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Factors that impact the instructional and technical support provided by site-based technology coordinators in K--12 schools

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FACTORS THAT IMPACT THE INSTRUCTIONAL AND TECHNICAL
SUPPORT PROVIDED BY SITE-BASED TECHNOLOGY
COORDINATORS IN K-12 SCHOOLS

by

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Factors that Impact the Instructional and Technical Support Provided by Site-Based Technology Coordinators in K-12 Schools

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ABSTRACT

Factors that Impact the Instructional and Technical Support Provided by Site-Based Technology Coordinators in K-12 Schools

by

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Dr. Neal Strudler, Examination Committee Chair
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School districts are increasingly employing teachers as site-based coordinators to support and facilitate a myriad of information and communication technology (ICT) related innovations. This study describes the barriers and enabling conditions influencing the technical and instructional support, and staff development provided by these coordinators. Diffusion theory (Rogers, 2003) and a staff development model developed by Guskey and Sparks (2000) were used as frameworks for this study of 134 coordinators from a large school district.

The findings of this study indicate that staff development and instructional support fell well below desired levels, and timely technical support is increasingly difficult to provide. Coordinators reported not having enough time to focus on each of the three types of support, likely due to the proliferation of ICT in K-12 schools. Those who
reported more barriers to technical support predictably reported increased time spent on technical support functions. Furthermore, coordinator role orientation towards technical support was associated with time spent providing such functions.

Factors positively associated with the amount of time spent providing instructional support included the experience level of the coordinator, the number of computers supported, and perceptions about the role of the technology coordinator position.

Perhaps the greatest implication of the study is that a high ratio of computers to coordinators may hinder optimal instructional support. These findings are generally consistent with the literature on the characteristics of the technology coordinator position. Recommendations to the school district include revisiting the goals of the position and restructuring the role as needed to better meet the instructional needs of teachers.
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Finally, as a Christian I give thanks to God for helping me complete this project and for wherever He leads me next.

“...be warned: the writing of many books is endless, and excessive devotion to books is wearying to the body.” Ecclesiastes 12:12, New American Standard Bible
CHAPTER 1

INTRODUCTION

Purpose

There is no longer much debate on whether or not information and communications technologies (ICT) should be used in schools. Current issues seem to be centered on how to use technology effectively and how to increase the use of ICT by teachers and students. Effective staff development and instructional support are important to both of these goals. Staff development is a key factor in the use of ICT because what teachers know and can do is the most important influence on what students learn (National Commission on Teaching and America’s Future, 1996). Additionally, the lack of effective staff development has often been cited as a barrier to the integration of technology into the curriculum (Dwyer, Ringstaff, & Sandholtz, 1990; Fuller, 2000; Ronnkvist, Dexter, & Anderson, 2000). As noted by the CEO Forum on Education and Technology (1999), "The transformation of classroom technology from hardware, software, and connections into tools for teaching and learning depends on knowledgeable and enthusiastic teachers who are motivated and prepared to put technology to work on behalf of their students (p. 7)."

As increases in spending have made access to technology less of a problem, schools are increasingly creating full time technology coordinators tasked with all aspects of
supporting ICT at the school level (Strudler, Falba, & Hearrington, 2005). This support often includes both an instructional support and a technical support role (Ronnkvist, Dexter, & Anderson, 2000). Technology coordinators have to juggle both roles, often spending the majority of their time performing technical support, because teachers and students cannot use ICT if it is not functional. Since the amount of time a coordinator spends on staff development and instructional support can influence teacher use of ICT (Shelton & Jones, 1996; Fuller, 2000), it is important to learn more about the barriers and enabling conditions to effective staff development and instructional support faced by technology coordinators.

This study investigated ICT staff development, technical support, and instructional support provided by school-level technology coordinators. It sought to identify the characteristics of the technology coordinator position and those who fulfill that role, how coordinators report spending their time, and the barriers and enabling conditions to instructional support and staff development. This study also explored the relationship between numbers of computers, networked learning programs, and instructional support provided by technology coordinators. The relationships between attitude similarity of coordinators and teachers, the coordinator’s perceived role, and instructional support were also examined.

