that day because it was encouraging in that when we take them out, even though they are gone from their classrooms and they do have so much on them, when we take them out and they are able to work on those types of things, they get excited. They kind of get rejuvenated a little bit. There is a spark."

The structure and content of the training sessions are based on Alice's belief about how teachers perceive professional development. Alice shared her perception of the role of the professional development provided by her instructional staff, explaining that teachers want hands-on exploration with the digital tool to determine how the device can best be used in their classroom, and they want quick ideas and resources that can be immediately implemented. The following comments presented by Alice illuminate her views on the role of professional development:

> They want down and dirty. How is this going to impact me in my classroom? How is this going to impact my kid? The philosophy behind it… I think we could offer that if someone wanted to come. But I think [pause] I don't like [pause] I'm a real pragmatic person and a realist. So for me the philosophy tied to technology [pause] I don't want them to [pause] they have sat in college classes before. They want [pause] they need hands on [pause] what is this going to do? What is this going to look like? We have had trainers in the past. That has been their approach. My approach to training is trying to be comfortable with the device, making sure that you are comfortable when your students are looking at you, all thirty of them, when it's not going to break, or what is going to happen? How do I roll this out? Not so much the theory behind it. They're going to get the theory and they know their content. So we are there to provide how does this look pulling it in to support my content. When we have done the pedagogy and we've done the constructivist and all that, it's great. But those classes tend to be not the fun and engaging, no matter how you [pause] and the teachers have so much on their plate that I just think you want them to use it and you don't want to get watered down in all that.

Although Alice and her staff prefer to conduct professional development training sessions at the central office, there are times when a more focused approach involving all members of a school staff is favored. Each year, Alice and her staff cross reference the data collected from the professional development needs survey against individual school initiatives to identify schools with a specific desire to improve use and integration of technology into classroom practices. Once such a school is identified, Alice and one of

her instructional technologists meet with the school's leadership team to collaboratively develop a professional development plan for that school. Alice encourages her staff to innovate and change the plan in accordance with the cooperative development process. Alice explained, "Now I am out of it. I said, 'Now you can start communicating with Dr. X, who is the director. If that is what you want, you're good. That is one thing I am learning. Go in…pull back." The assigned instructional technologist provides onsite professional development and support to the school's staff and reports regular updates on the plan's progress to Alice and the rest of the instructional technology team. Alice uses these reports in considering her future plans to support the schools and her department.

Alice considers her staff's work as the "behind the scenes" events that prepare teachers to use and integrate technology into classrooms practices. According to Alice, the support efforts her trainers take go beyond simple preparation and presentation of professional development training sessions to more involved ongoing site-based support. Alice and the trainers have noticed that without the necessary onsite support some teachers will not attempt to implement the strategies of using technological equipment learned during the training session. Before teachers are willing to use technology devices and programs, they want to experience how they work. Alice is aware of the challenge many teachers face using and integrating new technological devices into their instructional plans and explained repeatedly why ongoing support was so important,

> You've got to have people to support them. Whether it be they are teaching a lesson for the first time with a piece of technology and it may not go well. That it is what they are most nervous about, and they know the kids can pop up and help them. But that is not always the case. You know it is good to have somebody just

> kind of tag teaming and being there if something weird techy goes wrong. Because the first time it doesn't go right they are frustrated. That's it. They're done. And I can't blame them. They are always, even though they have stuff, they are always going to need support on how to use it and how to manage it. A technician is not going to be able to tell them how to manage it. They are not really going to be able to tell them how to use it because they are just going to get it working and move on to the next thing that is not working. The instructional folks are going to be the ones having those communications about what is best for the students. Let's try this. Your management, you might want to do this. If your technology goes down, you might want to do this, plan B. The technicians are not well versed in that.

Instilling a sense of support or service among the members in her department is considered by Alice to be one of the most important aspects of her job. She explained,

> You know really promoting to my employees that they are here for service. It is a huge one. I really try to hone in on that. It is a priority always to make sure that they are very service oriented and also that we are seen as support.

Alice noted some challenges her department has faced in providing professional development opportunities to teachers. Initially, funding must be secured to hire substitutes. Then, a balance must be struck between pulling teachers out of classrooms for professional development and leaving them in classrooms to teach. In the past, teacher training was scheduled after school and during half-day and early-release days in an attempt to limit cost and disruption of class time. Alice has observed that teachers are more tired and less focused in after school sessions and often less willing to participate

without stipends. The new superintendent is eager to expand the use of educational technology, particularly to advance teachers' ability to learn in a digital environment, and she acknowledges the need to balance professional development opportunities with classroom instructional time. She suggested the possible use of webinars. Alice expressed reservations about using webinars, concerned that teachers, as passive participants with no real opportunity to try out the strategies outside of the classroom with guidance from support staff, may view the session to be of little value. If webinars are used, at the least, Alice would want her staff to provide onsite follow-up visits to give the teachers hands-on support.

Alice and her instructional technology staff also provide training and support to board members and employees in other central office departments. Alice's access to department heads within the district has allowed her to identify and respond to unique professional development needs of the district staff. This includes specific responses to training requests made by administrators and central office personnel. For example, the food services manager recently requested that Alice's staff conduct training on applications for her head food service staff.

Leading the district in the development, distribution, and evaluation of district policies and procedures is another of Alice's major responsibilities. Members of the school board look to Alice to broaden their understanding of emerging trends in educational technology. Recently Alice met with board members to clarify the difference between cell phone use and the concept of Bring Your Own Device (BYOD). Alice clarified the difference among policies permitting student access to personal devices in

school, as well as the implications of such initiatives on infrastructure and schools. Alice explained,

> You know, you want a child to bring a cell phone, that's one thing. You think they are just going to have BYOD and we have no teachers trained; we have infrastructure not set up; we have no policy or guidelines [pause]; we don't have [a] BYOD [initiative]. We need to get a policy in place from the county to understand what we are going to do. Teachers have to be trained on how to really implement that in their classrooms and understand how they are going to teach it when all students come with [a variety of] devices.

The superintendent looks to Alice to assist in formulating district policies and procedures. These include detailing Internet use terms and disciplinary actions for inappropriate use, providing procedures for maintaining staff passwords, software installation, virus protection, and security. Alice is often asked to participate in planned and impromptu meetings at the central office with directors from other departments to answer technical questions and offer suggestions regarding information and technology tools. Prior to our first interview, Alice's presence was requested at a meeting between the superintendent and the director of operations to discuss the logistics of developing a social media presence. She was also asked recently to provide support to the curriculum and personnel department in utilizing the online teaching and learning platform associated with administration of the new statewide teacher and administrator evaluation tool. Alice's department also has a role in assisting the division of exceptional learners in the identification of assistive technology devices and strategies to use within special education classrooms.

Alice is responsible for the development and implementation of the district technology plan. In the past, Alice took it upon herself to familiarize herself with individual school improvement plans. New expectations from the superintendent are being placed on Alice to take a more active role in the development and evaluation of school improvement plans to ensure alignment with the district strategic plan for technology integration. Alice indicated that she is looking forward to assuming this additional responsibility and perceives it to be another opportunity to ensure technology integration is consistently addressed throughout the county.

Responsibility for the district website also falls on Alice and her head instructional technology coordinator. The county website communicates policies, procedures, events, and resources to the school community and the public at large. Many of the departments at the central office have a page within the site where additional resources can be accessed. The technology and media department's page, for example, communicates the vision of the department and links to instructional technology resources, the media page, video and media resources, equipment quotes, new teacher orientation resources, the technology help desk, teacher downloads, and a course evaluation form. The 3-year technology plan is also available on the site for review and download. Alice has delegated the maintenance of the district site to one of her instructional technologists, who often assumes responsibility of updating individual school sites as well. The website is very comprehensive with the resources it provides and reflects a high level of maintenance that insures accurate and current information.

As the Executive Director of Technology/Media, Alice regularly collaborates with a variety of school personnel to improve the county's use of technological resources.

Alice recognizes that building relationships and maintaining communication with key individuals and groups, both within and outside her district, are essential to meeting the district goals for technology integration. Although Alice has limited involvement in advocacy efforts at the national level, she is a member of two national educational technology organizations, CoSN (the Consortium for School Networking) and ISTE (International Society for Technology in Education), and perceives them as responsible for advocating for national policies pertaining to the acquisition and use of educational technology. In Alice's opinion, educational technology has not generally been perceived as an integrated part of curriculum, so there are not a lot of policies beyond funding stipulations generally associated with its instructional use. Alice acknowledges that the technology organizations are not as aggressive in taking an active role in policy development as other educational organizations. As Alice sees it, the impetus to transform the educational landscape in regards to educational technology must come from the federal government in the form of a federal policy. Alice thinks this is essential to ensure uniformity, sustainability, and adherence. Alice explained,

> Well, it needs to come from a uniform standpoint and I think a sustainability standpoint. It needs to come from the federal government saying to the states, 'This has to be done.' Now, of course, there is always, 'This has to be done or you don't get funding.' So, how do we fund it? How do we make it happen? But if it is just a state initiative, I'm afraid that down the road it will just be [pause] let's move on to the next thing. So, it's kind of a Catch 22. You don't want to have the [pause] I don't love federal government's involvement a lot, but at the same time there are certain things that our schools are held accountable for and

it's not just a state issue. And I think that would have more staying power in the long term.

Alice deems state level leadership, in addition to federal policies, to be a necessary component for promoting technology acquisition and use. In Alice's opinion, the director of technology at the state board of education should lead the charge. According to Alice, the current leadership at the state level appears to be shifting from a sole focus on products to include a broader view on instruction. Alice shared the recently released the GA DOE's technology services strategic plan, which includes a description of Georgia's Path to Personalized Learning, an initiative to be rolled out over the next 2 years. Alice expressed excitement about the direction taken by the department but also appeared concerned about meeting the deadline for infrastructure updates. In referring to the department's goal, Alice commented, "But it is way down here and we are way over here. I am not a techie, but I know the stuff has to work before we can get there. I want it to get there. But we keep going back around to [pause] the system can't handle it. They can't handle it." Alice suggested that even the personnel at the state level continue their focus on infrastructure and [equipment] count. According to Alice, the issue of infrastructure and use was addressed by Georgia's state's technology director during one of their monthly technology director conference calls. In sharing information on the four tiers in the new grant program, state leadership acknowledged that most of the money and efforts in the first three tiers will be focused on preparing the infrastructure. While Alice appreciates the regular updates from the state, she would like to have "a little voice" to share some of her insight about the progress and challenges her county has faced as they try to integrate technology into instructional practices. She wants to be given a chance to

speak out about what is going on and what is needed within her system. Unfortunately, monthly conference calls with the state personnel are geared more at disseminating information to the technology directors throughout the state rather than providing an opportunity for conversations about policies related to technology integration. Alice would like Georgia to review funding policies for textbooks in light of the move to digital content and applications. Sufficient and consistent funding for instructional technology support is another state policy directive Alice would like to see.

Consistent expectations for all teachers in the system are another component Alice identified as necessary to reach the level of technology use and integration she desires. Alice explained, "Well, from the local it is going to take the superintendent making it a district initiative and not so much pockets. So, from the superintendent's standpoint saying, 'This is what we are going to do…this is going to happen." Evaluation towards meeting expectations must also be done consistently. According to Alice, only 75% of the schools' principals use the purchased Ewalk program to evaluate technology integration in the form of teacher use, student use, identification of devices used, and grouping methods. Lesson plan audits have not been consistently happening even though this requirement was part of the last county technology plan. Alice found the current expectation for technology integration with lesson plans to be minimal and is pleased that the new superintendent intends to focus attention on student use of technologies, rather than teacher use. Alice found use of a third party to evaluate progress, as was done during the county's implementation of their recently grant funded iPad initiative, to be most helpful in gathering data on integration practices. Alice recognized and appreciated the value of having the input of an outsider serving as a

bridge between each level, the teachers, principals, and administrators, within the system. She explained,

> And I think it could be someone on staff. But the problem is [pause] it is good to have someone on staff, but it is also good to have someone like we did for the high schools [an outside contractor hired to assist with the county's recent grant funded technology initiative]. Where you have a support system and they can see both sides. They can see what is going on with the principal or the administration. They can see what is going on with the teachers and how it is affecting the students [pause] how the principal's actions are affecting the teachers. They just have an outside view that I think can be very non-threatening.

Alice believes that the new superintendent envisions and expects increased technology integration within teaching and learning practices at all levels of the system and predicted that the technology and media department will have "a more fluid representation and presence" within the county in the coming years. She has been asked by the new superintendent to develop a replacement and refresh cycle for existing technology, to evaluate the school staff's current level of comfort integrating technology, to help establish a Facebook and Twitter presence within the county, and to participate in state level training on implementation of the new teachers and administrative evaluation system, both of which have performance expectations associated with technology use. She believes that some responsibilities for student services may be reassigned to her as well and indicated, "I'm learning this year. The superintendent has tasked me to learn." Other departments within the system are also expected to become part of a learning community. Transparency and collaboration among central office departments are

expectations communicated by the new superintendent. Alice appears to embrace these changes as they reflect her philosophy. A comment from one interview provides evidence of this:

> I guess I'm not having a problem with it because it goes with my philosophy. I've been wanting that so I'm like, "Yah, let's do it! It's all good. You just got to get through it." I know that is easier said than done. Nothing worth doing has ever been easy. So, I wholeheartedly support her. It's hard to look at only your [pause] I mean, it is easy to look at only your area and not see the bigger pictures. And I am a bigger picture person. The bigger picture people don't seem to be having as much a problem as the "this is my area, why are we changing, and why am I having to share information about it.

Alice's Vision for Technology Integration

The bigger vision for the county, as seen by Alice, involves the recognition that curriculum should be the driving force behind many organization decisions. Technology's role is to support curriculum and instruction. According to Alice, the past curriculum director was not hired to really take on the overall big picture, leaving gaps and pieces involving the integration of technology within instructional practices. Alice has a good relationship with the new assistant superintendent of teaching and learning, who used to be her former boss when she was a media specialist. Alice described the assistant superintendent as progressive in the integration of technology within her school and was pleased to now be included in curriculum conversations taking place at the central level. Until recently, Alice noticed there was not a great awareness of exactly how technology could be used to promote organizational goals as presented in this statement:

> They care, but now it [technology integration] is more mission critical, everything on our side of the house. But a lot of people, they didn't know. Like up higher, didn't know what it [technology integration] was. They don't know how to help assist and organizing it [technology integration] to best [pause] all they thought was, "Okay, technology [pause] we need to keep it [technological devices] running. We need to fix it [technological devices] in the classroom." Now there is a big push for instructional. And it [the push] has been. But it is really building now with mobile devices and a lot more vendors putting things digitally [pause] content that is digital. Text books that are digital. And we are still early on with that, but it's [digital content] here. And it's [digital content] not going anywhere.

From Alice's perspective, curriculum is moving towards the development and utilization of digital content. Alice likes the idea of digital content but recognizes that her county, along with the nation, is not really prepared with the infrastructure or the necessary teacher preparation yet. She explained:

> That's right, but there are a lot of logistics. To me, just to put that on the teachers like that. If you are not really an innovative kind of go with the flow [pause]. You want to talk about giving students their own ownership of the [pause]. You're right, their owning it and then they are going to own their learning too. And that is a whole other thing to put on a teacher. So, I mean, I think it definitely has its place. I mean, we have repaired our infrastructure and making that happen so that when the trigger is pulled, it won't be them looking at us going, "Infrastructure? What are you doing?" But at the same time, policy and teachers [pause] getting them ready [pause] it is a whole other aspect.

Over the past year, members of Alice's department have assisted teachers through training to create their own digital content on iBooks and iTunes. Alice's hope is to have teachers building online courses and lessons embedded with lectures, reading passages, interactive applications, media clips, audio clips, and web resources. Students would use these resources in either the traditional classroom or in a flipped classroom, a model of blended learning in which students view new content online at home and receive individualized guidance and support from teachers on practice assignments at school. While there are some pre-made digital content resources available for purchase that reportedly align with state standards, Alice perceives classroom teachers as content specialists and the primary agent for providing needed instructional materials. Alice explained "I do strongly believe in it, even though we are in the early stages, that the teachers creating that digital content, because they are the ones in the trenches learning those standards, knowing them."

Alice has a vision of where the educational system is heading, towards the comprehensive integration of technology, and believes individuals serving as technology directors or coordinators must have "an instructional mind" to move systems beyond concerns over hardware and specs to a focus on the integration of technology within instruction. Although Alice feels empowered in her position to make decisions regarding professional development programs aims at improving the integration of technology in teaching and learning, she recognizes the need for collaboration between her department and the curriculum department. Alice recognizes members of the curriculum department as specialists in content and teaching strategies and her staff, the instructional technologists, as specialists in technological devices and instructional technology

strategies to support the delivery, acquisition, and mastery of content. The efforts between the departments, Alice contends, ultimately is required as apparent in this comment,

> We are starting to really work together because digital content [pause]. Clearly, you need a curriculum department, a strong curriculum department. But at the same time, with all the state wants us to do now with everything going web-based and all those things, it is still not just about the stuff. It is not about the specs. And I think there still needs to be a big voice that shows the teachers how to do this. And curriculum folks a lot of times are very curriculum minded with strategies and things like that, and they know content. I always tell my [instructional technology staff], they don't have to know content, but they need to have strategies and tools to use and show them what it should look like with the content.

Alice hopes that students leave her system having been provided ample opportunities to develop their technology literacy skills, to use, manipulate, and navigate various technological resources. She explained, "You know from an education standpoint you want to be able to provide those opportunities to them to allow them to be successful when they go out into the workforce in whatever capacity they contribute. So you want to be able to give them the opportunity to have used the equipment, to create with the equipment, you know, and to be able to feel comfortable navigating." It is essential to Alice that technology be placed in students' hands. That it be interactive. Alice's vision for instructional technology integration involves combining independent and collaborative learning opportunities with devices presenting teacher created digital

content. The structure of the classroom would be modified to incorporate more independent learning stations and workspace for student created projects. Alice described the environment as "learning spaces," an arrangement of technological resources seen in many media centers. While the content would remain the same, the format of the information would be varied to meet a student's individual ability and need. Teachers would serve as facilitators preparing digital resources in advance to support students' exploration and manipulation of the information in class. Alice presented the following description of what would be taking place in the classroom:

> High quality use of technology is when you walk in the classroom and it's very integrated, seamlessly integrated to the classroom with the standards. It is more about projects and not so much drill and practice. Although, remediation is important and so is enrichment. You know, drill and skill has its place, but overall the learning would be where technology was not seen as a separate tool.

Alice's comfort level remains with instruction taking place primarily within the confines of the traditional school day and school building. When asked about offering flexible school hours, Alice indicated, "Possibly, um, you know that is really kind of busting out of the whole brick and mortar idea anyway. It could be. I mean, there could be a lot, almost like a take on the flipped classroom too. You know you could incorporate a lot of different things, so, I mean, it could have flexible hours. I don't know if I am that out of the box to be honest with you."

Alice believes the ultimate goal of education, which can be accomplished in part through the integration of technology, is to help students become independent learners and problem solvers…a feat which requires teachers' willingness to "let their guards

down enough to be part of the learning" and to "turn over a little bit of the control" to students thereby giving them a sense of ownership of their learning. Alice recognizes that moving in this direction is a process, one which requires guidance and support for teachers, one which Alice perceived as being in conflict with the nature of the current educational system. Based on her personal experiences and observations, Alice has found that the educational establishment works against innovation, in that teachers, departments, and even administrators will put pressure on individuals to conform and stay within the bounds of their experience level as presented in this vignette:

> I think that a lot of times those folks that do come out of college, even if they feel that way to start with, they feel like, "Okay, I'm going to [pause]" It is quickly squashed in my mind because of the departments or who they are with and what they have to do in the K-12 environment and what they are required to do because we have not made the true shift. Even if they are not being prepared for some things, I think that they are open to do it because they have had devices in their homes or they don't know. So, where older people, even older than me, that are sitting there needing to go home aren't and you have the department head who says, "We can't…why would you want to do that?" Instead of encouraging that, it is almost seen as a, "We don't have time to do that. Why would you?" Or even the means to if they wanted to. A lot of places don't have the [pause] I mean we find it here. I have go-getters. Well, your low man on the totem pole. So instead of getting that rolling lab, forget about it!

Alice believes the current focus of the educational system on standardization of curriculum deters teachers from experimenting with technology based independent studies. Alice shared:

> There is so much pressure to really [prepare students for standardized tests] and at this point they are teaching and the kids are learning, but the teachers are just going through the motions because they are being forced to. They can't see the forest for the trees. And so they are just [pause] really, they've got blinders on and they are just looking [forward]. We are having a hard time alone just with the CCGPS and Teacher Keys, let alone throw in 30 devices and have them used for a purposeful reason and not just let's look at all the Apps we can find. So that is a tall order.

As a result, Alice and her staff have intentionally pulled back and modified their professional development plans in lieu of the other state mandated initiatives. Disconnect. As Alice sees it, disconnect exists when policy makers don't understand the nature of the educational system and the ramifications of their policies. "They are just not as knowledgeable. They are very [pause] kind of standing on the outside thinking it's going to be a great idea."

Summary of Case One

Alice is the Executive Director of Technology/Media for a district of roughly 10,000 students. She has served in the field of education for over 20 years, first as a teacher, then as a media specialist, and finally as an instructional technologist before attaining her current position. Her responsibilities range from managing technology infrastructure and access to coordinating professional learning opportunities to assisting

district administrators in the development of district policies and procedures regarding acceptable use, security, filtering, and use of online resources. Her familiarity with the K-12 environment guides Alice's hiring and daily operational practices. Alice's department, consisting of 16 support staff, provides technical and instructional assistance to teachers, administrators, and central office staff to advance the county's goal of making technology accessible and productively used for administrative and instructional purposes. Alice has a vision for the comprehensive use of technology across the district and is excited about the opportunity to work collaboratively with the new superintendent and department heads at the district level. It is her hope that through a collaborative effort with the curriculum department, teachers will be guided in the design, development, implementation, and evaluation of a variety of instructional learning activities that incorporate teacher-created, standards-aligned digital content and technology use. Throughout her interactions with staff, teachers, administrators, and district personnel, Alice maintains a leadership style founded on the principle of servant leadership, a style that places her in a prominent position at the center of the organization. Alice listens. She hears. She provides support. Alice acknowledges the challenges of creating a digital-age learning culture within her system: not enough infrastructure, not enough access, not enough time, not enough comfort, not enough expectations, and not enough state and federal policies directed at instructional support. Yet, she holds fast to her belief that her county will get there and that others within and outside of her district will see the bigger picture of how technological resources can be used to provide engaging, authentic, educational opportunities for all students.

Case Two Analysis: Context of the Study

The second case study also took place in the southeastern part of Georgia in a county covering a total area of almost 800 square miles. Roughly 13,000 individuals reside in the rural county (U.S. Census Bureau, 2014). The population of the county has increased 8.9% from 2010 to 2013, reflecting a substantial change compared to the state average of 3.1% (U.S. Census Bureau, 2014). Construction, public administration, and paper production were identified as the most common industries accounting for 18%, 12%, and 9% respectively of the county's commerce (U.S. Census Bureau, 2014). Two cities are located within the county providing access to a few restaurants, retail shops, and services. Despite the increase in the number of residents, the county's only hospital recently closed, home values have declined, and few new businesses have been drawn into the area. Information attainable through the Georgia Department of Labor (2014) indicates an unemployment rate of 8.5%, which is above the state average of 7.2%. According to data collected by the U.S. Census Bureau from 2008-2012, 15.2% of individuals fall below the income poverty level. Evidence of the economic hardships faced by the county's citizens is also demonstrated by the percentage of students eligible to receive free or reduced price meals, which has steadily increased from 64.7% in 2009 to 78.6% in 2013 (KidsCountData Center, 2014). In total, the staff of two elementary schools, one middle school, one high school, and one alternative school provides educational services to around 1700 students. One elementary school, the middle school, and the high school are located within close proximity to one another and serve all but 150 students in grades Pre-K through six. Those students attend the second elementary school located in the southern most region of the county.

Three interviews were conducted with the participant, who will be referred to as Deborah. The first and third interviews took place in the participant's main office, located within the media center of one of the elementary school. The second interview took place in the server room located at the central office.

Deborah's Professional Background and Educational Experiences

Deborah and I sat across from one another during the two meetings scheduled at her office. The office contained an assortment of books and computer parts. While all of the interviews were originally scheduled to take place at the same site, Deborah's need to perform some maintenance tasks on the county servers, which are housed at the central office, required a modification to the original plan. Even though the interviews took place after instructional hours, the media center was active with teachers and support staff, who were participating in meetings and locating instructional resources during the two interviews conducted there. A few times during both interviews, individuals interrupted to ask questions or signal that they were leaving. Based on the interactions between Deborah and the other teachers, it was obvious that she is perceived to be part of the school's staff. Despite a long day serving as the school's media specialist, Deborah cheerfully greeted me and openly shared her thoughts on her role as technology director and the state of technology use and integration within her county's schools.

Deborah attained her undergraduate degree in Business Administration in 1980 and worked the 4 years following her graduation within the legal field. Her husband at the time was then transferred overseas to Saudi Arabia. After their move, Deborah obtained employment working for a private international school as a computer teacher. Although Deborah reported having some experience as a physical education teacher

during her student teaching, this was her first experience working independently in the education field. Deborah shared, "Went over there, wonderful experience. I wouldn't have traded it for the world. Ended up there [Saudi Arabia] and came kind of in the middle of the year. They didn't really have anything for me at the time. Well someone left, midway, and they said, 'Hey, you wouldn't mind teaching computers?' and I said, 'To little kids. Yeah, sure, no big deal, you know I can do that." Deborah continued working at the school as the computer lab teacher in what was designated as the 'resource class', for 4 years. The structure and focus of the resource class was perceived by Deborah to be unique. The private school maintained low class sizes and provided ample instructional support for teachers. Her class provided instruction on basic technological applications and programing skills at least twice a week to students in fourth through sixth grades. Each resource class generally contained 20 students and was also staffed with a fulltime paraprofessional. Using her background in business and familiarity with business technology, Deborah collaborated with classroom teachers to modify the resource class curriculum as necessary to align with instructional content in the main classroom. Deborah recounted partnering with the art teacher to assist students in the production of digital media projects, teaching students PASCAL and Logo programming language, and using the first Internet interface system to allow her students in Saudi Arabia the opportunity to communicate with kids in California. Although technical support was not part of her job description, Deborah soon assumed responsibility for maintaining the school's hardware. She said, "I also had to do hardware over there. I had a [pause] I was doing both sides of it. But I didn't, I really wasn't wanting to do the hardware end of it. It's just [pause] it's the nature of the beast."

While living overseas, Deborah used the summer months to travel stateside and pursue an advanced degree in education with a minor in technology. She shared, "I've always been around…technology's kind of normal to me." Female interest in the field of information technology was not as prevalent at the time. Most of her classmates in technology classes were men with strong math backgrounds. As the computer teacher, Deborah developed and taught lessons to elementary age students, provided instructional support to teachers, and managed the school's hardware and software. Around the time Deborah completed her degrees, she divorced her husband and moved to Michigan, where she worked part time as a computer teacher in a public school and at a local community college as a technology instructor. As a college instructor, Deborah taught computer technology courses to college students and developed basic technology literacy training classes for adults. After a few years, Deborah remarried and relocated to Atlanta, Georgia, but she continued her previous line of work in higher education at a nearby state college, where she performed a variety of instructional, administrative, and technical technology tasks. As an instructor, Deborah developed workshops for teachers on instructional applications of educational technology. She reported that she, like many other instructors in the field of computer technology training, developed most of the content, objectives, and materials herself. After another year of teaching at the college level, Deborah was hired by a large school district in one of Atlanta's suburban areas to serve as an instructional technology specialist. She was assigned to provide staff development and support to 12 schools within a particular region of the county. Deborah expressed her initial excitement at the prospect of being part of a team of instructional technology support staff. It was only after attending some of the scheduled training

courses that she questioned the group's purpose. Deborah explained, "They sent us through all this training. Well, a lot of that training was working on computers, and I was like, 'Well, why're we doing this, too?' 'Well you'll have, you know, support.' And I'm like, 'Wait a minute, you want us to do instructional and we were doing technical on top of it." Although the county's technology department included computer technicians, principals would often turn to Deborah while she was in their building to provide instructional support to fix hardware and software problems. Deborah recounted her experiences, "I ran around like a crazy woman teaching. I was supposed to do integration of technology. It was [pause] InTech was just starting. I was to go around and train the teachers. I did that. But once they figured out that I could also do technology stuff, they wanted me fixing stuff. That was the biggest problem. I'd go, 'I can't do both. Yeah, you can't have me fixing servers.' In addition to providing support to schools within her assigned region, Deborah's familiarity with Apple operating systems often extended her responsibilities to other schools beyond her assigned region in the county. Deborah was overwhelmed. When an opportunity to work for a smaller Georgia school district presented itself, Deborah happily accepted.

Deborah assumed the role of Technology Director from her predecessor, who was the first individual to hold the position within the county. Initially hired to provide instructional training and support to teachers, Deborah quickly found herself working once again spending her time doing hardware and software repairs. Referring to her recruitment by one of the county's former assistant superintendents as "the old bait and switch," Deborah laughingly recalls why she assumed the role of technician,

> Well, when I came here [pause] let me back up. When I arrived here, I was hired to be an instructional technology person. Yes, I had to do some computer repair. But we had a contracted, which they had when I got here already, contracted engineer. Well, when I started to learn more about him I got rid of him. He did not [pause]. He was horrible. He wasted a lot of money and time on this. We had viruses on servers. You don't want that. He just sat around and had lunch and we would pay him for an hour lunch. No. I mean it was a real difficult battle that I had to fight and I fought it and got rid of him.

Over the years, Deborah has continued to advance her knowledge of hardware and software programs, becoming certified as a NetWare Administrator for Novell, a certified Microsoft Office User Specialist, certified InTech trainer, as well as numerous hours attending training sessions offered through Georgia regional technology training centers. She also earned a doctoral degree in educational leadership.

Deborah considers herself to be a "Jane of all trades," a notion demonstrated by her ability to perform multiple –functions associated with educational technology. Three years ago, when state funding for one of the elementary school's media specialist position was cut, Deborah also assumed the additional responsibilities of that position, a move that required her to return to school for an add-on media certificate. When Deborah assumed the position of media specialist, the school's population was much smaller; now the school has over 500 students. Acting as media specialist, which Deborah initially considered would take a minimal amount of her time, has turned into a fulltime responsibility, with only limited support from a part-time paraprofessional who is shared between two schools. While Deborah loves working directly with students in her media

specialist role, juggling her responsibilities as the Technology Director, providing both technical and instructional support, and as the Media Specialist for an elementary school has been a challenge. She explained, "Well, I'm trying to figure out, being in this position now, and doing my other job as well. I'm trying to figure out what is the best way to do both jobs, or, as you said, how can you do both jobs, and do [them] effectively and efficiently."

Deborah's Department

Deborah is effectively the entire technology department for her county. She is in charge of maintaining all network operations, setting up and configuring new hardware, providing technical support throughout the county, and training school personnel. The system employs one part-time contracted engineer to assist Deborah with some network and computer maintenance issues. Deborah reported, "I get to see him once a week if I'm lucky." According to Deborah, it was a struggle to build acceptance for even such minimal outside technical support. Smaller systems, in Deborah's opinion, tend to function like a close family often making it difficult for outsiders. Even other media specialists within the county, who are considered by Deborah to be the ones in charge of providing school-based tech support, were initially reluctant to embrace the part-time contracted engineer. Acceptance for the use of outside support increased over the past few years as more schools within the system struggled to maintain funding for the media specialist positions. Presently, the county employs four media specialists, only one of whom is not assigned additional instructional duties. The current arrangement for providing technical support involves use of these school-based media staff as the first level of technical troubleshooting. After the instructional day, Deborah addresses

technical problems throughout the district, remotely if possible and in person as necessary.

As Deborah perceives it, these are the circumstances faced by many technology directors in smaller counties; the position may be described in terms of instructional support, but providing network and computer maintenance support is the reality of the job. While general job descriptions for the position exist, they cannot accurately portray the actual work that's performed in the field. Deborah explained, "Well, we use to have job descriptions. We have job descriptions. But trust me; my job description does not fit any of the [responsibilities] any longer… In today's economy and time, it is not realistic to stick to a template saying you do this, this, and this. It doesn't work that way especially in small districts."

Deborah's Role in the County

Deborah's district has also adopted a 3-year plan outlining her county's vision for technology use, the current reality of access and use across the county, and the goals and strategies for increasing access to technological devices and instructional uses of technology. The county's goals include: (1) enhancing the county's network and computer infrastructure, (2) providing all staff and students access to current and emerging technologies, (3) providing all instructional personnel professional learning on the use and integration of technology within standards-based instructional practices (4) ensuring that all administrators are prepared to lead and evaluate their staff's use of technology within instructional practices, and (5) utilizing technology to build stronger partnerships with educational and community stakeholders. In developing the most recent technology plan, Deborah first turned to the media specialists, based on her belief that

this group of individuals is most knowledgeable about the infrastructural needs within their schools. The core group of individuals gathered and shared input from their colleagues and administrators with Deborah, who ultimately created the plan. Once the plan was reviewed by administrators and approved by the superintendent and assistance superintendents, it was sent to the State. Deborah prides herself on developing "doable plans." She shared, "And my tech plans have always been fulfilled. Every time I set a plan. If it's going to be a 3 year plan [pause] 5 year plan, it doesn't matter what it is going to be. We are going to reach it. I just believe you can't create a plan without putting in reachable goals. If you set goals that are just crazy goals [pause] you know you don't have funding [pause] you know you don't have support…you'll never win. So, that's why my plans always get approved quickly." Although Deborah is primarily responsible for generating and submitting the 3-year technology plan, she is also one of several individuals or groups identified as responsible for facilitating the strategies to achieve the county's goals and evaluating their outcomes.

In Deborah's opinion, her goals to improve network connectivity and to increase equitable access to 21st century technological devices have been met. When she took over as the technology director, the department had no budget and the system had no wiring for Internet access. Deborah was one of the first individuals to apply for and receive funding through the E-rate grant program. The initial $350,000 the county received through that grant was used to purchase WAN and LAN lines. Additional funds awarded throughout the years, amassing nearly two million dollars, have been used to expand the county's network infrastructure. Over the past 10 years, Deborah advocated for and secured additional local funds to improve the system's infrastructure and access.

In 2012 the county undertook a massive upgrade providing 10 gigabytes of bandwidth connectivity to each school in the system. Deborah's efforts to increase her county's s bandwidth took place prior to the GA DOE's recent distribution of additional bandwidth. She explained,

> No, they were doling out additional bandwidth. And they did it to all the big counties up in the north and then they came down to the middle and they did the little ones last. And you know we are at the very bottom of the State. They did us dead last. But I already had enough bandwidth. I had more bandwidth than the state. People called me asking, "How did you get the extra?" And I said, "I went and bought my own." I said, "I'm not waiting for them." Cause we had schools in session. It was in January and we could not function. It was shutting down, shutting down. So I am just telling you, these people don't…know they're getting it.

Deborah prides herself for thinking ahead and securing the necessary infrastructure upgrade. As a result of Deborah's efforts in 2012, the county now has 145 Meg: 100 Meg of bandwidth going out to all the schools and 45 at the board. All of the buildings in the system provide reliable wireless access to the Internet. Deborah has been able to increase the use of cloud computing across the county and eliminate some of the county's services. She shared, "I'm eliminating servers. You don't want to have too many servers. That means more management and I already have enough servers. Think one person and I had 14 servers to manage. That's a lot."