Data were gathered from 134 school-level technology coordinators from a large school district in the southwestern region of the United States using a paper questionnaire administered in a large group meeting. This questionnaire, partially designed by the researcher and partially based on the Teaching, Learning, and Computing survey by Becker and Anderson (1998), measured the variables studied. Additional data were
gathered from eight coordinators who participated in focus groups designed to provide richer descriptions and evidence to answer the research questions. The school district was chosen as a convenient means of gathering data from schools known by the researcher to have technology coordinators on staff who perform their role on a full-time basis.

Background

In 2001, the Hundred Seventh Congress of the United States passed, and President Bush subsequently signed into law, the No Child Left Behind (NCLB) Act. This law has several goals, but in the area of educational technology, it seeks to promote student academic achievement, including technology literacy, through the effective use of ICT in classrooms, including improving the capacity of teachers to integrate technology effectively into curricula and instruction. Further, NCLB advocates aligning challenging academic content and student achievement through the use of innovative curricula and delivery strategies, including distance learning (U.S. Congress, 2001).

The NCLB goals mentioned above coincide with great strides made in recent years in the acquisition and installation of ICT in education. There have been increases in school connectivity to the Internet from 35% of schools in 1994 to 99% of schools in 2001 and improved student access to computers from 12.1 students per computer in 1998 to 2.7 students per computer in 2005 (U.S. Department of Education, 2002; Market Data Retrieval, 2005). The improvement of school access to these technologies has been rapid and expensive.

Even though there has been a large increase in the access to ICT in schools, there remains ample evidence that this investment is not being utilized to the fullest extent...
possible. Support for teachers’ use of ICT has been cited as an obstacle to effective student learning with these technologies (Dwyer, Ringstaff, & Sandholtz, 1990; President’s Committee of Advisors on Science and Technology & Panel on Educational Technology, 1997; Ronnkvist, Dexter, & Anderson, 2000; Strudler, 1995-1996). The Partnership for 21st Century Skills, a consortium of high tech companies, the North Central Regional Education Laboratory, and the International Society for Technology in Education, has created a list of skills students need to succeed in the future (Lemke, 2002). The 21st Century Skills list was created partially to respond to the need for meaningful use of technology in schools, but also because the national economy is increasingly reliant on information and communications technologies and needs workers knowledgeable in these technologies (Lemke, 2002). The 21st Century Skills are: (a) digital age literacy, (b) inventive thinking, (c) effective communication, (d) high productivity, and (e) information technology. Indeed, the call for effective use of technology in classrooms and the improved capacity of teachers to integrate technology in the NCLB act are finding increased support in the literature.

Analyzing data from the 1996 and 2000 National Assessment of Educational Progress test in mathematics, the 2000 test in science, and the 1998 tests in reading, Wenglinsky (2005) used structural equation modeling to show relationships between the variables identified through test score data and surveys of students and teachers. His analysis showed effective uses for ICT in mathematics education, science education, and language arts education. Specifically, Wenglinsky (2005) found that using computers for simulations or real world problem solving in mathematics classes, using computers for...
analyzing data and simulations in science, and using computers for writing instruction all had significant, positive relationships to student outcomes.

Research shows, however, that teachers need both technical and instructional support to implement ICT effectively (Ronkvist, Dexter, & Anderson, 2000; Strudler, 1995-96). As of 1998, approximately 87% of schools nationally had someone serving in the capacity of technology coordinator, the person most likely to directly provide this support. However, only about 19% of schools nationally had someone working full-time in that capacity (Ronkvist, Dexter, & Anderson, 2000). While this is an improvement from five percent of schools having a full-time technology coordinator in 1997 (President’s Committee of Advisors on Science and Technology & Panel of Educational Technology, 1997), there are limited data on the barriers and enabling conditions to effective staff development and instructional support faced by technology coordinators. As substantial investments in ICT continue, it is worthwhile to study these barriers and enabling conditions to learn more about this important aspect of coordinator effectiveness.