Decreased educational funding over the past 6 years has made it more difficult for Deborah to maintain the county's inventory of functioning educational technology

devices. Massive cost shifts from the state to local school districts, along with increasing state mandates, have impacted Deborah's technology budget. The funds earned and allotted by the State through the current formula-based method are spent on salaries, general management and operating expenses, professional learning, and transportation. Special Purpose Local Option Sales Tax (SPLOST) and local funds are used to supplement the state funds, allowing the county to fund capital projects and purchase technology equipment. The county's 3-year budget for purchasing educational technology devices sets aside $350,000 from local technology funds and $97,500 from SPLOST. Budget allocations in Deborah's district are allocated to schools based on their number of students served. Additionally, both elementary schools and the middle school received Title I funds, which are provided to schools with high numbers of students identified as economically disadvantaged; 85% of allotted school Title I money is used for purchases of computer devices and programs. As the technology director, Deborah serves as a resource during the budgeting process, assisting school administrators with their questions regarding the purchasing of technological devices. Each school in the systems consults with Deborah to determine what type of technological device or software application suit the school's particular needs. Deborah then approaches vendors to get quotes and determine the best way to increase each school's purchasing power for the devices and programs identified. The school-based budget approach used by the county somewhat limits Deborah's ability to standardize access and equipment across the county. Deborah shared, "It's school-based. Everything went school-based a few years ago. And once it went school based, it's like, you know, my arms were cut off." Deborah would like to see the current method utilized at the state and local level for funding

educational technology improvements replaced to permit her to make district wide choices to ensure continuous, equitable access across the county.

Regarding access to technological devices, all of the teachers in the county have what Deborah considers the essential technological tools for a 21st century classroom. She shared, "We already have all [pause] we have already facilitated that. I believe that we've done that. We're there. What I envision the 21st century classroom is…we have a SMART board, we have a document camera if they so choose to use it, every classroom has one. They have a laptop and a desktop or two laptops so that they are mobile. They even have iPads so they can project it on the SMART board. I've gone into that level." As specified in the technology plan, the county is reported to have an average student-to computer ration of 2:1. The majority of the 900 technological devices are desktops; 160 are laptops. All teachers in the system are assigned an individual computer, printer, projector, interactive whiteboard, and networked grade level or department level copy machine. Additional technological devices, such as student response systems, wireless slates, document cameras, digital cameras, microphone systems, and stationary or mobile mini-computer labs are available for checkout through the media center. Deborah explores emerging technologies to share with school administrators in the hopes that school upgrades might align with the district's objectives as identified in the 3-year technology plan, to provide a wide range of devices for staff and students, and to provide assistive devices for students with special needs. One elementary school recently acquired new SMART interactive projectors. A few elementary teachers use iPads and iPods as assistive technology devices with their special education students. Mini-labs consisting of four to five computers are now available in each of the middle school

classrooms and, through a Title IID grant, the county's high school purchased iPods and Apple laptops for use in one of the English classrooms.

Deborah would really like to transition the county away from stationary and mobile computer stations to some type of one-to-one initiative. This would complete her image of the 21st century classroom. She explained, "But, I would really like to see that kind of go away. I would like to see more iPads, like a one-to-one initiative. I wish that every child had their own." Over the past two years, Deborah has been working to increase the number of devices available for student use. Her goal is to provide every grade level or academic department a 21st century technology suite consisting of a class set of tablets or laptops. As a way of meeting this goal, the county is in the process of implementing a countywide Bring Your Own Device (BYOD) initiative to increase student access to technology. Two years ago they piloted a BYOD program at the high school. Since many high school students in the county own such devices, the program is proving to be very successful in providing more students with individual access to a technological device while in school. Using student owned equipment also decreased the amount of technical support and maintenance of equipment required of Deborah. She said, "I'm telling you, we're dealing with less over there. We have of course labs, but that's all I'm having to deal with. And that's okay. I can deal with a lab." The only problem noted by Deborah resulting from the implementation of the BYOD initiative pertained to wireless access through and control of the school network, and restriction of access to unsuitable Internet sites, what she refers to as the "filtration system." She explained,

> My biggest problem is that [pause] you know [pause] I have a good filtration program that picks up on it and blocks these kids from a lot of things so they're safe while they're in our school system. But they can't connect to our wireless, so they have to go to our media center, where the media specialist uses her password to connect the student's device to the school wireless connection. Once they're connected, then I have [pause] then I can see it. I can see everything that's going on.

Once the connection and filtration issues are resolved, Deborah envisions the countywide BYOD program as the most effective means to transform traditional classrooms into mobile environments.

Working with vendors on maintaining and supporting infrastructure and technological devices provided by the district is another important component of Deborah's job. Deborah advised that her district's size, location, and limited budget have made it difficult to secure reliable and effective vendor support. She explained:

> They can do a lot for you if you get the right partnerships. Like our SMART boards. I like the people that we worked with. But trust me, if you don't sign up for maintenance [pause] and I understand their side of it too. They need to make money, right? You don't sign up for another maintenance contract extended agreement [pause] they're going to help you as much as they can. But they're not going to be at your doorstep every time you need them.

Some vendors actually tailor their efforts to attract smaller systems. Unfortunately, the quality of their work is sometimes questionable and deters smaller systems from making improvements. Deborah explained:

> I've established great partnerships with good companies. I had to weed out bad companies initially. I fired companies. Like I said, I had to get rid of the unqualified and bring in the qualified. I mean, it's a struggle. You just don't know how, especially in a small district. You get some real loser people show up on your doorsteps. You look them up. But if your bids [pause] you're down to a couple of bids and you're like, "Oh my God. I have to deal with them!" I mean it's tough. It's tough. You're like, "Maybe I just won't do it this year."

Deborah believes that shifting the responsibility of providing access to technological devices from the system to the students may resolve some of the issues Deborah has faced when dealing with vendors for support and maintenance.

Providing professional learning and support to instructional personnel in the effective use and integration of technology within instructional practices is another aspect of Deborah's role as technology director. Deborah was initially hired for that express purpose, to provide support to instructional staff. She commented, "Well, when I came here, and I told the teachers and I've never changed, is I'm here to support you, period. You know, technology… in whatever way I can help you. I'm going to help you. That's why I'm here." She recognizes the value of regularly coordinated professional development opportunities. Although she originally had an office at the central level, Deborah made a point to travel to each school at least one day per week, work directly with teachers in classrooms, and develop after school and summer training workshops. Deborah utilized services and computers available through the county's local Regional Educational Services Agency and a nearby post-secondary school to deliver training at the central office. Using professional development funds, Deborah was occasionally able

to hire trainers certified and associated with the purchased hardware and software. While Deborah was generally pleased with the training provided from outside providers, she found the timeframe of the learning sessions inadequate. She explained, "It's very limited. You have to be careful. It's limited. Now, I knew it was limited and always told them, 'You're only going to get a couple of hours or a day or a half a day. That's it.' That's not enough. You have to plan to put in more training."

Given the evolution of Deborah's job responsibilities and the limited availability of classroom teachers for training sessions, planning for any professional development workshops at this point is a challenge. Deborah struggles to provide principals and teachers the required hours of training on use of technology equipment as specified in the county's 3-year technology plan. Decreased funding for professional development, increased responsibilities as the media specialist and technical support staff, and additional administrative requirements placed on instructional personnel have impacted Deborah's ability to plan and provide instructional support. Instead of planning afternoon and summer training sessions, Deborah trains whoever and whenever she can.

"On the fly," would be an appropriate description of Deborah's current approach to providing training on the technical and instructional use of educational technology. One strategy Deborah practices for training involves the use of grade level lead teachers. She teaches one or two lead teachers within her own school how to use a new technological device or program in hopes that they can in turn teach others. Deborah has found that the problem with this approach occurs when the lead teachers don't want to learn about the new product or don't like technology in general and therefore are unwilling to teach others. Deborah has similarly tried to teach the staff in her assigned

school how to handle technology malfunctions, to decrease the amount of time she must devote to technical support. Many teachers are willing to try this, bypassing the online procedures for reporting technical errors, preferring to email Deborah directly. However, Deborah has found many teachers reporting that they don't have time to learn or are not interested in learning how to respond to technical support issues. Sometimes Deborah attempts to quickly update the staff on worthwhile online programs or applications. But quick updates are often easily forgotten. In discussing ClassDoJo, an online classroom behavior management program, Deborah shared, "It's wonderful in the elementary classrooms especially. I showed it to them in the beginning of the school. No, actually last year I sent it out to them. I said, 'You guys, this is really cool.' And I showed them in about 2 seconds. I showed them, the classroom teachers, when they were at lunch. I ran to their rooms and showed them real quick. But, that's not enough time." Recently, Deborah incorporated Friday resource classes for students into her media schedule, an experience that has been enjoyable and eye opening for Deborah and the observing teachers. During the classes, Deborah models practical ways teachers can incorporate educational technology and technology literacy skills into instructional practices. Lessons include work with sight words on the interactive SMART Board, development of research skills, and instruction on digital presentation software.

Deborah believes that these alternative approaches to providing instructional support are not as effective as dedicated time for professional development. Moreover, as a practical matter, "on the fly" is limited to the staff at the school where Deborah serves as a media specialist and spends the bulk of her day. Deborah has considered utilizing the county's website as a platform for providing students and staff with online tutorials on

software and hardware applications available to the schools and other effective ways to use and integrate technology in instructional practices. Providing teachers with anytime/anywhere access to these resources, followed up with face-to-face support, is considered by Deborah to be a practice particularly suited to smaller school systems with limited technology support staff. Deborah hopes that the GA DOE will assist in creating and providing a growing variety of online professional development resources for instructional staff. She said, "I think it's great if they do that because it will really [pause] number one it will save money for small systems as well as large cause you can't afford to keep sending people, driving people to locations. You don't need that anymore."

Deborah firmly believes that the concept of "effective use" requires that teachers have some basic level of technology troubleshooting skills. While she would like to focus more of her time assisting teachers in designing instructional units that integrate technology into classroom activities, the reality is user errors and technology malfunctions continue to dominate most of her support efforts. Deborah shared her frustrations regarding a recent incident when a teacher inadvertently changed the master user and password settings on a set of school iPads, effectively barring Deborah from further administration and maintenance of the devices. Deborah spent a tremendous amount of time on the phone speaking with five different Apple technicians, none of which could quickly rectify the problem. Even her remote access software has its limitation. Ultimately, Deborah was required to physically reset the user name and passwords on each of the 80 individual devices. Other technical responsibilities, like managing software updates, pose their own challenges. Deborah is responsible for ensuring that all software updates are done and all browsers are functioning properly.

Every time software is updated, Deborah must consider how the update will affect the devices in her system. Deborah explained, "I setup for PowerSchool. I was so livid. They had updated the Java. Well, oh, PowerSchool, oh, so sorry but you shouldn't update your Java to 7. It won't work for your gradebooks. I had to go round and uninstall 7, so they could open up their gradebooks. And they said, 'Well, just put Firefox on it,' and I said, 'I tried Firefox, I tried Google Chrome, I tried IE, I tried them all. You guys fix the darn problem.'" Preparing computers with the appropriate software and updates for administering online tests also falls on Deborah. This is her reality. Handling technical issues takes forever at times, especially since she is the only technician on staff. If the equipment fails to work properly, Deborah's limited time is spent on providing technical support rather than providing instructional support.

In addition to her technical and instructional support responsibilities, Deborah provides guidance on formulating district policies, such as staff and students' acceptable use, and procedures, such as Internet filters, user password protection, software downloads, security management, and communication guidelines. The superintendent and administrators turn to Deborah to provide guidance on emerging trends in new technologies. Shortly after her hire, Deborah advocated the use of online student managed learning platforms for students attending the middle school and high school. Deborah saw the value of these learning opportunities for students seeking alternative instructional formats and advanced content courses, opportunities often difficult to provide in smaller school systems. With Deborah's assistance, the middle school administrators were able to identify and purchase an online platform, Classworks, to provide academic instruction to targeted academically at-risk students. Locating and

funding qualified personnel to teach advanced placement classes was a challenge for the county, so Deborah worked with the high school administrators and staff to identify alternative options online for the school to offer advanced placement classes. Deborah explained her county's decision to support the use of Georgia's Virtual Academy, currently in use at the high school, "It is almost a Godsend, because that means you can have less and less staff less salaries." Deborah's own perception and experience with online learning clearly factored into her decision to promote the option within the district. Deborah shared, "I think it's really good for the children that are motivated. Like, if I had been in school, I probably would have done the same thing because it is so boring. I was one of those [pause] aarrgh! It's so boring. The lectures." The positive feedback expressed by students enrolled in the virtual classes has further encouraged Deborah to promote online learning opportunities throughout the schools in the district.

Deborah is the central figure in maintaining internal and external communication systems through the district's website and Intranet. The site provides access to board policies and meeting minutes, links to individual school websites and pages, school system calendar updates, and resources for students, teachers, and parents. Individual schools are responsible for updating their individual sites; Deborah has been handling the website updates for the school where she is housed. She hopes to have a volunteer take over the responsibility for the school website soon, which will allow her more time to work on a new website she is planning and developing for the district. Deborah would like to design the new website to include links to resource pages using Symballo, an online learning platform, which would afford easier access to a variety of online programs for student use and instructional training videos and lesson plan resources for

teacher use. As she pulled up the county's page on the online bookmarking program, Deborah shared, "So what I am working on right now is [pause] I have Symballo©, which I am setting up for the kids. All it is [pause] the page comes up and it's just links to all different types of programs that they would use. Then I'm going to set up [one] for teachers. I'm setting them up something a little bit different. I'm not sure if I am going to use Symballo© with them or not. I just started working on it. But I am setting it up for them to go to the website and there are different links that have videos and training and really gives them some documentation they can use, lesson plans, everything."

Although Deborah is directly accountable to the superintendent, she has developed relationships with other key figures at the federal, state, and district level. In the past, Deborah was acquainted with some of the individuals from Georgia involved with planning for educational technology at the federal level. When Deborah had a question or a concern about funding for devices and programs, Deborah was able to contact them directly to determine whether monies were available through some program or grant. Deborah has not reached out to individuals at the federal level in quite some time; most of her communications regarding policies, procedures, and programs are with a few individuals who serve in the State Department of Education. Infrastructure, one of the technology services departments, is responsible for implementing the E-Rate program, gathering school systems' technology plans, and managing the statewide K-12 network. Deborah shared, "I've gone through them and said, 'Hey, are you going to be able to come up with any funding for this project or are we going to come up with any money for this project?' Yah, I just go directly to them. Joe [pseudonym] or…generally

Joe Smith [pseudonym] or Sally King [pseudonym]. Those are the only two I really contact."

In the past, contact with the State largely involved exchange of information rather than opportunities to provide input regarding the State's strategic technology plan. Deborah dialed into the department's monthly Illuminate meetings when able but often felt that the meetings were not geared at soliciting input from county technology directors. Deborah believes that some technology directors in the counties surrounding Atlanta have been afforded more opportunities to provide input. She shared:

> They usually take the people up in the north part of Georgia, the bigger districts, and they talk to them. So larger districts, they tend to talk to. And I can understand why, because of distance. Who are you going to talk to, people right in your back yard or are you going to go miles away? Usually it's people right in your backyard. And I understand that. I mean, they do ask me questions. They'll do emails and they'll send surveys. They do things like that occasionally. And they'll ask you for input. But their surveys are generally: what do you have? And I think…I am pretty sure they are all data driven. So they'll draw from our information.

When Robert Swiggum joined GA DOE's Office of Technology Services in 2009 as chief information officer, Deborah articulated to him her county's need for state assistance to obtain additional infrastructure. According to Deborah, Mr. Swiggum's background in the business sector limited his perspective of "the real world" taking place in the educational system, a world involving a variety of daily academic, behavioral, emotional, and administrative challenges. Deborah sensed that his focus on developing a

statewide education data system took precedence over more immediate needs felt by teachers and local administrators. Despite these early misgivings, Deborah has recently seen changes in the department's focus. This past December, the department sent Deborah an email requesting submission of a proposal detailing her infrastructure needs. She was somewhat frustrated by the short submission deadline, especially for smaller school systems that function with little to no support staff, but was pleased overall with the statewide goal of increasing broadband to 100 MG per school. The State Technology department recently released their 3-year technology services strategic plan. For the first time, the State has coordinated a technology conference to take place the summer of 2014, affording smaller, more remote school systems a chance to participate and give input. Although Deborah attends the Georgia Association of Managers of Educational Information Systems conference yearly, she expressed excitement at the prospect of attending this new State coordinated event, where she hopes to collaborate with other instructional technology directors throughout the state on the State's initiative to develop personalized learning environments for all K-12 students, which will be made available to local districts

As part of a small rural district, Deborah has worked with administrative leaders at all levels within the county. In the past, she was able to attend leadership meetings between the central office staff and the school administrators. Deborah's current schedule limits her ability to participate in many local leadership activities. Deborah hopes this will change. This past year the district promoted a middle school administrator to the position of curriculum director, a position that had been vacant for a number of years. Deborah believes that the new director, who has a strong background in middle school

and high school curriculum, is capable of providing the leadership required to effectively integrate technology into instructional practices. She hopes to work more collaboratively with the new director in the coming year to ensure the integration of technology in the standards-based curriculum. She also will continue working with the system's Parent Involvement Coordinator and media specialists on developing more opportunities for parents and community members to familiarize themselves with technological devices used throughout the county's four schools.

Deborah's Vision for Technology Integration

Individual access to mobile technological devices is a key component of Deborah's vision for technology integration. Deborah anticipates that the county's plan to extend the BYOD program to all schools within the system will have a positive impact on student access and use of technology while at school. She would like to see more inclusion of online learning platforms, like Classworks and Georgia Virtual Academy, as instructional delivery methods throughout the county. Deborah envisions teachers serving as facilitators within the class, using data and online learning platforms to tailor instructional programs to meet students' individual needs. She also envisions the inclusion of collaborative learning activities that integrate the use of technological applications within instructional practices, in a manner which will allow students the opportunity to learn from one another.

As Deborah perceives it, the educational system is not prepared to fulfill her vision of the ideal learning environment in the digital age. To reach this goal, Deborah said she needs local and state support. Deborah believes that it is important to have one individual serving fulltime in the role of technology director at the district level; someone

with both technical and instructional experience and knowledge. Deborah would like to have at least one fulltime engineer to handle many of the technical responsibilities of her job. The media center, in Deborah's opinion, would be "all-encompassing for instructional learning" and be staffed with a fulltime trained support personnel handling routine circulation procedures, thus enabling media specialists the time required to serve as site-based instructional technology coaches.

The need for professional learning opportunities would be recognized as an integral part of promoting a digital learning environment. Deborah would like to dedicate more of her efforts to developing instructional workshops and online training videos and podcasts for use by students and instructional staff. Web-based training and instructional resources would be readily available and arranged in one centralized location accessible through the county's Intranet. She would like the Department of Education to adopt a plan for providing the financial support and the curriculum framework for continuing educational courses on enhancing student learning through the use and integration of educational technologies. In Deborah's opinion, the statewide Georgia's framework for Integration TECHnology (InTech) training program developed by the GA DOE in 1997 and implemented in 1998 was successful at showing teachers how to successfully use and integrate technology. It was the first step in addressing what Deborah believes is an ongoing need. Deborah recalled the conversation she had with a state employee:

> You got everybody hooked, keep going but you go to the next level. 'Oh well, we're done.' And I said no, you're never done." She further explained her concern over the lack of state supported staff development, "What they've done is they've taken away a really important component that we had that made

> Georgia's technology really hum and that's training for teachers. You can't take all that out and throw technology at them. If you don't have training, you're crazy!

Deborah would also like the instructional day restructured to accommodate the changing role of the teacher from disseminator of information to administrator of individual learning plans. Teachers would be given time devoted to analyzing student data, reflecting on their instructional methods, and planning appropriate instructional strategies using technology to advance students' academic goals.

Deborah would like to guide the system in consistently evaluating effective integration practices as measured through classroom observations and weekly lesson plan audits, a task currently delegated to and often disregarded by school administrators. Deborah's experience with the InTech training program helped her to recognize the value of establishing, communicating, and evaluating outcomes associated with professional development opportunities. She explained, "Well, when we had InTECH we did have proficiency. We had something, something to aim for and that really helped them to use technology, even older teachers. Oh, it had lesson plans. I sat with them and we would write lesson plans. Actual plans that would work in their classrooms utilizing technology that they were comfortable with. Not some pie in the sky thing. And it worked."

Likewise, Deborah would like to lead the county in establishing and evaluating clear expectations for student proficiency. In the past, Deborah's county was required to document and report the technology literacy proficiency level of all eighth grade students to the GA DOE's Office of Instructional Technology. Deborah noted several problems with the assessment instrument, namely the test's focus on specific use of various

Microsoft productivity applications. As she explained, "Do you know how to do PowerPoint? Do you know how to do this…who cares? I mean, there is a lot more to technology than just that." She also expressed concern at the decisions to wait until eighth grade to assess student proficiency. It is her desire that students master basic technology literacy skills in elementary school. Then, technology knowledge among middle grade students would be "a given…so they could concentrate on learning other skills."

Summary of Case Two

Deborah is a technology director and media specialist for a small, rural district serving 1,700 students. She has spent nearly 30 years in the educational field, as a technology teacher, instructional technologist, trainer, and media specialist. Although she was initially hired to primarily provide instructional support to district staff on the integration of technology within instructional practices, Deborah spends the majority of her time fulfilling her full-time responsibilities as a media specialist, managing the district's infrastructure, conducting a range of desktop support for system employees, maintaining the district's website, and developing the district's technology plan. Deborah supervises one part-time contract employee, a networking engineer, who provides regular maintenance on the system's servers. She relies heavily on media specialists throughout the county to provide the first line of technical support to instructional personnel and school based volunteers to regularly update individual school websites. With Deborah's assistance, the county recently increased their bandwidth and piloted a BYOD program in the high school, an initiative which will be extended countywide in the upcoming year. With Deborah providing the impetus, the county has also incorporated online learning

platforms, such as Georgia Cyber Academy and Classworks, within high school and middle school instructional practices, allowing greater opportunities for individualizing instruction to meet students' individual academic needs. According to Deborah, the county has adequately outfitted classrooms with the equipment deemed necessary for a 21st century classroom. Providing professional development opportunities, however, is perceived by Deborah as the key to reaching her vision of a digital-age learning culture, a culture that embeds technology literacy throughout the K-5 curriculum, establishes countywide expectations for teachers' use of educational technology within instructional practices, and provides opportunities for student self-directed exploration of online instructional resources. She hopes the state rethinks the value of ongoing, state-supported professional learning for technology use and integration. In the meantime, Deborah intends to create an online digital library of learning resource for students, teachers, and administrators on troubleshooting practices, software applications, and Web 2.0 tools. She is excited about collaborating with the district's new curriculum director on the effective use of technology for learning and the possibility of providing face-to-face and online learning opportunities in the near future. More than anything, Deborah would like to refocus her role from a full-time media specialist to a full-time technology director and provide the district level leadership she considers necessary for changing administrative and instructional educational technology practices.

Cross-Case Analysis

Introduction. While unable to be generalized to the larger world, the findings and subsequent theories generated by the research process itself enlarge the subject matter of the study, are relevant to a greater audience, and relate to practitioners in a greater variety

of field settings (Maxwell, 2005). By using the data collected from interviews with Alice and Deborah, it is possible to identify themes distinct to both participants. In conducting this research study, I hoped to examine the beliefs and experiences of district level coordinators of technology, to determine how these factors influence their actions as educational technology leaders, and to ascertain their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration. I wanted to discover how district level coordinators of technology help administrators and teachers rethink technology integration, instructional practices, and student learning. I wanted to understand how their beliefs and personal and professional experiences have shaped their actions in fostering organizational change. The themes are reported as they relate to the three research questions guiding this study.

Research Question 1: What are the beliefs and experiences of the individual serving in the role of district level coordinators of technology and how have these factors influenced their decisions regarding educational technology integration?

Although computer technologies have been a feature of the educational landscape for over 60 years, the position of district technology coordinator is rather new to the educational system. Two resource books, one by Moursund (1992) and the other by Frazier and Bailey (2004), provide rare insight into the role and responsibilities of the individual often charged with development and implementation of district-level technology plans, financial planning for the acquisition and replacement of technological infrastructure and computer resources, coordination of in-service staff training, formulation of technology integration initiatives, development of district-level policies pertaining to technology, coordination of technical support, dissemination of information

on emerging instructional practices involving educational technology, and fulfillment of data reporting for state and local purposes. Little is actually known regarding the educational background and professional experiences of individuals serving in this role today.

Walter Freeman, an American neurophysiologist, discovered that our minds have the ability to selectively choose what information from the external world to acknowledge and with that information is able to create a parallel world (Wind, Cook, & Gunther, 2004). The process that the brain uses to make sense of the world in this manner is commonly referred to as a "mental model" (Wind et al., 2006, p. xlv). Mental models are shaped and restructured by genetics, education, and experiences (Wind et al., 2006). According to Peter Senge (1995), senior lecturer at Massachusetts Institute of Technology's (MIT) Sloan School of Management and chairman of the Society for Organizational Learning, it is important to regularly reflect on the impact of mental models on an individual's perceptions and interactions.

The research data reflect two people serving in the same position with different educational backgrounds, different professional experiences, and working in different educational environments. Alice resides in the same community where she graduated high school. She attained an undergraduate degree in early childhood education from a nearby public university and has worked within the same public educational system for the entirety of her educational career. Alice's experiences working as a public elementary school teacher, media specialist, and instructional technologist have given her a unique perspective on a variety of challenges, technical and instructional, faced by teachers when attempting to use educational technology. These experiences, along with her natural

interest in providing teachers with professional learning programs on integrating technology into instructional and business practices, prompted Alice to pursue advanced degrees in Instructional Technology and Media and Instructional Technology in Distance Education, degrees that focus on the assimilation of technology within teaching practices. Clearly, Alice's point of view is that of a teacher, an instructional facilitator.

Unlike Alice, Deborah entered the educational field after attaining a business degree and working in the business sector for four years. Her business background helped her gain her first teaching assignment at a private school oversees where she was asked to teach a computer literacy and basic programming skills resource class. Deborah acknowledged that "it was a different world than the public schools." Class sizes were small; a full-time paraprofessional was provided. Deborah collaborated with teachers on classroom activities using software presentation applications and taught students basic programming skills. As part of her position, Deborah was expected to perform desktop support to teachers within the school. Deborah welcomed this task since she was naturally interested in the technical aspects of computer technology. Deborah's experiences in the field of education include working part-time for a public school as a computer lab teacher, teaching computer applications courses at a community college, working as an educational technology specialist as a state university, and serving as an instructional technology specialist at a large urban public school system. The majority of her experience in the educational system, 18 years, took place within the system where she currently holds the title of technology director and most recently part-time media specialist. Throughout all these work experiences, Deborah pursued her natural interests in the technical side of educational technology management by acquiring formal training

in numerous aspects of network operations and desktop support. Deborah's experiences within the K-12 system have placed her mainly in the role of a resource to students and teachers. Deborah's point of view is that of a technical resource.

In both cases, the performance expectations associated with the position were developed initially by the first district technology coordinator at each respective site. Alice had the opportunity to work directly under that individual and familiarize herself with the tasks associated with the job. Deborah was given a job description by one of the former department superintendents. Changes in funding, staffing, and technology altered the original job description from a focus on instructional support to technical support. While the two directors have some apparent similarities in their job responsibilities, such as developing the 3-year technology plan, managing infrastructure and desktop support, providing instructional support, and maintaining the district's website, they perform their duties in very different ways. Alice's office is located within the central office affording her the opportunity to develop relationships with key district level personnel. As part of the district level staff, Alice is more knowledgeable her district's handling of state and local policy and program changes. She is able to collaborate with other department heads on strategies for enhancing administrative and instructional uses of technology. Because her department was initially housed within a school but has since moved to the district office, Alice believes location, namely the placement of her office within close proximity to other central office administrators, is crucial in terms of her ability to serve as a leader.

As the director of technology for her county, Alice is responsible for a department of 16 individuals. Although Alice is considered the head of the department, she clearly considers the department a team, allowing numerous opportunities for her staff to share in

the decision making process. Alice is able to lean on her staff for guidance, for support, and for insight into individual school and district technology needs. Alice has dedicated technical staff performing routine maintenance on the district's infrastructure, networks, and equipment; dedicated media staff performing ongoing, site-based support to teachers on strategies for infusing technology literacy skills into teaching and learning practices; and dedicated instructional technologist staff providing professional learning programs for educators on digital resources, software applications, and instructional practices. Having a team, frees Alice for leadership activities.

The structure of the county and of the technology/media department requires that Alice consider the impact of any decision on the whole district. When considering technology related initiatives, like BYOD, Alice thinks in terms of uniformity, consistency, and equitably across the county. For Alice, her role as the director of technology requires continual consideration of how the district's technology policies and initiatives affect the overall district organization.

Deborah works in a county with fewer students, schools, district level personnel, and district departments. Deborah has two offices, one at the central office and one in the school where she works as a media specialist. Although most of Deborah's time is spent working from her office within the media center, proximity to the central office staff is not perceived as a factor affecting Deborah's performance of responsibilities associated with her job as district level coordinator of technology. Deborah has no department; she has no team. She has one contracted network engineer who performs some aspects of regular maintenance on the county's network. For all practical purposes, Deborah is solely responsible for handling all of the functions generally associated with maintaining

the district's infrastructure, network operations, and desktop support. She is also responsible for coordinating professional learning programs for administrators and instructional staff. Performing these aspects of her job has become increasingly difficult since she assumed the media specialist's responsibilities. When considering technology related initiatives, like BYOD, Deborah does not primarily think in terms of uniformity, consistency, and equity across the county. She considers the economic advantage of students' supplying, maintaining, and upgrading their own devices. For Deborah, her role as the director of technology requires less consideration of how the organization functions uniformly as a whole and more focus on how she can best assist individual schools and individual teachers with technical and instructional technology resources.

It would appear that the participants' background and experiences have influenced their decisions regarding educational technology integration. Alice's educational background and experience teaching within the educational system influence her hiring practices, her view on professional development, and ultimately her vision for technology integration. Alice prefers to hire individuals with actual teaching experience. She prefers to conduct professional development at the central office, away from the continual interruptions associated with school buildings. She envisions teachers designing and using digital content. She believes the role of technology is to support curriculum; she believes the role of her department is to support teachers. Instructional support is a key component of Alice's vision for technology integration. Comfort with technological devices was a theme that emerged from statements made during the second and third interview sessions. Alice thinks in terms of teacher comfort in using technological devices, as reflected in the following statements: "I think there still needs to be a big

voice that shows the teachers how to do this [strategies and tools to use and show them what it should look like with the content]," "my approach to training is trying to be comfortable with the device, making sure that you are comfortable when your students are looking at you, all 30 of them, when it's not going to break, or what is going to happen, how do I roll this out," "making sure the teachers feel comfortable with that [digital content]," "It is one thing to be comfortable and know those are your devices…that you are in charge of those devices…but the kids bringing them from home and you've got an iPad and they've got an Android…that is a whole other gamut of being comfortable," and "teachers receiving the professional learning to be able to feel comfortable implementing and integrating [technology] into their classrooms." Evidence on the training programs offered during the 2013-2014 fiscal year, which include Apple training, Windows training, software training, and web based training similarly suggest that the focus of Alice's support efforts address teachers' comfort using devices. Alice thinks in terms of student comfort in using technological devices: "So you want to be able to give them the opportunities to have used the equipment, to create with the equipment, you know, and to be able to feel comfortable navigating." Alice thinks in terms of the functioning and management of the technological devices when used in classrooms. Shifts that may occur in how teachers' approach teaching and learning with the increased availability of infrastructure and access are regarded as taking place within the confines of a traditional learning environment.

The size of Deborah's district and central office staff placed her in the unique position of developing her own technology-driven approach to meeting the technical and instructional support needs in her district. Deborah seeks ways to develop school-based

technical troubleshooting. She perceives the media specialist role as one that includes the responsibility of providing technology assistance. She believes that teachers should have some basic level of technical troubleshooting skills to address software and hardware malfunctions. She believes that teachers and students should have opportunities to utilize online learning platforms. Deborah thinks in terms of shifting organization and delivery of instructional content, whether it is professional development for teachers or content-based instruction for students, from site-based to online and from teacher-directed to student-directed as reflected in the following comments:

> We actually had the…we were the first district in the state to do online programs. I mean, I brought it here; I think it's great if they do that [online programs] because it will really… number one it will save money for small systems as well as large cause you can't afford to keep sending people, driving people to locations. You don't need that anymore. I was a firm believer in fact in the virtual high school; I think it would be a great asset for a teacher if we had more online training; and they [online learning platforms for students] are the best options for us.

Deborah does not think in terms of teacher comfort or student comfort with technological devices in the same manner expressed by Alice. Students, in her view, have devices and know how to use them. Her concern, rather, is on finding and organizing instructional tools in an online format for student and teacher use. Shifts that may occur in how teachers' approach teaching and learning with the increased availability of infrastructure and access are regarded as taking place beyond the confines of a traditional learning environment.

Research Question 2: How do these individuals function as educational technology leaders in the sense that they serve as agents of instructional and systemic change transforming integration of technology practices in K-21 classrooms?

The International Society for Technology in Education (ISTE) NETS-A for administrators identified five categories intended to guide district-level technology directors as they lead the transformation of learning within their organization: visionary leadership, digital age-learning culture, excellence in professional practice, systemic improvement, and digital citizenship. The performance indicators established for these five broad categories contain the following verbs: inspire, facilitate, engage, advocate, ensure, model, promote, provide, participate, lead, collaborate, collect, analyze, interpret, share, recruit, retain, establish, leverage, maintain, and stay abreast. Based on the data collected in this study, it is clear that both participants perform all these aspects of leadership in some manner and that each of them functions as educational technology leaders transforming integration practices within their districts. The approach used by each participant is unique, reflecting their individual personalities, beliefs, strengths, and to a certain extent, the dynamics and situations encountered within their county organization.

Alice expressed her thankfulness for having the autonomy to make department decisions. Yet, she really looks for a consensus within her department and at the district level, as reflected in the comment:

> But it is all tied in and I feel lucky that I'm able to not have to go to somebody and say, "What do you think about 'so-and so? Do you think [pause]?" No! Tell me what you think and we, as a group [pause] as a consensus. I am very glad,

> honestly, that I don't go to Curriculum and say, "I want to do [pause]" I mean, if we work together, that is one thing, and we do.

Alice considered herself to be a leader that includes those affected as much as possible in making decisions. Alice reportedly brings the members of her team together to discuss organization and site-based goals, includes them in the conversations with site-based leadership teams to determine the process for achieving goals, and delegates responsibilities for supporting the groups among her various team members. Alice's leadership style appears to reflect her personality and the value she places on building a collegial team and cooperative relationships within the organization. Alice is a good communicator and attentive listener, skills that help her to make effective choices when purchasing and managing educational technology resources and support services. Alice understands the organizational dynamics at work in her district and attempts to balance the technology integration goals of the organization with the needs and desires of the instructional personnel. She empathizes with administrators, teachers, and support personnel, creating a safe and nurturing environment for undertaking technology integration initiatives. Alice recognizes the reality of what takes place in school classrooms and the increasing demands placed on teachers in the public school system and adjusts the department's structure to provide support services accordingly. Alice is aware of her personal strengths and weaknesses in providing digital-age leadership and management for the district, as well as the strengths and weaknesses of her department in meeting the technical and instructional support needs of the district. Reflecting on these personal and professional practices increases Alice's ability to lead and support transformation throughout the organization. Alice seeks consistency and continuity in

how administrative and instructional staffs use technology for teaching, learning, and evaluation. She has a vision of comprehensive technology integration and can conceptualize what she thinks it will take to reach the county's goal. She is a steward of the county's financial and technology resources, feeling personally responsible when technology is not functioning properly. Alice leads by working collectively and collaboratively with the stakeholders in her system.