Although a well-developed picture of the impacts technology coordinators have on schools is still emerging, the literature does contain some information about the relationship between technology coordinators and effective technology integration. In case studies of six sites, Dexter, Seashore, & Anderson (2002) examined the contributions of a professional community to the exemplary use of ICT. They found that technology leadership and staff development contributed to the creation of a professional community. The professional communities, of which technology support staff and staff developers were a part, deepened the shared vision of the purposes of ICT in schools,
which in turn fostered the professional community in a mutually supportive way. As technology coordinators play a role in this community, they support and deepen the vision for instructional technology in schools as well.

Within the school community, there is further evidence that technology coordinators play a significant role in technology integration. Fuller (2000) asked a very salient question: Would students use computers more routinely in their classroom work if technology coordinators spent more time helping teachers? Fuller investigated the effects of time spent by coordinators on the incidence of student computer use in academic subjects in grades five and eleven. She found a measurable effect of the support a coordinator provides to teachers on students’ computer use, although that effect was small. Further, Fuller found that time spent supporting students had no measurable effect on students’ computer use. Most notably, this study showed that the time a technology coordinator spends supervising students, teaching teachers, and writing lesson plans that integrate ICT predicts the amount of time students use computers in academic subjects.

The present study builds upon the prior work of Strudler, Falba, & Hearrington (2005) in their study of elementary school level technology coordinators. The researchers found that coordinators increasingly spend more time on technical support tasks than they spend on instructional or curricular support tasks. They reported that the percentage of time coordinators spent on technical support tasks increased from 29.6% in 1999 to 60% in 2004 while the percentage of time spent on professional development and support tasks decreased from 56.1% in 1999 to 30.5% in 2004. This finding is supported by similar results reported by Ronnkvist, Dexter, & Anderson (2000). Other findings by Strudler et al. (2005) indicate that the numbers of computers and the sheer numbers of
teachers and students using them are a barrier keeping technology coordinators from providing more instructional support. The present study expands upon this prior work by investigating additional factors and by including high school and middle school technology coordinators. These additional factors are specific barriers and enabling conditions to staff development and instructional support, perceived similarity between coordinator and teachers, the enormity of technical functions filled by technology coordinators, role expectations, and instructional support.

Theoretical Framework

Staff development was examined using Guskey and Sparks’ Model of the Relationship Between Staff Development and Student Learning (Guskey and Sparks, 2002). The premise of this model is that the primary and most direct influence on student learning is teacher knowledge and practice. The most direct influence on teacher knowledge and practice is the quality of staff development, which contains three component characteristics: content, process, and context. Content characteristics concern the knowledge, skills, and understandings important to any staff development. Process characteristics are concerned with the way staff development activities are planned, organized, carried out, and followed up. Context characteristics are the organization, system, or culture in which staff development takes place (Guskey, 2000). Additionally, there are five levels of staff development that must be evaluated to increase effectiveness: participants’ reactions, participants’ learning, organizational support and change, participants’ use of the new knowledge or skills, and student learning outcomes.
Instructional support was examined through Diffusion Theory (Rogers, 2003), which is the process by which an innovation is communicated through channels, over time, among members of a social system. Diffusion Theory predicts that an innovation, such as the use of ICT in education, threatens the status quo and will therefore encounter opposition because of uncertainty concerning the innovation. This uncertainty may be a lack of predictability, structure, or information. Information is a means of reducing uncertainty. Instructional support provided by technology coordinators to teachers increases predictability and structure, therefore reducing uncertainty and aiding the diffusion of ICT. Diffusion Theory postulates that information is most effectively communicated between individuals who are most similar (Rogers, 2003). This degree of similarity, called “homophily,” may therefore play a role in instructional support. In the present study technology coordinator homophily with the classroom teachers they support was examined to determine whether or not perceived homophily has any relationship with the amount of time a coordinator spends providing instructional support.

Limitations of the Study

While this study provides up-to-date information about technology coordinators and explores the enabling and inhibiting factors school technology coordinators perceive, it has at least two limitations. First, because the population of technology coordinators being studied is all from the same school district, the results cannot be generalized to all technology coordinators or all school districts in the United States. It may be that some, or many, of the factors found to enable or inhibit staff development or instructional support are indeed ingrained characteristics of, or due to, the school district itself.
Second, due to resource limitations, data were gathered solely from each school’s technology coordinator. Therefore, the results of this study are subject to the biases of the participating school technology coordinators’ self-reports.