For Deborah, the organizational structure of her district demands a different type of leadership style. Deborah does not have the range of control that Alice has for making districtwide purchasing decisions, a team of staff to provide support, nor a schedule permitting extensive opportunities for collaborative decision-making. When a problem is encountered, such as the need for more bandwidth, Deborah comes up with a solution and identifies key individuals within each level of the educational system that are necessary or might be helpful to implement that solution. Deborah enlists support within the district office, within individual schools, and with teachers to garner the backing necessary to advance her educational technology goals. For example, Deborah had no computer infrastructure when she assumed the role as technology director in 1996. She contacted the appropriate individual at the state board of education seeking potential grant resources, completed the requirements for an E-Rate grant, and was awarded $350,000 to purchase and install WAN and LAN lines. Deborah recognized the need for site-based technical support and enlisted the help of the school-based media specialists to provide it. Deborah found ways to provide guidance to principals after recognizing their need for assistance in making technology related purchasing decisions. Deborah predicted the need for more wireless bandwidth in the schools 2 years ago and sought and gained

support from the superintendent to allot SPLOST funds for substantial infrastructure upgrades. Deborah recognized teachers' need for additional professional development and instructional resources and arranged an online platform to provide video tutorials and instructional links. As a result of her leadership, despite the limit of her resources, Debora's district has been able to transform the learning environment within individual classrooms and schools to include online learning platforms, secured student Gmail accounts, and a BYOD initiative. Deborah's method of leading the county's educational technology efforts involves a personal, direct, persuasive approach of leadership. Deborah leads by coming up with proposals and influencing and persuading the necessary individuals to realize her vision.

Research Question 3: What are their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration?

Educational systems, as presented by Lunenburg (2010), are made up of elements functioning together as a whole to fulfill an agreed upon purpose or goal. Preparing students to compete in a global economy is the purpose of the public education system as identified by the U.S. Department of Education Office of Education Technology (2010) and referenced in their current National Education Technology Plan. The model of learning proposed in this plan calls for "engaging and empowering personalized learning experiences for learners of all ages," experiences that are made possible in part by "leveraging the power of technology to support continuous and lifelong learning," (U.S. Department of Education, Office of Educational Technology, 2010, Letter from the Secretary section, para. 3). Ultimately, the plan calls for a change not only in the teaching and learning process but in how the educational system functions. This call for change

requires consideration of the complexity of the educational system. Lunenburg (2010) proposed that schools, as open-systems, consist of elements and subsystems that are often interdependent on one another and are constantly interacting within their environment to deal with influences that are exerted upon them. The exerting influences, also referred to as inputs, acting upon schools generally consists of human, financial, physical, and information resources (Lunenburg, 2010). The operational management of these resources by district and school administrators alters the teaching and learning exchanges, or transactions, taking place between school staff and children to produce the following common outputs: improved academic growth, attendance rates, employee performance and job satisfaction, and community relations (Lunenburg, 2010).

Gail Connelly, the executive director of the National Association of Elementary School Principals, explained this phenomenon succinctly in her article, *ED's Perspective: A Systems Approach*, featured in the April 2011 edition of the Communicator. Connelly (2011) state, "Learning is the outcome of complex, nuanced, and interdependent activities teachers and students experience in classrooms and schools, which are themselves complex, multifaceted enterprises," and recommended a systems approach to facilitating school improvement. Senge (1990) proposed that systems thinking "is a way of thinking about, and a language of describing and understanding, the forces and interrelationships that shape the behavior of systems" (p. 6). Using a systems approach, as presented within the literature review, generates insight into the conditions that facilitate or impede the process of educational technology integration that operate within various interrelated levels within the educational systems under study.

Environment

The economic crisis that began in 2008 affected county residents, businesses, community services, and educational institutions across the state of Georgia. Alice's community is home to several industrial companies, manufacturing companies, and distribution centers making it a leader in employment growth rates according to the U.S. Bureau of Labor Statistics (2014). Alice mentioned very little about the effects of the economic crisis on her community focusing all of her comments on the impacts felt within the educational system, whereas Deborah made frequent comments throughout the interview sessions regarding the impact of the economic state of her county on services and residents. She shared that the county hospital recently closed leaving residents concerned over the quality of health available in the area and that partnerships made with businesses in the community to provide awards for reading and math competitions were limited noting, "They've given us [pause] I mean they only have so much money. This is a really poor district." Deborah explained that individuals often reside in her county where the cost of housing is cheaper and find work in nearby counties. While parental involvement is greater at the elementary level than elsewhere in the system, Deborah has found that parental involvement overall is relatively low. Only one parent, for example, visited the media center during last year's Back-To-School technology event. Alice similarly experiences difficulty in increasing parents' awareness of technology currently available to students in the system. The 3-year technology plans for both systems identify the need to address the gap in what parents and community partners know in regards to the systems' technology programs.

Adoption of the Common Core State Standards by the Georgia State Board of Education in 2010 required transformational changes in curriculum and instructional

practices. Decisions to accept federal grant dollars, like Georgia's Race to the Top, required changes in the State's evaluation system for assessing teachers' performance. The new Teacher Keys Effectiveness System (TKES) for evaluating teachers' performance entails frequent informal and formal observations and measurement of students' percentile growth and academic achievement using an assessment component intended to transition over the next 5 years to full administration online (GA DOE, Office of School Improvement, 2012, pp. 3-4). The following comments made by Alice reflect the implications these policies have on technology related initiatives and instructional technology professional development support in her county: "But teacher-wide [instructional technology professional development], we will sometimes do [pause]. Well, they [teachers] have so much on their plate this year. We [the instructional technology support staff] have intentionally pulled back a little to give [pause]. Well, we [the system] are doing the whole TKEs and LKES. We are doing it countywide. We are doing everybody, so there is a lot on them," and "We are having a hard time alone just with the CCGPS and Teacher Keys, let alone throw in 30 devices and have them used for a purposeful reason and not just let's look at all the Apps we can find," and "So, you have to make it [instructional technology professional development] as pleasant as possible and as exciting as possible with them knowing that the TKES and the Common Core are on them like crazy." Deborah likewise noted the impact of these policies: "All I ever hear from the teachers is, 'Ugh, I've got all this paperwork. I didn't have time to do this [undefined]. I went around today [to collect books] because I just knew they were that stressed out.'"

Administrative changes in key positions at the district level either support or interfere with the effectiveness of district-wide efforts to expand technology infrastructure, digital resources, and technical and instructional support. Alice and the new district superintendent share a similar view of the role educational technology fulfills within administrative and instructional practices. Alice explained, "I love working with her. She is great and like I said, it [the superintendent's vision for technology integration] is all encompassing. I like that." As an active user and embracer of social media and digital technologies, the new superintendent expects all employees to integrate technology into administrative and instructional practices. Yet, there are lots of unknowns associated with structural changes in district administration leaving many school principals and teachers feeling uncomfortable and resistant. Alice stated, "It's true. I'm not going to [pause]. We're kind of in a [pause]. Everyone is really tense right now and everyone is really stressed [pause] and it is revolving. I'm not having a problem with it because it goes with my philosophy." Deborah revealed the sociopolitical implications she experiences working in a smaller system:

> In a small system, it's very political. It's [a] very close family. I mean, the nicest compliment I got was from my [pause] the principal. You know I've been here forever, right? And I said, "Well, I'm not really from here. You know I'm kind of an outside[r]." And he said, "No, you're part of the family." I mean [pause] that was a big compliment. You know after twenty years you hope you're part of the family.

With fewer administrative positions maintained at the central office, the structure of Deborah's smaller system allows a somewhat decentralized approach to making

decisions. Principals and school staff are given more autonomy in making technology integration initiatives decisions. The decentralized practice of technology management and integration initiatives are not always perceived by Deborah to be beneficial as reflected in her statements, “Its school based. Everything went school based a few years ago, and once it went school based, it’s like, you know, my arms were cut off.”

Inputs

According to *Transforming American Education*, the United States Department of Education, Office of Educational Technology National Education Technology Plan (2010), the ideal environment for learning is one that embraces the current technologies prevalent and used in our everyday lives to promote personalized individual learning opportunities for students, opportunities that promote higher order thinking skills, align what students need to know with how and when they learn, promote continual lifelong learning, and use data for making instructional decisions. While the term “vision” is never used, the concept of transforming education from a one-size-fits-all approach to an individualized approach that takes into consideration what needs to be learned, when people learn, and how people learn is woven throughout the document (U.S. Department of Education, Office of Educational Technology National Education Technology Plan, 2010). Several recommendations for transforming the learning environment, many involving an investment of time and money, are directed at state and local governments such as (1) develop and implement learning resources that use technology and provide anytime anywhere access, (2) design, develop, and implement technology-based assessments, (3) revise practices, policies, and regulations regarding parent access to assessment data, (4) provide professional development opportunities for educators onsite

and web-based, (5) promote use of online learning options for students, (6) prepare educators for facilitating online instruction, (7) provide access to the Internet, technological devices, and applications, (8) upgrade infrastructure systems to manage evolving needs, and (9) design an integrated system for generating assessments and disaggregating educational and financial data (U.S. Department of Education, Office of Educational Technology National Education Technology Plan, 2010). Interestingly, the committee charged with developing the vision for the plan identified varying degrees of technology integration across states and districts based on two factors: funding and educators' knowledge of integration practices.

The GA DOE, Office of Technology Services provided the following as their vision in their updated 3-year technology plan released in August 2013:

> Utilize technology to make education work for Georgia's teachers, students, parents, business/industry, and educational partners by providing them with timely and accurate information using high quality data and tools that are easy to use, powerful, cost effective and readily accessible. (p. 3)

Tools, as defined within the document, are "the software systems that let users work with their data" (GA DOE, Office of Technology Services, 3-Year Technology Plan, 2013, p. 5). Several strategies for meeting the state's vision result in outcomes that align with the vision of learning described within the national plan, including an integrated educational and financial data system; infrastructure to support one-to-one digital access, a statewide online platform for viewing academic data, digital resources, and student data; online assessment resources; and online learning opportunities for teachers and students. Yet, the plan does not specifically address how additional funding beyond what is available

through E-rate will be secured to make the desired improvements to infrastructure or how districts are expected to fund one-to-one access of digital devices within their system. Based on the information available at the department's website, it appears that the online training provided to teachers will be directed at using the statewide integrated platform, not addressing their knowledge of integration practices. Substantial emphasis is placed on increasing the abundance, use, and organization of assessment data with little regard placed on the pedagogical purpose of using the technological tools.

And yet, use of technology to enhance the academic development of all students is the fundamental vision of both case study sites. Statements made by the participants and analysis of the technology plans for each district suggest that reaching this vision of technology use and integration requires access to infrastructure, devices, and applications and access to technical and instructional support services. These conditions are the ones communicated to shareholders and acted upon by the participants leaving a question as to whose intended vision is actually presented to teachers.

Cuts in state funding over the past 6 years impacted class sizes, per-pupil funding, school calendars, and available administrative support. The number of students receiving free and reduced lunch increased. State funding for educational agencies that provide support for technological devices, such as the Regional Educational Service Agencies, decreased. Both participants expressed concern regarding the current method of funding educational technology resources and noted their declining budgetary situations. Alice's county found success in pursuing federal grants to advance technology integration efforts at the middle and high schools. The funds enabled the county to purchase additional devices, provide stipends to teachers participating in afterschool and summer technology

workshops, and hire an outside educational consultant to guide and support school improvement efforts throughout the organization. The diminished availability of state and local funds and the lack of supplemental resources forced Deborah's district to discontinue the appropriation of stipends for teachers attending district sponsored afterschool and summer technology training programs. This resulted in a decline in the number of training programs offered and attended by teachers.

Technical and instructional support staff was considered a necessity by Alice and a need by Deborah. Alice never mentioned having a problem with providing support perhaps because she has a team of 16 central office staff, that she is directly responsible for supervising, and 15 media specialists, that report to her media coordinator, dedicated to providing technical, media, and instructional technology support. Instead, she repeatedly emphasized the value of "investing in people" and credited her staff as being the strength behind the department. Deborah frequently expressed her frustration regarding the state of technical support available in her district and desired one fulltime technician to assist with routine server maintenance and technology repairs. Like Alice, she recognized the importance of having individuals available to offer timely technical and instructional support. Physical proximity to vendors was mentioned by both participants as a limitation to the level and quality of technical support available. Generally situated in larger metropolitan areas, vendors cater to counties that are both physically close and have greater purchasing power.

Upgraded infrastructure and access to reliable technological devices were identified as physical resources important to educational technology integration initiatives. Alice, in particular, identified these components as the main barrier to

fulfilling her county's vision for transforming classrooms into a digital age learning environment. She ultimately desires one-to-one access for all students. Deborah upgraded the broadband infrastructure in her county almost 2 years ago. For Deborah's district, implementation of a BYOD initiative at the high school allowed greater student access to computing devices while at school for educational purposes. Deborah perceived this approach as the most sensible way for school systems to reduce their expenses on hardware, upgrades, and repairs.

In Alice's opinion, the State should reconsider the current funding formula to provide consistent appropriations to support districts in acquiring technological devices and infrastructure, applications, support personnel positions, and professional development programs, all of which she considered to be important aspects of 21st century technology infrastructure. Deborah similar recognized the need for some level of state administration of these essential components. The technology department at the state level only recently focused attention on addressing infrastructure according to Deborah, as reflected in their last minute call for proposals requiring district technology coordinators to detail their infrastructure needs. Deborah was able to fund the desired upgrades within her district but lacks the technical and instructional support to assist teachers in selecting and using appropriate technology tools within teaching and learning practices. This suggests that a possible tradeoff exists when making district level decisions—fund infrastructure, fund devices, or fund personnel. The absence of a state plan for providing technology-related professional development was considered by Deborah to be a major setback in transforming teacher's comfort in using and integrating technological devices.

Transformation process

In his book, *The Dance of Change*, Peter Senge (1995) ten challenges that organizations often encounter when attempting profound change endeavors. Senge (1995) grouped the ten challenges by their impact on initiating change, sustaining momentum, and rethinking and restructuring organizations. Alice and Deborah noted several of the challenges limiting their district's efforts to transform technology integration practices within teaching and learning.

Teachers' comfort, time, and lack of support were noted challenges of initiating and sustaining changes in technology integration practices. Alice recognized teachers' fear of technological devices not working properly during a whole group lesson, fear of students damaging devices during independent use, fear of students' exposure to inappropriate content while researching, fear of their own incompetency in comparison to students' knowledge and use of technological applications, and fear of the responsibility for managing a gamut of unfamiliar technological devices. Alice also recognized the existing spectrum of comfort with technology and integration practices that exists within the district. She recommendation that a needs assessment survey be used to determine teachers' comfort and attitudes towards technology and integration practices. Deborah found teachers' commitment to utilizing technology in their classrooms increased when they were supported in development of lesson plans that aligned with their level of comfort.

Time and relevancy were perceived as factors affecting integration practices as reflected in these statement from Alice and Deborah: "In this day and time, teachers

[pause] they don't have time to go learn something by themselves. It is hard to get them away to be able to focus and learn something new," and "To me, I see it as a problem because teachers have to be trained. You can't just keep giving them the technology and go, oh, figure it out. It's like class Dojo. I sent out that information last year. Did I have time to go and show them? No. I could show maybe one, which I tried to do is show a lead [teacher]. That's it. But do they have time? And, if one grade level person doesn't want, doesn't like technology, think they're going to show the rest? Participants noted additional administrative requirements placed on teachers that limit their available time for practicing and developing basic competency using new technological devices. Reconfiguring the instructional day or school calendar to accommodate the demand for instructional time, administrative time, and training time was suggested.

Supporting educators as they develop instructional lessons involving the use and integration of technology was perceived as a responsibility shared between the technology department and the curriculum department. Strengthening the quality of the relationship and interactions between these departments was perceived as necessary by Alice and Deborah for providing effective hands-on professional development opportunities. Both directors agreed that instructional support should be ongoing, varied, and layered to meet teachers' individual needs. Alice mentioned the use of onsite support to "tag team" with teachers during an instructional lesson, develop technology integration action plans with school leaders, and coordinate support efforts between district level instructional technologists and school based media specialist and computer lab teachers as an important component of providing help. Small group professional development outside of the school facility was perceived by Alice to be especially worthwhile for re-

energizing teachers' excitement in educational technology innovations, developing professional learning communities, and increasing core competencies in using educational technology tools. Deborah suggested that a long term commitment to professional development be made at the state level. Failure to build upon the foundation of knowledge that originated through the InTech training program was perceived by Deborah to be a major hindrance to sustaining the momentum required to elicit profound change in integration practices.

Social factors also affect the organizational embracement of educational technology initiatives. There are lots of unknowns associated with structural changes in schools leaving many individuals in the educational system uncomfortable and resistant. These attitudes can affect school climate and teacher performance. Alice recognizes that many teachers in her system are not committed to the change, but rather going through the motions as if forced or coerced into complying with state and district requirements. She shared, "Because there is so much pressure to really [pause] and at this point they are teaching and the kids are learning, but the teachers are just going through the motions because they are being forced to." In describing the new superintendent's focus on restructuring the curriculum and implementing the new teacher evaluation system, Alice shared, "some of the way she [the new district superintendent] has restructured curriculum and some of the expectations. Yeah. So by the time we [the technology department] come along, there will be nothing there. They will be like, 'Yeah, that's what she wants.' There will be no shock value. Here we [the teachers] go." Teachers often work against change in the system. Alice found that new teachers enter the system with a desire to change organizational and instructional practices are often perceived as a threat

by others within the school or by the nature of the K-12 environment. She explained, "It [the desire to thinking innovatively about technology integration] is quickly squashed in my mind because of the departments or who they [the new teachers] are with and what they have to do in the K-12 environment and what they are required to do because we have not made the true shift. Even if they [the new teachers] are not being prepared for some things, I think that they are open to do it because they have had devices in their homes or they don't know. So, where older people, even older than me, that are sitting there needing to go home aren't and you have the department head who says, 'We can't. Why would you want to do that?' Instead of encouraging that, it is almost seen as a, 'We don't have time to do that. Why would you?' Or even the means to if they wanted to. A lot of places don't have the [technology]. I mean we find it here. I have go-getters [pause] Well your low man on the totem pole. So instead of getting that rolling lab, forget about it!" Making the transition to a digital age, as perceived by Alice, involves a change in the culture of systems regarding the acceptance of different views of technology users and nonusers.