Significance of the Study

The presence of staff development and instructional support are key factors in the integration of technology in teaching and learning (Dwyer, et al., 1990; President’s Committee of Advisors on Science and Technology & Panel on Educational Technology, 1997; Ronnkvist, et al., 2000; Sandholtz, et al., 1997; Strudler, 1991; U.S. Congress, 1995). This study provides an updated view of who technology coordinators are and what they do in schools in a large district and should inform the training and utilization of technology coordinators. It should also inform the practice of school-based technology coordinators as staff developers and instructional support providers. Finally, this study also provides schools and school districts with a continuum of factors that are associated with increased technical support, instructional support, and staff development. Ultimately, the results of this study should contribute to the increased realization of the potential of ICT in K-12 education.

Research Questions

This study sought to answer seven questions:

1. What are the characteristics of the technology coordinator position, by school level (elementary, middle, or high school) and those who fulfill that role?
2. How do technology coordinators, by school level, report spending their time?
3. What are the barriers and enabling conditions to technical support, by school level, as perceived by technology coordinators?

4. What are the barriers and enabling conditions to instructional support, by school level, as perceived by technology coordinators?

5. What are the barriers and enabling conditions to staff development, by school level, as perceived by technology coordinators?

6. What is the relationship between the number of computer users, the number of networked learning programs, the number of computers, and the percentage of hours of instructional support provided?

7. What is the relationship between perceived homophily, the perceived role of the technology coordinator, the perceived role expectation of the supervisor, and the percentage of hours of instructional support provided?
CHAPTER 2

REVIEW OF RELATED LITERATURE

As the numbers of computers in k-12 schools has skyrocketed in recent years, so has the expectation that teachers and students will make use of information and communication technologies (ICT) to maximize the return on the public's investment. Quality Education Data surveyed 1,000 U.S. public school teachers to find out how important using ICT was to them in the performance of their duties. They found that a large percentage of teachers agreed that their personal use of ICT for administrative functions (86%), communication (83%), research and planning (79%), and classroom instruction (77%) was important to teachers (CDW-G, 2005). This increasingly important role of ICT has become the law of the land. The No Child Left Behind Act (NCLB), signed into law by President Bush in 2001, seeks to promote technology literacy through the effective use of technology in classrooms, including improving the capacity of teachers to integrate technology effectively into curricula and instruction (U.S. Congress, 2001). Additional impetus has been given to this effort by the Partnership for 21st Century Skills, a coalition of organizations and businesses working together to draw attention to the skills they believe students should have to succeed in the 21st Century. These skills include ICT literacy (Partnership for 21st Century Skills, 2003).
The implementation of large-scale innovations in education requires many types of support. Among the keys to increased and more effective usage of ICT in education is staff development and instructional support. Due to the trends of increased access to ICT, and along with the demand that ICT be well utilized, school districts have increasingly invested in school level technology coordinators to provide technical support, staff development, and instructional support. This study adds to the understanding of the role of these school-level technology coordinators, particularly in the areas of staff development and instructional support.

In support of this study, the following review of the literature was conducted and is divided into three sections: (a) the history and role of the school level technology coordinator position; (b) staff development, and (c) the diffusion of educational innovations.

Technology Coordinator History and Role

As ICT has proliferated and grown in importance in schools, technical and instructional support has become increasingly important. The position of school-level technology coordinator continues to evolve to meet these demands. The literature pertaining to the history and role of the technology coordinator position is organized into four areas: (a) history and context of the position, (b) duties and responsibilities, (c) the increasing demands of the position, and (d) quality support.
History and Context

In 1963 one percent of U.S. secondary schools used computers for instructional purposes. By 1975 twenty-three percent of secondary schools used computers for instructional purposes (Molnar, 1975). In 1985, David Moursund wrote one of the first publications about and for technology coordinators. The booklet said that at the end of the 1984-1985 school year there was approximately one computer for every 60 students in the United States (Moursund, 1985). In contrast, the school district examined in the current study had approximately one computer for every five students in 2005. This represents a 12-fold increase in the numbers of computers in schools in a 20-year period. In 2005 the national ratio of students to classroom computers is 2.7 to 1 (Market Data Retrieval, 2005). These increases are significant when considering the myriad of duties performed by a technology coordinator.