Both participants acknowledged internal operations and management conditions as impacting the transformation process. Superintendents, district administrators, and principals were recognized by Alice as foremost in leading the transformation of learning environments by establishing a shared vision of county-wide technology integration, modeling effective uses, and encouraging a digital-age learning culture. Expectations for use and integration established at the district level and expected by principals and assistant principals at the school level was cited by Alice as necessary to ensuring systemic use throughout the organization as reflected in these comments: "Well, from the

local it is going to take the superintendent making it a district initiative and not so much pockets of, 'You know, this school is interested in it so we are going to let them do this,'" and "Well, and that is where I think we need to do a better job with the principals. That is one part of that grant where we really had the 6th through 8th principals. I think we didn't do as well of a job getting them ready. I mean, they were so supportive. They were extremely supportive. They think it's been great, but really [pause] then really pushing it and continuing to push it," and "But, it's just the whole climate. I mean, it boils down to [pause] they can be doing some really awesome things and really having the access for their kids if they would have just said let's try it, let's follow through, let's hold fast."

Deborah did not specifically designate the system superintendent and school administrators as responsible for initiating technology related transformative changes in teaching and learning practices, but some of the comments she made regarding the work of the new curriculum director, the absence of system-wide cohesion in technological purchases, and the lack of a shared vision of technology use among principals, are suggestive of the need for leadership at the district and school levels. These comments include: "I think doing a lot of clean up [in reference to the work undertaken at the central office by the current superintendent and the new curriculum director]. One of the things I want to tell you about Tom Cash [pseudonym for the previous superintendent], and I really liked working with him, but I don't think he had [pause] he was a coach. He was a principal, but he was an elementary principal. I think Terry [current superintendent and Sarah [new curriculum director] have more of the inside track in that they were at the high school level and then middle school level," "I don't see that they [the principals] are all on the same page. No, I don't see that. I see that they're on different pages. I see that

they're, they're promoting technology, not, um, how do I say this diplomatically, they're not really seeing the end," and "they [referring to the state of Georgia] should have [adopted the NETS standards for administrators]. You always should start from the top and work your way down."

Another challenge identified by Senge (1995) concerning the governing structures within the districts was also indirectly acknowledged by the participants. Senge (1995) compared the process of embracing the "advantages of local autonomy and decision making while increasing the ability to understand and manage interdependence" with walking a tightrope. The governing structure of Alice's district is more centralized than Deborah's district making technology initiatives more systemic throughout the organization. As a result, the district is able to impose certain expectations in regards to technology integration but is also hindered by the inability to allow smaller groups autonomy in developing their own initiatives. For example, Alice must first consider how a BYOD initiative affects all users in the district before allowing individual teachers the autonomy to experiment with the process. Emerging educational technology is also provided to all users rather than targeting the teachers most likely to adopt and integrate the products within instructional practices. The following comments made by Alice reflect the challenge in balancing these two aspects of governance: "Well, from the local it is going to take the superintendent making it a district initiative and not so much pockets of, 'You know, this school is interested in it so we are going to let them do this and [pause],' That is kind of, besides the grant, how we have operated. And unfortunately some people will miss out and they jump up and down after the fact [and complain],'Well I didn't [know]'. No, you did have the opportunity. Your teachers were yelling so you

decided, ‘We’re not going to go down that road right now,’” and, “Well, according to the superintendent, everyone is going to get and everyone is going to be interested. [Chuckle] But in previous years, we have been able to work on other initiatives based on the interest. Is that fair? Who is going to put the work in? That’s where I look at it.” The governance structure within Deborah’s county appears less integrated; however she also faced challenges related to governance as suggested by her comments: “I would like to see more iPads like a one-to-one initiative. I wish that every child had their own [device]. That’s why when they [the high school] said BYOD, I said, “Do it.” We did it,” and “It’s school based. Everything went school based a few years ago, and once it went school based, it’s like, you know, my arms were cut off.”

Outputs

Despite these challenges, Alice and Deborah have seen transformations in instructional practice involving technology integration taking place across their county. Documents available on her district’s instructional technology and media services webpages support Alice’s statement that teachers develop their own digital content and create, produce, and post podcast on iTunesU. The media website provides supporting evidence that media specialists collaborated with teachers to develop lessons that incorporate technology literacy skills with the mandated state curriculum. The instructional technology resource database provides supporting evidence that teachers create instructional technology resources for use. The superintendent’s vision of improving communication with stakeholders is visible in her Superintendent’s Corner postings and videos. Documents accessible on the New Teacher Orientation blog provide resources to navigate use of administrative software for lesson planning, recording

grades, requesting technical support, and utilizing the SMART interactive board. The technology department's commitment to providing a variety of instructional courses on technology applications and integration is evident in the number and variety of professional development course scheduled and listed online within the professional development registration portal. Of the 10 school improvement plans available online, 8 identify integration of technology into teaching and learning processes as a primary goal and recognize the instructional technology support department and school based media specialists as responsible for facilitating professional development support. Based on Alice's statements and supporting documents, it is clear that the county worked towards meeting their goals established in the 2011-2014 technology plan for creating 21st century learning environments. They provide greater access the various computing devices, provide access to updated hardware and software, provide greater access to the Internet, provide support and resources for technology integration practices, maintain a centralized website, and empower schools to develop shared technology expectations.

Deborah, in her dual position, is not capable of serving her district in the same manner as Alice. Theoretically, as the sole district-level staff member in the technology department, her responsibilities are truly technical in nature. Through this avenue, Deborah improved the state of technology access in her county despite the decentralized structure for purchasing technology equipment. Deborah worked in partnership with principals to outfit classrooms with a standard technology suite, consisting of a computer, printer, projector, and SMART interactive board. Great strides were made by Deborah to ensure that all schools had the necessary fiber network infrastructure to utilize online programs and cloud computing. Opportunities also presented themselves informally

allowing her to extend her knowledge of emerging technologies to improve the state of technology integration throughout the system. Perhaps the most notable examples of this are found in the middle school, which utilizes a distance learning program for at-risk and homebound students, and the high school, which has implanted a BYOD initiative and embraced learning opportunities afforded through Georgia Virtual School.

Feedback

Feedback provides a valuable way for systems to assess their processes and progress towards meeting organizational goals. Alice's department has several opportunities to gather feedback from educational stakeholders. Access was not granted to professional learning course evaluation documents, but evidence of the technology department's attempt to gather this feedback was provided on the district website. The course evaluation form attempts to gather information on the effectiveness of the methods used by the presenter, the relevancy of the information provided, the adequacy of the presenter's knowledge on the subject, the opportunities provided for participant input, and insight into what new information participants learned from the course.

Alice's utilized a variety of data collection instruments as part of the data collected to evaluate the middle school mobile device initiative. In addition to achievement test scores, a third party evaluator gathered feedback from student and teacher surveys and focus groups. Use of a variety of data provided Alice with a unique perspective on teachers' perception of the iPAD educational technology initiative. Alice reported that the results were positive, noting that certain subject areas exhibited more progress in adopting student centered integration practices than others. She explained, "Now, they've [the middle school science teachers] had 3 full years though and their curriculum really

hasn't changed. Math [pause] I know I'm being recorded, but I don't really care. They're a different breed altogether. Those math teachers. And their curriculum [pause]. They have gone through some changes and they continue [pause]. You know, it has not been the easiest for them to get some really good data on them. That has been a little bit more of a challenge just all the way around. We do see it at the high school [either]. But in fairness to them, they have had a lot of changes. More so than science, and I wouldn't say that science necessarily lends itself to more project-based things, but it is kind of a struggle for the math teachers to really kind of [use technology] all encompass."

Alice's district regularly schedules forums to elicit parent input. Although technology may be brought up at one of the events, none of the forums to date focused strictly on the technology integration initiatives. Individual schools are expected to organize a yearly technology night to allow parents an opportunity to familiarize themselves with the technology available to students. According to the 3-year technology plan for Deborah's county, parents are asked to annually complete an on-line survey at each school and are invited to attend an after school technology workshop. Deborah considers herself lucky if any of the parental surveys evaluating the county's technology program are return.

Both participants reported that software programs are available for using during principal walkthroughs to evaluate technology integration. According to Alice, the Ewalk program used by her district utilizes a checklist format to document teacher and student use, the structure of the instructional lesson, and the types of devices used. Administrators in Deborah's district reportedly use Ewalk for capturing data on teachers' integration practices as well. Neither participant provided the results of the Ewalk

documents for review, and based on their responses the results do not appear to be used for planning professional development courses or in developing school-based improvement plans.

Chapter V
CONCLUSIONS AND RECOMMENDATIONS

Conclusions

For years, technological advancements, like the printing press, televisions, B. F. Skinner's teaching machines, personal computers, and the Internet, were introduced into the educational system, many having little impact on the overall structure of the universal schooling establishment fashioned during the Industrial Revolution. Politicians, businesses, and educational organizations direct educational policy. Responsibility for teaching resides with educators, standards define the content of what is to be taught, and instruction is often limited to occurring within the classroom and school building. New demands associated with the anticipated needs of the 21st century, expectations that students develop skills for lifelong-learning and working with others, the explosion of materials available through online sources, and the proliferation of personal technological devices used by individuals in their daily lives have led many technology advocates, policy makers, and parents to call for a revolutionary transformation of the educational system and instructional methods.

I propose that altering a teacher's view of instructional practices to reach the desired levels of technology integration involves leadership. The International Society for Technology in Education identified district level technology coordinators as one entity responsible for providing coordinated leadership to support transformations of the educational system whereby digital age technology is interwoven seamlessly into

teaching and learning practices. The purpose of this research study was to explore the beliefs and experiences of the individual serving in the role of district level coordinators of technology, to discover how they function as educational technology leaders, and to determine their perceptions and beliefs about the conditions that facilitate or impede the process of educational technology integration.

Prior to this research study, I held certain beliefs about individuals holding the position of director of technology. I posited that the responsibilities and beliefs of the individuals in this role significantly shape the extent to which technology integration occurs in K-12 classrooms. I was unsure whether or not individuals serving in the position actually had any responsibility for working with educators on the effective use of technology in instructional practices, practices that would have a direct bearing on student learning. Prior research conducted on the individual assigned the task of coordinating district level efforts for the integration of educational technology within K-12 classrooms suggested a great deal of variance in educational background, professional experience, and job responsibilities (Ausband, 2006; Lesisko, 2004; Lewis, 2005; Reilly, 1999; Webster, 2010).

While it is not possible to statistically generalize the findings from this research study, which was limited to two purposefully selected participants, the collected data reinforce the concept that individuals serving in the role have varied educational backgrounds, professional experiences, beliefs, personalities, and job responsibilities. Both individuals appear to be well suited to the leadership needs of their particular county. For Alice's district, the coordinator needs to have strong leadership skills to inspire, lead, and manage a staff of technicians, instructional technologists, and media

specialists. Technical knowledge and expertise were not considered a necessity; global thinking about educational technology purchases, policies, and support was. For Deborah's district, direct handling of technical systems, support management, and modeling of effective uses of technology for staff and student learning were leadership skills essential to fulfilling the role of district level technology coordinator. Despite their somewhat similar visions of a transformed classroom, Alice and Deborah have differing approaches for integrating educational technology into instructional practices, one supporting teachers' development of digital content and the other identifying existing online learning platforms. What is clear from this research study is that both Alice and Deborah provide leadership for the use of technology for learning, each doing so by finding a fit that works in their unique school system, by adjusting themselves to meet the multifaceted demands of their positions, by tailoring their support efforts accordingly. Some level of variability on how district coordinators lead systemic reform is then to be expected. Some level of variability on what constitutes the desired levels of technology integration is also to be expected. The influence of the district coordinator on technology integration is not easily isolated from the other parts of the educational system. The size of the school district and the boundaries established at the system level regarding how departments interact determine to a certain extent the kinds of leadership tasks required of each coordinator, and subsequently the types of technology integration initiatives undertaken. Therefore, understanding the process by which districts transform the learning environment requires an in depth understanding of the interactions taking place within all levels and parts of the educational system.

Although their leadership approach differs, both coordinators attempt to acquire and facilitate the use of emerging technologies throughout their school system. The findings of previous research suggest that the first-order barrier, that of access to high-speed Internet and information technologies, is no longer the primary obstacle to teachers' integration of technology into classroom instructional practices (Ertmer, 2005; GA DOE, Office of Technology Services, 2012; Gray et al., 2010a; Gray et al., 2010b; Gray et al., 2010c;Wells & Lewis, 2006). My findings suggest otherwise. Alice and Deborah each served in their respective position for a number of years, during which time they promoted the acquisition of Internet infrastructure and technology devices. They handled computer maintenance and upgrades. While noticeable improvements in bringing these technological resources to students and staff are evident, neither system reached ubiquitous access. Instead, they regularly replace nonfunctioning or nonoperational technology with new technologies to improve student learning. Advancements in information and communication technology constantly occur. Computers don't always function reliably. These issues create a continual challenge for funding infrastructure upgrades and access to technological devices. The current configuration of technology inventories based solely on number of devices per classroom fails to capture the ongoing challenge of providing teachers and students with access to sufficiently functioning digital resources for the evolving digital age. As I reflected on the experiences of Alice and Deborah in their roles as district coordinators of technology an image arose in my mind, a scene where each participant runs after a train; a train that always moves faster; a train with no stops and no final destination.

Advances in educational technology and digital resources cause a continual need for technology related staff development. The dichotomy between teachers need to learn about the technology and their need to learn strategies for utilizing the technology for delivering and supporting curriculum mirrors the same dichotomy faced when teaching students *with*, *about*, and *through* technological tools. Reconciling different perceptions on how and when these important aspects of technology use and integration should be addressed is vital to transforming educational practices. As systems make purchasing decisions, teachers need the time and resources required to learn first how to use the products and then secondly how to integrate the devices effectively into their daily administrative and instructional practices. Opportunities for professional development should be supported and coordinated at the state, district, and school level and available to all members within the system. The professional development process for building educators confidence, interest, and knowledge of technology integration strategies must acknowledge the multidimensional spectrum of technology adoption existing in schools. Providing support must be perpetual, differentiated, sequential in nature, and multifaceted, in essence utilizing the same concepts recognized as best practices in meeting the individual needs of students. Based on my findings, neither participant focused their attention on developing awareness of teachers' pedagogical beliefs or understanding of instructional design principals, two factors identified by previous research as hindrances to teachers' integration of technology in teaching and learning practices (Becker, 2000; Bryant, 2008; Chen, 2008; Cuban et al., 2001; Davies, 2011; Domine, 2009; Ertmer, 1999; Ertmer & Ottenbreit-Leftwich., 2010; Gorder, 2008; Judson, 2006; Lackney, 2005; Levin & Wadmany, 2008; Matzen & Edmunds, 2007;

Mishra & Koehler, 2006; Palak & Walls, 2009; Lawless & Pellegrino, 2007; Ringstaff & Kelley, 2002; Ronnkvist et al., 2000; Shuldman, 2004; Trinidad, 2003; Tsai & Chai, 2012). Senge (1995) identified reflection on one's mental models as a discipline required for developing learning capabilities in organizations. Further exploration into the dimensions covered within technology-related professional development would potentially provide a wealth of information to district technology coordinators, as would research on the relationship between professional development directed to teacher's content knowledge, pedagogical beliefs, and technology knowledge on core instructional practices and professional development involving regular reflection teachers' mental models.

Based on the data collected and analyzed for this research study, I maintain my proposition that a disconnect exists between the intended vision for educational technology integration and the actual focus of many educational initiatives and policies, which in turn, impacts the types of instructional support for integrating technology provided to teachers and the expectations for educational technology use. First of all, a conflicting sense of purpose exists regarding technology integration. While some notable similarities may be found within the federal, state, and local technology plans in regards to the vision of technology, the absence among the layers of the educational system to address fundamental ideologies of what technology integration means—*learning with technology*, *learning about technology*, or *learning through technology*—constrains facilitation of individual transformations and educational transformations in teaching and learning practices. Educators and policy makers need to come to a common philosophy or rationale detailing the relationship between technology, curriculum design, and

pedagogical practices. Secondly, the federal technology plan acknowledges that a *one size fits all* approach to transforming educational practices is not appropriate given the complexity of the educational system. Yet, mandated curriculum, assessments, and teacher evaluation systems institute a *one size fits all* approach to organizational performance. The irony in a *one size fits all* approach to the organizational governance of school systems is that it contrasts the approach perceived as essential for creating digital age learning cultures: an approach whereby teachers construct learning environments that promote creativity, innovation, critical thinking, problem solving, and decision making. In other words, teachers must create a classroom climate that encourages students to take academic risks and provides opportunities for making curricular decisions. If we are to make transformational changes in how schools prepare students for the 21st century, we also need to reexamine the current governing structure of public education.

Society is in the midst of a knowledge-based technological revolution, an event unlike any other in our history. The universal schooling approach that has been the dominate form of learning since the Industrial Revolution is no longer compatible with the demands for developing students' ability to become life-long, self-directed learners. Upon reading my completed dissertation, one committee member suggested an alternate title, *A Tale of Two Districts*, based on the contrasting nature on how technology coordinating is handled by the two districts. Another committee member suggested that the piece is a cautionary tale of what occurs when decontextualized generalizations fail to consider the significant variables that take place within and across counties and the complexities of systems. Perhaps the study captures the heart of the problem, the need to

reevaluate the relationship between technology and instruction, what exactly is the vision and how is it supported or hindered by underlying educational issues.

What role will district level coordinators of technology play in preparing students for a technology-rich civilization? I envision their role as rather large. Based on the results of this study, I believe leadership at the district level necessary to ensuring that the system is guided by a new vision, one that considers technology not in isolation, but rather as one component of learning, and as a means for extending learning possibilities beyond the physical constraints of the classroom.

Recommendations

Researchers have explored a variety of factors that can impact the success of instructional technology integration initiatives, but little research to date has been conducted on the leadership role of district level coordinators of technology in fostering organizational change and transforming instructional integration practices. While this qualitative study provided valuable insight into the personal experiences, responsibilities, and dimensions of leadership assumed by two purposefully selected district level coordinators of educational technology, key components from this research that could be explored further through the use of a questionnaire involving a larger population of district technology coordinators include (1) determining the relationship between the coordinators' instructional support responsibilities and educators' effective use of technology in instructional practices, (2) determining the relationship between school system's size and governance structure on the types and dimensions of technology integration support provided, (3) determining the extent to which the standards identified in the ISTE NETS for Administrators are exhibited by district technology

coordinators, (4) examining the relationship between various instructional technology professional development programs and teachers' pedagogical beliefs and instructional practices. Future qualitative research could be conducted to examine multiple perspectives within the educational system on the kinds of support strategies required to transform instructional practices involving the integration of educational technology. Research could also be conducted to determine the effectiveness of collaboration between district level technology coordinators, curriculum directors, and professional development program directors in developing educators' technological pedagogical content knowledge and instructional design knowledge.

As society becomes increasing dependent on technology and schools strive to prepare students for a world powered by technology, the role of district level coordinators of technology will emerge as an integral component in promoting technology integration within instructional practices. Further research on the role and responsibilities of district level coordinators and their efforts to support the effective use and integration of technology will add to the understanding about the necessary conditions for optimizing the power of new technologies to transform the educational system.

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APPENDIX A

Institutional Review Board Protocol Exemption Report

Institutional Review Board (IRB)
for the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER: IRB-02968-2013 **INVESTIGATOR:** Elisabeth Moody

PROJECT TITLE: Bridging the Divide: District Level Technology Leaders as Agents of Change

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board oversight under Exemption Category(ies) 2. You may begin your study immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS/SUGGESTIONS:

Although not a requirement for exemption, the following suggestions are offered by the IRB Administrator to enhance the protection of participants and/or strengthen the research proposal:

Please review the consent statement prior to each interview; with the individuals and the focus groups.

☐ If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.

Elizabeth W. Olphie *9/30/13*
Elizabeth W. Olphie, IRB Administrator Date

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-259-5045.

Revised: 12.13.12

APPENDIX B

Emails to Superintendent Requesting Participation

<Name of Superintendent>
<School System>
RE: Permission to Conduct Research Study

Dear <Name of Superintendent>
I am enrolled in the doctoral program at Valdosta State University in the Department of Curriculum, Leadership, and Technology and am writing to request permission to conduct a qualitative research study in Charlton County School System. This project will be conducted under the supervision of Dr. Lorraine Schmertzing and Dr. E-Ling Hsiao, professors at Valdosta State University in Valdosta, Georgia. The study is tentatively titled Bridging the Divide: District Level Technology Leaders as Agents of Change.

As a gifted education teacher, I have witnessed efforts taken by my district's Information Systems Department to provide greater access to educational technology for student use and teacher use. My experience transitioning into the role of instructional developer, my interest in educational technology, and my educational background in curriculum and instructional technology has led me to seek greater understanding of the district's role in providing technology leadership for facilitating the systemic change required to sustain and advance educational technology integration. The research I wish to conduct for my dissertation involves the exploration of district level coordination of educational technology and the leadership provided at the district level for the integration of educational technology into teaching and learning instructional practices. Specifically, how do the individuals charged with coordinating district level educational technology integration perceive the support and modeling of technology integration as part of their role and responsibilities and execute plans that develop, transform, and sustain systematic pedagogical and organizational change? While research studies have explored various organization factors that can impact the success of instructional technology integration initiatives, little research has been conducted on the role district level support has in creating, motivating, inducing, and fostering teachers' instructional integration practices. I am hereby seeking your consent to contact potential participants within your district and ask for their participation in one or more phases of this qualitative research study. If

authorization is granted, I will contact <Name of Coordinator>, the individual designated as responsible for coordinating district level efforts for educational technology integration, by email and request her participation in this qualitative research study. As part of the study, I will review any policy and planning documents pertaining to educational technology that your system uses to guide technology integration efforts. I will conduct three one-on-one interviews with <Name of Coordinator>.

Based on my initial findings from the interviews, additional stakeholders within your system will be identified and approached requesting participation in either a one-on-one interview or a focus group. This may include other district level personnel, principals, media specialists, and teachers. I will provide you with my findings upon completion of the study.

If you have any questions concerning the nature of the research, please contact me at eamoody@valdosta.edu. I have provided you with a copy of the introduction letter to participants and the interview instrument to be used in the research process. If you consent to my request to conduct this research study in your district, please provide me with a letter of cooperation. This letter may be sent via email or to my home at 907 Seagrove Street, St. Marys, GA 31558.

Finally, thank you for taking time out of your schedule to consider my request. Your time and assistance is greatly appreciated.

Yours sincerely,
Beth Moody
Valdosta State University

APPENDIX C

Email to District Level Coordinator of Technology

Dear <District Level Technology Coordinator Name>,

I am enrolled in the doctoral program at Valdosta State University in the Department of Curriculum, Leadership, and Technology. I am writing to request your participation in a qualitative research study in <County>. This project will be conducted under the supervision of Dr. Lorraine Schmertzing and Dr. E-Ling Hsiao, Professors at Valdosta State University in Valdosta, Georgia. The study is tentatively titled *Bridging the Divide: District Level Technology Leaders as Agents of Change*.

The research I wish to conduct for my dissertation involves the exploration of coordination provided at the district level for the integration of educational technology into teaching and learning instructional practices in Georgia public schools. Specifically, how do the individuals who are charged with coordinating district level technology integration efforts perceive the support and modeling of technology integration as part of their role and responsibilities and execute plans that develop, transform, and sustain systematic pedagogical and organizational change? I sincerely hope that you will be able to help me with my research.

Please review the required Consent Statement:

> You are being asked to participate in a research project entitled "Bridging the Divide: District Level Technology Leaders as Agents of Change," which is being conducted by Beth Moody, a graduate student at Valdosta State University. All individual responses will be treated confidentially so that no person is direction identified. Participation is voluntary. You may choose not to take participate in the research at any time or skip any interview questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.
>
> Questions regarding the purpose or procedures of the research should be directed to Beth Moody at eamoody@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.

I will contact you to schedule an initial interview. If you have any questions concerning the nature of the research or are unclear about the extent of your involvement in it please contact me at eamoody@valdosta.edu. Thank you for taking the time to consider my request. Your assistance is greatly appreciated.

Sincerely,

Beth Moody
Valdosta State University
907 Seagrove Street, St. Marys, GA 31558

APPENDIX D

Guide for One-On-One Interviews

Date: _____ Interviewee: _____

Times: _____ Place: _____

Interview Protocol:

1- Introductions and contact information
2- Explain the purpose of the interview
3- Address terms of confidentiality
4- Explain the format and time frame for the interview
5- Address any questions

Interview Questions

A. First Interview Session

Personal Background
Possible probes:

- What life experiences led to your service in the field of education?
- Describe how your interest and proficiency with educational technology developed.
- How did you come to serve in your current position?
- What experiences in your life prepared you for handling the technical and business responsibilities of your job?
- What experiences do you have with educational uses of technology for teaching and learning?

Role and Responsibilities
Possible probes:

- Describe the role of a director of technology within the field of education.
- Describe the details of your personal work as district level technology coordinator?
- What do you see as the most important priorities of your job?
- What role do you have in determining how educational technology is used in instructional practices?

B. Second Interview Session

Vision & Goals
Possible probes:

- What is the district's vision for educational technology?
- What goals have been established in your district for student technology proficiency?
- What standards, if any, have been developed and utilized by the district to specify the desired competencies?
- Who was involved in developing the competencies?
- How is educational technology used throughout the district to help students gain the district's desired level of student technology proficiency?
- What types of instructional technology use would I observe in the district's schools?
- What would a student from your district know and be able to do with technology upon graduation?
- What do you believe the ultimate value of educational technology to be for students?
- What goals have been established in your district for teacher technology proficiency?
- Technological proficiency is embedded within the Common Core State Standards with the expectation that educational technology will be integrated using instructional design principals into daily instructional practices. Describe the instructional design principals used by the teaching staff within the district.
- What do you believe the ultimate value of educational technology to be for teachers?
- What do you believe the value of educational technology to be for the educational system?
- How do you assess the district's educational technology initiatives to know if they are effective in supporting instructional practices and student learning?

C. Third Interview Session

Support

Possible probes:

- What types of district support is necessary to help meet the desired level of student and teacher technology proficiency?
- Who do you perceive as responsible for promoting and supporting effective instructional use and student use of technology?
- What process does the district use to determine professional development in regards to educational technology?
- What do you perceive to be the top priorities for professional development?

System

- How are district level technology decisions made?
- Who is involved in making these decisions?
- How is the district technology plan developed?
- How does the district technology plan relate to individual schools' action plans?
- What role do you have in supporting action plans for the individual schools?
- How important is district level technology leadership to the systemic adoption of instructional practices that integrate educational technology into student learning throughout the district?
- What conditions facilitate or impede the process of educational technology integration within instructional practices?
- What changes, if any, are needed to help your district further advance in effectively using technological tools?
- What are the main educational technology issues faced by your district?

APPENDIX E

Contact Summary Sheet Examples

Contact Summary Sheet

Contact type: Visit
Site: A
Contact Date: October

1. What were the main issues or themes that struck you in this contact?

* Participant has very limited experience as a classroom teacher- only during student teacher. All of her experiences are as a resource teacher, first in a computer lab and then in the media center. Has strong background in IT education and experience.
*County leadership is very small. Some positions have been vacant for a while. Central office has not really had a vision of technology integration that was shared by individual schools. The director is really a resource for administrators to ask questions about the cost and usability of devices. No clear central office vision that is communicated across the county. Director has limited role in leading the county towards a common vision. She spends a great deal of time handling technical issues.
* Media specialists in the school are doing some of the IT work. Not all schools have a full time dedicated media specialist.
* Schools need onsite support…someone there to fix devices and answer questions about use
* Not able to address training needs of the system. That training portion that she was hired to address has disappeared. It really seems like every school and every teacher is functioning on their own.
*Recognize a need to have a strong curriculum person at the county level. Has a good relationship with the new curriculum person in their county.
*Software updates can cause major issues with how other programs function. Constantly needs monitoring.
*States behind the ball. Not thinking far enough into the future on a 10 year plan.
*Relationship with the DOE staff is primarily to get information during monthly meetings and to give information (ie data and reports). She does not know of or even work directly with the individual at the state level who is identified as responsible for handing instructional technology.
*Nature of K12 system can make it difficult to be part of a team at the central office level. Also seems that the levels within the system and across the system are disconnected.

---

2. Summarize the information you got (or failed to get) on each of the target questions you had for this contact.

- What life experiences led to your service in the field of education?

Not really answered. Experience in business world and teaching technology overseas led her to her work in IT. I didn't really get to the heart of why she stuck with education.

- Describe how your interest and proficiency with educational technology developed.

Structural Code: EDUCATION AND ONJOB EXPERIENCE

Interest in learning about technical side. Catalyst was initial job overseas. Continued to take IT classes and educational classes. Currently taking classes to get media certification. Says she was always a nerd.

- How did you come to serve in your current position?

Structural Code: EDUCATION AND ONJOB EXPERIENCE

Taught overseas with no teaching certificate in a private school. Position was in the computer lab. Probably utilized her initial interest in business. Four years of work in the field of teaching led to desire to get Masters in education. Continuation in the field of educational technology after her return to the states. Didn't really want to stay in the technology aspect of the job. Limited experience as a resource teacher. No experience as a classroom teacher. Really enjoys working with kids.

- What experiences in your life prepared you for handling the technical and business responsibilities of your job?

Structural Code: EDUCATION AND ONJOB EXPERIENCE

Has a business degree and some experience working in business sector. Has experience working as a IT specialist for the central office of a larger school system in the state and for a college. Had to teach herself some of the aspects pertaining to grant writing and management. Did not have to worry about budget issues initially. A lot of on the job learning.

- What experiences do you have with educational uses of technology for teaching and learning?

Structural Code: CLASSROOM EXPERIENCE WITH TECHNOLOGY

Experience as a computer lab teacher for 4.5 years. Experience as a media specialist for 3 years. No experience in an actual classroom.

- Describe the role of a director of technology within the field of education.

Structural Code: JOB RESPONSIBILITIES

Not asked directly- She did say that there really shouldn't be a hodge-podge of job responsibilities. Should be more consistent across the state.

- Describe the details of your personal work as district level technology coordinator?

Structural Code: JOB RESPONSIBILITIES

All over the place. Jill of all trades. For her the job entails a tremendous amount of IT work and administrative management of the county's website and technology plan. Less leadership work at the board level. Less ability to work on training needs.

- What do you see as the most important priorities of your job?

Structural Code: BELIEF ABOUT JOB PRIORITIES

Make sure the computers are up and running.

- What role do you have in determining how educational technology is used in instructional practices?

Limited across the county. Most decisions, from purchases to training, is made within individual schools. Makes it difficult to establish uniform expectations and standardization within technological devices. Has more impact at direct school where she is working.

3. Anything else that struck you as salient, interesting, illuminating or important in this contact?

The school was decorated with pumpkins and icons depicting fall and Halloween. The staff was actually dressed up. The larger system where I work will not allow any images or activities referencing Halloween to be presented within schools. It reminded me of my elementary school. More relaxed…more kid oriented…more like a community school.

4. What new (or remaining) target questions do you have in considering the next contact with this site?

What does she think the role of the technology director is within the field of education?

Contact Summary Sheet

Contact type: Visit
Site: B
Contact Date: October

1. What were the main issues or themes that struck you in this contact?

- The position is still a relatively new position- only the 2nd person to hold this job
- Focus is on curriculum
- Technology is there to support instruction
- Department is there to support district staff
- Implications of professional background on practices- Media background
- Perception of being different than others in the state- department structure
- Leadership style- extensive use of "we" in describing department
- Awareness- she really seems to be aware of policy changes and how they affect organization
- Support from district BOE- committed to providing instructional tech support through district personnel both IT and tech, as well as student programming through school based labs
- Instructional background is perceived as an important attribute
- Value of asking the right questions
- Allotment of time spend of responsibilities varies each year depending on the system's tech needs- really dealing with infrastructure now
- Systems View- Recognition of the value of relationship with other departments and need to support other departments' initiatives
- Communication weekly with staff on tech issues and policy/program issues occurring in the county
- Identification of staff as district verses school employee…finding the right fit
- Creation of digital content
- Professional support- balancing need for training with need to be in the classroom

2. Summarize the information you got (or failed to get) on each of the target questions you had for this contact.

- What life experiences led to your service in the field of education?
  Structural Code: PART OF COMMUNITY; TIES TO EDUCATION FIELD
  She really didn't answer what led her to choose the teaching profession. Family has military connection. Husband is in the field.
- Describe how your interest and proficiency with educational technology developed.
  Not directly answered but it is clear that she comes to the field with a focus on the curriculum/teaching side rather than the IT side. Based on other responses, she appears to have proficiency with applications not necessarily technical

aspects of the job. She is self-directed to expand knowledge as indicated by her desire to pursue advanced degrees and research IT issues on her own.

- How did you come to serve in your current position?
  Structural Code: JOBS IN THE K12 SYSTEM
  Media connection. Teaching led to media position. Media position led to information communication technologies for researching and providing technology support for teachers in the building. Technology support knowledge led to district level instructional technology support position. Media experience later led to media coordinator position for the county. Both the instructional technology support position and the media coordinator position were under the District Technology Coordinator. Appears to have received on the job training from the previous director.
- What experiences in your life prepared you for handling the technical and business responsibilities of your job?
  Structural Code: PREPARATION FOR JOB: EDUCATION AND ONJOB EXPERIENCE
  Teaching experience/media experience/training experience and working directly under previous director.
- What experiences do you have with educational uses of technology for teaching and learning?
  Structural Code: CLASSROOM EXPERIENCE WITH TECHNOLOGY
  Remembers the early days of computers on rolling carts. Sharing one computer among many teachers and many students. Used for administrative purposes. Remembers access to more computers in the media center. Computers were used for research and development of written presentations. Tried to get students and teachers involved in the GA Media Festival.
- Describe the role of a director of technology within the field of education.
  Structural Code: JOB RESPONSIBILITIES
  This question was not directly asked. Information gathered from responses: Responsible for 16 individuals. Support student learning through use of technology, coordinate acquisition and management of infrastructure, ensure timely technical support, coordinate instructional educational professional develop for staff, participate in leadership meetings at local and state level, advise board departments on technological issues, communicate with stakeholders on issues related to instructional technology, researching current issues and trends in instructional technology
- Describe the details of your personal work as district level technology coordinator?
  Structural Code: JOB RESPONSIBILITIES
  Varies depending on the needs of the county at that particular time. No two days are the same. Meet with department staff and BOE staff. Ringleader of the department- coordinates and manages the actions of each department.
- What do you see as the most important priorities of your job?
  Structural Code: BELIEF ABOUT JOB PRIORITIES
  Establishing a culture among her staff that they are there to provide support and must be very service oriented.

- What role do you have in determining how educational technology is used in instructional practices?
  Not directly asked.