Along with increases in access to ICT and the Internet, the use of computer-related technologies in schools has been given increased visibility and importance on a national level. The Federal Government’s No Child Left Behind Act (NCLB) of 2001 has made the use of ICT as a tool for improving student achievement a national priority. The NCLB Act has established three broad goals for the use of instructional technology in schools: (a) improve student academic achievement through the use of technology in elementary and secondary schools, (b) help students bridge the digital divide by ensuring that every student is technologically literate by the end of eighth grade, and (c) encourage the effective integration of technology through teacher training and curriculum development (U. S. Congress, 2001). National attention to the use of computer-related technologies in
schools increases the importance and value of the work of technology coordinators as it is
directly related to each of these three goals.

Duties and Responsibilities

In 1985 a typical school level coordinator had these duties: work with others to set
district and school goals for the instructional use of computers; work with others,
including teachers and curriculum leaders, to develop plans to implement computer-
related goals and objectives; help teachers develop curriculum materials; provide formal
and informal staff development; responsible for school’s hardware, software, and
support; help students; evaluate the schools instructional computing program; and keep
up to date on the computer field (Moursund, 1985). The technology coordinator was
expected to be a computer-assisted learning specialist, a computer-integrated instruction
specialist, and a computer scientist according to Moursund (1985).

In 1992, Moursund updated and expanded his publication on Computer Coordinators
into a publication for the newly named International Society for Technology in Education
called The Technology Coordinator. Moursund (1992) found the duties of the position
largely unchanged, with noted additions to the role being the responsibility for the
school’s technology budget, the articulation of computer-related goals between grade
levels and subjects, and the need to work with administrators and support staff to make
effective use of computers for administrative purposes.

The value a technology coordinator adds to a school may not be adequately described
in a list. In a follow-up study of three elementary school technology coordinators,
Strudler (1995-1996) used a case study design to study the ICT programs and the work of
the technology coordinators at their schools. As a follow-up to his earlier work with Gall (Strudler & Gall, 1988), this study represents a seven-year longitudinal analysis of the work of these three technology coordinators and their programs. He found that the coordinators worked collaboratively with teachers, groups of teachers, and committees as facilitators of change and disseminators of new ideas, similar to change agents. The coordinators in his study provided leadership to the staff in the areas of ICT by implementing pilot programs, conducting training, suggesting ICT tools and resources to teachers, and providing substantial help to teachers. Strudler found that technology coordinators were critical to maintaining the innovation and that without coordinators it was unlikely that ICT would fulfill its full potential in schools. He also found that the coordinators believed they would someday “work themselves out of a job” (p. 11) by helping teachers become comfortable enough to use ICT without them.

Indeed, coordinators have not worked themselves out of a job and, in 2004 the duties and responsibilities of the technology coordinator were still similar. According to the Technology Coordinator Issues Model (Frazier & Bailey, 2004), there are five areas of responsibility: (a) budgeting and planning; (b) teaching and learning; (c) administrative computing; (d) desktop support; and (e) network operations.