3. Anything else that struck you as salient, interesting, illuminating or important in this contact?

Her office is at the BOE. She was late to the meeting b/c she was pulled into an impromptu meeting with the new superintendent. Use of "we" throughout the interview representing the perception of a team/unit; humility of subject was present as exhibited in recognition of personal technical knowledge as developing, need for strong staff to bring knowledge to the table, and transformation as gradual. Strong vision for department- service oriented/support. Professional training is in support not leadership. Recognizes the value of IT coaches' instructional experience in K-12 environment. Developing relationship with Curriculum Department is perceived to have positive consequences on technology integration. BOE recognition of the value of technical and professional support for teachers.

4. What new (or remaining) target questions do you have in considering the next contact with this site?

- Need to ask about their role in determining how educational technology is used & how their interest in IT developed. Specifically, how did the experiences as a teacher, media specialist, and instructional technology specialists affect the participant's thinking about instructional technology?
- You mentioned in during the first interview that vendors of technology do not offer much support unless you are in the Atlanta area. Why do you think that is?
- You mentioned in the first interview that other departments look to you for guidance on infrastructure. Do they also ask about integration practices, technology literacy, technology standards, independent learning opportunities, and instructional design
- As a media specialist, what was your role with supporting technology?
- What motivated you to pursue degrees in these fields? How did these prepare you for this job? Any specific classes that may have made an impact on how you function as an IT Coordinator?
- Describe the process whereby your county applied for the DoDEA grant and how the decision was made to purchase the devices and use them in the middle/high schools?

APPENDIX F

Portion of Transcribed Site A_ Interview # 2

Note: This interview was originally scheduled to take place at the school media center but actually took place in the server room at the BOE due to the participant's time constraints. It was very difficult to hear in the room. The interview tape was paused at times to allow the participant time to address maintenance on the server.

#	Comment	Code	Reflective Remarks
1.	P- Teachers are dying to have training but we aren't doing them.	RET- PD	No formal training taking place. Perception that teachers desire training support.
2.	R- Well, I noticed that in your plan. I saw in your mission statement that…		
3.	P- Our mission statement? (Emphasis placed on the Our)	DEVSTRPLAN	Interpretation is that the plan was really produced by the director. Involvement from other contributors was limited.
4.	R- What is your actual vision?		
5.	P- To hire someone fulltime under me to be the engineer and run around working on computers. I would like to be working on the instructional part like I used to do when I first came here when I trained people. That's what needs to be done. I can't…I mean, it's like, I send out emails telling them, "*Oh, here's this really cool program. You can use it in your classroom."* Well, they need someone to show them how to use it. Like, I sent out something at the beginning of the year, DoJo (Classroom DoJo)…	VIS	Instructional part really relates to use of applications and software. Not necessarily instructional design.
6.	R- Yes, we have that.		
7.	P- Do you use it?		

8.	R- No, I am…		
9.	P- See. There you go.		
10.	R- Part of it is the way I serve students. Only 25 days. It's not…		
11.	P- Conducive for your instruction.		
12.	R- But I have seen a lot of teachers using it.		
13.	P- It's wonderful in the elementary classrooms especially. I showed it to them in the beginning of the school…no actually last year I sent it out to them. I said, "*You guys, this is really cool."* And I showed them in about 2 seconds. I showed them, the classroom teachers, when they were at lunch. I ran to their rooms and showed them real quick. But, that's not enough time.	RET- PD	Mainly able to show the elementary teachers in her school. Found time to share around their schedule going room to room.
14.	R- No.		
15.	P- So, they finally got to use it this year only because a teacher came from another district and she said," *Oh, I use it all the time. I'll show you."* She showed them more. So they were like, "*Oh, yeah."* See, I didn't have enough time. She had enough time to show them…	LRNCOMM; BAR- TIME	Value of having others in the school that have technological interest and experience. Director doesn't have enough time to follow-up and support teachers' use of applications and software.
16.	R- And come back and follow up.		
17.	P- Exactly. So that is where I think…		
18.	R- But, it says here on your mission statement here: To achieve academic objectives, one is access, which is clear, and online learning. So, what		

	do you consider that online learning to be?		
19.	P- Alright. Right now, I don't have enough online learning setup. I had…initially I started setting things up and then I got pulled to do the SPS stuff. So what I am working on right now is I have Symballo, which I am setting up for the kids. All it is is the page comes up and it's just links to all different types of programs that they would use. Then I'm going to set up for teachers. I'm setting them up something a little bit different. I'm not sure if I am going to use Symballo with them or not. I just started working on it. But I am setting it up for them to go to the website and there are different links that have videos and training and really give them some documentation they can use, lesson plans, everything. It's more like a…I can't think of the name of it. It'll come to me. Anyway, so I am working on these things. But to get them all done…oh, and I am working on the website. A new website. So that is another thing I've got going.	TECHPLAN-RET-PD; TECHPLAN-RET-INST; VIS; RESPON-WEBSITE	In response to question about what online learning means since this was addressed in their 3 yr. plan. Currently working a resource for students using an online program that organizes instructional resources on a page that is accessible anywhere since the data is stored in a data cloud. Wants to also provide a similar resource for teachers with links and videos for training purposes. Coordinator is doing the work, not asking teachers to be part of the instructional design. Have teachers asked for additional resources? How will she know if, how, and when these are being used? Will teachers be able to add resources to a

			district page?
20.	R- If you could, if you had the personnel and you had the individuals, what is your vision for what you think…		
21.	P- I'd have this really cool online training program. I really could. I've done videos…training videos. Where I'd show them to the teachers," *Oh, wow…that's cool."* I could set up those things. But when you are trying to catalog books and work on servers and work on…you can't get it all done. And I can't do it…I am not going to spend all my weekends…I really can't do that on my weekends…and at night.	VIS; RESPON; BAR- TIME	Coordinator is really overwhelmed trying to juggle the responsibilities of both positions.
22.	R- What would it look like for students? What would that online learning look like for students?		
23.	P- That, I think I'm going to get accomplished. If I get the Sybaloo setup. They can just go to the…what I'll do is…I'll setup the default webpage for the students to come to. It would have all the links there.	VIS	Problem is that the online resource is developed by the coordinator. May not be content specific. Teachers need to be making the resources along with support from the curriculum side.
24.	R- As soon as they go on?		
25.	P- Yeah. Yeah. So they can go to Internet Explorer…		

APPENDIX G

Document Summary Sheet Examples

Document Summary Sheets

Name of document: Site B Media Handbook

Date of document: No Date

Accessed: Online

Responsible Department: Technology & Media Department

Target Audience: Media Specialist

Responsible Evaluator: Media Specialist and Director

Significance of Document:

Resource provides guidance and resources for media specialists.

Summary of Contents:

Media Handbook- Mission statement includes the following "to assist instructional personnel as they develop instructional plans and present classroom instruction." Role of the media specialist is as an instructional leader in the use of information resources and one who plans collaboratively with teachers to integrate resources and information literacy skills into the curriculum. Includes the role of the instructional technology specialist: to assist school system staff in the direction and supervision of the integration of technology into the instructional process by providing onsite assistance, conducting staff development, serving as leader and coordinator of the school instructional technology plan, modeling integration of technology, assists in the development of instructional materials. The plan includes information technology integration skills and standards per grade level, an instrument for evaluating media specialist, recommended strategies for the integration of resources and technology into instruction, and a planning form for collaborative media/teacher work.

Media Resources- Elementary Resources for teacher instructional use to support instruction & LEMONS lessons, which stands for Lessons Engaging Media Offer Needed Skills. The goal of the project is to provide teachers and media specialist with lessons that implement the GPS, the AASL's Standards for the 21st Century Learner, and ISTE NETS for students. Meetings agendas are available online. Templates for writing lessons, course evaluation, use in the work setting, "recipe for making lemonade", and sample 3rd grade lesson is available online. Completed lessons links by grade level are also available. Media meetings are available online with passwords. Resources for the Media Festival, Helen Ruffin Reading Bowl, and District Catalog are online as well.

Value of this Document to Research:

This document provides evidence of support from the department for the integration of instructional technology. Effort is made through the department to provide training and time for teachers to work collaboratively on lessons that integrate content standards, ISTE NETS standards, and AASL standards for 21st century learning. It appears that some attempt for addressing instructional design takes place within schools with support from the media specialist. Lesson plans range from 3 to 6 per grade level.

Researchers Notes:

Time has been spent thinking about the role and responsibilities of these two support personnel (media specialists and instructional technologies). A coordinator effort to address the use and integration of technology appears to be taken by the department. Technology is utilized as a tool to provide unlimited access to instructional resources and planning documents. Based on the dates of the LEMONS documents, it appears that the

initiative is either no longer taking place or the site is no longer being updated, which is highly unlikely given the overall management of the county website and online resources.

Document Summary Sheets

Name of document: Site A Website

Date of document: July 2012

Accessed: Online

Responsible Department: Technology Department

Target Audience: Staff, students, and parents

Responsible Evaluator: Technology Director

Significance of Document:

Site provides policy documents, calendar, links to PowerSchool, links to individual school sites, resources for teachers and parents.

Summary of Contents:

District- Breakdown of departments and organizational chart provided. Longitudinal data on NI Title 1 School available but not updated since 2011. Some legislation pertaining to instructional programing provided.

Technology Department- Identifies their mission and services provided. No mention is made about professional development on the list of services provided. Files available for download include the acceptable use policies, the computer disposal plan, the technology disaster plan, and the 3 year technology plan. Links to a few resources sites are included.

Media Department-Does not have a page or a particular representative at the board level.

School Board- List of Board Members; minutes dated 2012-2013 and 2013-2014.

School sites- School improvement plan listed on the two elementary sites only

Student resources- Online resources that are broken down by grade level.

Staff resources & Parent resources- Mostly links to applications, programs, or other sites.

Value of this Document to Research:

This document provides insight into the types of communication available online to stakeholders. It also presents the overall structure of the system.

Researchers Notes:

The site is limited in the scope of information and resources provided to stakeholders and staff. It also is not updated regularly. This is not a surprise given the other additional responsibilities placed on the director. This district has fewer funds to hire individuals at the district level to support schools in their operation and management.

Document Summary Sheets

Name of document: Site B Technology & Media Services Webpage

Date of document: No Date

Accessed: Online

Responsible Department: Technology & Media Department

Target Audience: Parents; Community Members; Staff

Responsible Evaluator: None

Significance of Document:

Resource for stakeholders.

Summary of Contents:

Evaluations of professional learning courses are completed online. The IT page provides iTunesU page for searching their self-produced podcasts and courses. A link to the Galaxy Project 6-9 STEM program that aims to increase test scores on CRCT is available, as well as the GA Innovators information on their e-device initiative. A resource page organized by grade level, content area, and standards is available through the site. Teachers are able to submit lesson plans for review to be included on the site. Resources for new hires are also available online. So are troubleshooting documents. Video and audio files from BOE staff are a recent addition.

Value of this Document to Research:

The head instructional technology specialist is in charge of updating the site. Direction for managing the site comes from the district technology coordinator and the new superintendent. The presentation of the resources on the site is consistent with the director's desire to provide digital content to students. Let resources be digital. The site

models use of digital age tools for communication, management of digital resources, and evaluation of professional development services.

APPENDIX H

Attribute Coding Example

Transcription 1st Interview: Case One participant

DESCRIPTION OF PARTICIPANT:

The participant is a white female holding the title of Executive Director of Technology and Media in a school district serving a student population between 6,000 and 15,000. The participant has seven years of experience as Executive Director of Technology and Media and over twenty years of experience in the educational system. She has a Bachelor degree in education, a Master degree in Instructional Technology and Media, and a Doctorate degree in Instructional Technology in Distance Education. The interview took place on October 13th, 2013 in the participant's office located within the Board of Education offices at 2:30pm. The participant was late getting to the meeting because she was in another meeting. The purpose of this interview was to gather data on the participant's personal and professional backgrounds, data on their roles and responsibilities, and pertinent technology planning document, such as the district's technology plan, the district and individual schools' action plans, and the district's schedule for professional development.

APPENDIX I

Initial Code List with ISTE Standards and Descriptors

ISTE Standards	ISTE Verbs	ISTE Nouns Phrases
VISIONARY LEADERSHIP	inspire	shared vision of change
VISIONARY LEADERSHIP	facilitate	shared vision of change
VISIONARY LEADERSHIP	engage	ongoing strategic planning process involving the development, implementation, and communication
VISIONARY LEADERSHIP	advocate	policies, programs, and funding
DIGITAL AGE CULTURE	ensure	instructional innovation focused on digital age learning
DIGITAL AGE CULTURE	model	technology for learning
DIGITAL AGE CULTURE	promote	technology for learning
DIGITAL AGE CULTURE	provide	technology equipped learner-centered environment
DIGITAL AGE CULTURE	ensure	effective practice in the study of technology
DIGITAL AGE CULTURE	promote	learning communities
DIGITAL AGE CULTURE	participate	learning communities
PROFESSIONAL PRACTICE	allocate	time, resources, and access to professional learning
PROFESSIONAL PRACTICE	facilitate	learning communities that support personnel
PROFESSIONAL PRACTICE	participate	learning communities that support personnel
PROFESSIONAL PRACTICE	promote	communication and collaboration with stakeholders using digital tools
PROFESSIONAL PRACTICE	model	communication and collaboration with stakeholders using digital tools
PROFESSIONAL PRACTICE	stay abreast	educational technology research and trends
PROFESSIONAL PRACTICE	encourage	evaluation of new technologies in regards to student learning

SYSTEMIC IMPROVEMENT	lead	purposeful change to meet learning goals through technology and media resources
SYSTEMIC IMPROVEMENT	collaborate	on evaluation instruments
SYSTEMIC IMPROVEMENT	collect	data on staff performance and student learning
SYSTEMIC IMPROVEMENT	analyze	data on staff performance and student learning
SYSTEMIC IMPROVEMENT	interpret	data on staff performance and student learning
SYSTEMIC IMPROVEMENT	share	findings on staff performance and student learning
SYSTEMIC IMPROVEMENT	recruit	technology proficient personnel
SYSTEMIC IMPROVEMENT	retain	technology proficient personnel
SYSTEMIC IMPROVEMENT	establish	strategic partnerships
SYSTEMIC IMPROVEMENT	leverage	strategic partnerships
SYSTEMIC IMPROVEMENT	establish	robust infrastructure
SYSTEMIC IMPROVEMENT	maintain	robust infrastructure
DIGITAL CITIZENSHIP	ensure	equitable access to digital tools and resources
DIGITAL CITIZENSHIP	promote	policies for safe, legal, and ethical use
DIGITAL CITIZENSHIP	model	policies for safe, legal, and ethical use
DIGITAL CITIZENSHIP	establish	policies for safe, legal, and ethical use
DIGITAL CITIZENSHIP	promote	responsible social interactions with digital tools
DIGITAL CITIZENSHIP	model	responsible social interactions with digital tools
DIGITAL CITIZENSHIP	model	shared understanding and involvement in global issues through use of digital tools
DIGITAL CITIZENSHIP	facilitate	shared understanding and involvement in global issues through use of digital tools

APPENDIX J
Document Analysis Worksheet Example

Source	Source Name	Date	Access	Department	Target Audience	Focus/Goals	Supporting Text #1	Supporting Text #2
SB	Three- Year Technology Plan	7/2011-6/2014	Online	Technology/Media Department	GA Department of Education/Staff	Vision: implement technology to enhance the education; strategies that instruct students on gaining access, analyzing, and using information in an ethical manner to develop higher order thinking skills; provide materials, equipment, software, and most importantly, training to all stakeholders; maintain o a highly qualified technology department dedicated to offering training and support. Bulleted list: provide access to equipment, provide access to Internet, provide instruction to empower information collection, collaborative learning, problem solving, and decision making; provide devices to enhance	ACCESS-Goal 1: To provide all staff and students equitable access (Increase number of pilot technologies by 2 & 10% increase in modernization of current technologies);To provide assistive tech to special ed. students (100% will have assistive tech devices)	INSTRUCTIONAL USES-Goal 2: To provide all instructional personnel continued high quality professional learning in the effective use and integration of technologies (Access to interactive boards, projectors, and laptops); Training for teachers (20 hours); and Training for Administrators (annually)

Supporting Text #3	Supporting Text #4	Supporting Text #5	Supporting Text #6	Supporting Text #7	Supporting Text #8	Supporting Text #9
ENSURE INTEGRATION-Goal 3: To ensure the integration of technology in the standards-based curriculum and assess students' technology literacy (GA tech standards for tech literacy by 8th grade)	ADMIN USES-Goal 4: Administrators will demonstrate leadership in the use of technology to support standards-based schools and establish an ongoing process of assessing the use of technology to improve instructional planning. (inludes PD for Admin, evaluation of integration practices, evidence of technology integration in lesson plans, Admin use of technology, technology integration goals in school improvement plans, data disaggregation, school based PD for teachers, technology advisory	PARENT/COMMUNITY- Goal 5: To utilize technology as a medium to create an interactive partnership between the school system and parents, community agencies, industry, and business partners. (After-school workshop for parents to increase awareness of devices in use; Increase web page usage; Expectations that classroom teachers have and maintain a website or blog; Web based instruction using Atomic Learning system for enrichment/remediation; Access to OAS)	SYSTEM READINESS-Goal 6: To continue to enhance,maintain, and support the network infrastructure to ensure access for all employees and students to meet educaitonal needs (3 yr. replacement cycle; Upgrade Mbps; Technicians and network engineer receive 10 hours training)	The Instructional Technology Department implemented the Technology Teacher of the Month award, to recognize teachers who exemplify the integration of technology in the classroom.	Nearby University Educational Technology Training Center provides support to system by assisting with grant writing, training, and other professional learning needs. Also maintain involvement with the ETTC. PD geared towards training in application programs.	

Person responsible	Evaluation
Varied depending on the goal. Ultimately, the Executive Director of Technology and Media was responsible for all goals.	Varied depending on the goal.