The International Society for Technology in Education (ISTE), in conjunction with the Gates Foundation, created yet another model useful to describe the work of the technology coordinator. Although designed to measure ICT support at both the district and school levels, the Technology Support Index (TSI), is a potentially useful guideline for many areas of a coordinator’s job (International Society for Technology in Education, 2005). The TSI contains four domains: (a) equipment standards, (b) staffing and
processes, (c) professional development, and (d) enterprise management. All four of these domains would certainly apply to the duties of a school district-level technology coordinator, but the domains of staffing and processes and professional development contain elements especially applicable to school-level coordinators. First, under the domain of staffing and processes, there are four categories applicable to the school-level coordinator and to this research: (a) contracted primary support, (b) staffing to computer ratio, (c) use of online knowledge bases for technical help, and (d) support by teachers. Specifically, these guidelines recommend a 72-hour turnaround on computer repairs, a computer to technician ratio of 75:1, an extensive online knowledge base for all aspects of ICT in education, and that classroom teachers not be used to provide technical support in schools. Second, under the domain of professional development, there are five categories applicable to the school-level coordinator and this study: (a) comprehensive staff development programs, (b) online training opportunities, (c) just-in-time training, (d) expectations for all staff, and (e) troubleshooting as part of professional development. Specifically, these guidelines recommend a progressive and comprehensive ICT staff development program; online learning opportunities for all skill sets; a delivery system for just-in-time training organization wide; ICT expectations of staff that are clearly articulated, broad in scope, built into work functions, and with performance expectations; and that basic troubleshooting should be a part of the staff development program (International Society for Technology in Education, 2005).
Increased Demands

As increases in funding over time have made access to ICT more widely available, schools are increasingly creating full time technology coordinators tasked with all aspects of supporting ICT at the school level (Dexter, Anderson, & Ronnkvist, 2002). Technology coordinators play an especially important role in schools as reliance on ICT continues to increase. More than ever, ICT is used for administrative functions once performed without technology, new administrative functions never before implemented such as identifying instructional needs through databases of student test scores, and to support a myriad of instructional functions in which ICT is used as both a tool for teachers and a learning aide for students. The CDW-G Corporation (2005) commissioned a nation-wide survey of 1,000 randomly selected teachers to ask them about ICT. With a 95% confidence level that their results are accurate within 3 percentage points. This survey is the most recently available data on teachers and ICT in the United States, but because the researchers did not fully explain their methodology their findings could be viewed skeptically. These teachers reported using ICT to take attendance (90%), post grades online (79%), send email to parents (79%), and post homework online (61%). Besides these recent increases of ICT usage by teachers, other technologies requiring technical support by coordinators are increasing in usage and availability as well.

There has been a rapid increase in the number of laptop computers and wireless networks in U. S. schools. In 2004 there was one instructional laptop computer for every 24 students. In 2005 that ratio has changed to one instructional laptop computer for every 19 students (Market Data Retrieval, 2005). In 1991 10% of all schools reported using a wireless network. In 2005 that number is 45% of all schools (Market Data Retrieval,
2005). Clearly the complexity of technology in schools and therefore the support burden on coordinators is increasing, with no end in sight.

In perhaps the most comprehensive and up-to-date examination of technology support available, Ronnkvist, Dexter, and Anderson (2000) surveyed a national probability sample of 1,215 public, private, and parochial schools. Their response rate of 75% included 488 principals, 467 technology coordinators, and 2,251 teachers. Their research identified two aspects of technology support: instructional support and technical support. Their research provided detailed information about the breadth and impact of the technology coordinator on instructional and technical support. In the present study, these two aspects of technology support are further explored.

Ronnkvist et al. (2000) found that 87% of schools had someone assigned to fill the role of technology coordinator. However, only 19% of schools have someone serving in this capacity full-time. While the corporate norm is to have one support person per 50 computers, this is hardly the case in schools (National Center for Education Statistics, 2003). In schools that distribute computers to every student, this means a school of 400 students and faculty members would require a technology staff of eight. However, this level of technology support is far from available as there are indications that as many as 45% of technology coordinators nationally also have teaching duties in addition to their coordinator duties (Dexter, Anderson, & Ronnkvist, 2002). The latest national data available show that coordinators spend more time on technology tasks than they spend on instructional support and staff development, and part-time coordinators spend most of their time on technology support tasks (Dexter, et al., 2002; Strudler et al., 2005). In contrast, the data from Dexter et al. (2002) indicate that full-time coordinators spend
roughly two hours per week helping teachers integrate technology into the curriculum with part-time coordinators spending less than one hour per week on integration. These findings are consistent with a study of six school-level technology coordinators in six middle schools in North Carolina, which found that coordinators spent 75% of their time on technical support tasks despite the original instructional purpose of their role (Moallem & Micallef, 1997).

Other research supports the conclusion that technology coordinators spend a preponderance of their time on technical support tasks. Strudler, Falba, and Hearrington (2001, 2003, & 2005) studied the population of elementary school-level coordinators in a large southwestern school district from 1999 to 2004. The researchers gathered data using a combination of questionnaires, interviews, and focus groups in. Strudler et al. (2005) found that the percentage of time their participants reported spending on technical support tasks started at 29.6 in 1999 and increased with each study until it was 60% in 2004. Their research also found that as the percentage of time coordinators reported providing technical support increased, the percentage of time providing professional development and instructional support decreased from 56.1% in 1999 to 30.5% in 2004. Additionally, the researchers found that coordinators reported not having enough time to do their jobs well more often than not. A likely explanation for the increases in time spent providing technical support in these studies is the fact that the number of students coordinators reported supporting increased from a mean of 1,149 in 1999 to 2,030 in 2004. As the number of students supported increased, so did the number of teachers. Coordinators in these studies reported supporting a mean of 66 teachers each in 1999 and 121 in 2004 (Strudler et al., 2005). Based on these year over year increases, these data
seem to support the notion that the demands of the coordinator job is getting more difficult over time.

The emphasis on technical support at the expense of staff development and curricular support is a consistent throughout the literature reviewed. This use of time is likely because teachers and students cannot use ICT that is not functional and the sheer amount of ICT that coordinators have to support is increasing in both quantity and complexity. In a study of five middle schools and their school-level technology coordinators, using a case-study design in a district in northwestern Georgia, Belvin and Leaderer (2002) found that these coordinators were so burdened with technical support issues that teachers sometimes waited weeks for issues to be resolved. The average time a teacher waited for a computer to be fixed in this study was five days and the longest time was 30 days. It is easy to see that other duties take a back seat when the technology does not work. This appears to be a national phenomenon as Solmon (1998) found in a survey of technology coordinators in 21 states that the average computer repair time was reported to range from 5.6 hours to 3.6 days.

Quality Support

The literature reviewed indicates at least two aspects of support for ICT are important: instructional support and technical support. The literature also consistently indicates that the support teachers typically receive isn’t sufficient to support large-scale change in the uses of ICT in the classroom. The CEO Forum on Education and Technology (2001) developed the STAR Chart as a tool to measure levels of various elements of ICT in schools. The STAR Chart is specific about several elements of
support and provides a benchmark for quality they call “target tech.” Quality support on the STAR Chart is measured in terms of technical support being available 24 hours a day, professional development being available anytime and anywhere, and all teachers being at a high phase of development in terms of using digital content.

Building on the STAR Chart as a framework, Dexter, Anderson, and Ronnkvist (2002) found that teachers in schools with quality technology support engaged in more and varied uses of ICT. They characterized quality technology support as consisting of four elements: (a) access to one-on-one personal guidance and help, (b) frequent teacher participation in technology-oriented professional support among teacher peers, (c) professional development content focused on instruction and integration, and (d) access to resources (Dexter et al, 2002). Resources included such things as access to photocopying, printers, fax machines, computers for teacher use, email, Internet access, and a computer to borrow from school for home use. Their data sample consisted of 488 principals, 467 technology coordinators, and 2,251 teachers from a stratified national sample of schools in 1998. Participants were scored in each of the four categories from “0” to “4.” A score of “3” or “4” was considered high quality. Based on these scores an effect size was calculated for each of the four categories as they apply to technical support and instructional support. All effect sizes were positive and ranged from .16 to .70 indicating that each of the categories of quality were important for both technical and instructional support. However, the researchers found that the mere presence of the four dimensions of support did not lead to greater technology use by teachers. Using regression analysis Dexter et al. (2002) found that the presence of quality support was a significant predictor of teacher use of technology with students ($R^2 = 0.15$, p < .000) and
it was a significant predictor of teacher professional use of technology ($R^2 = 0.28$, $p < .000$).

The present study provides updated information on the technology coordinator role and the amount of time spent on various tasks. Additionally, it builds upon the above research to gather data on time spent providing staff development and instructional support as well as examining the effects of various conditions (number of computers, number of networked learning programs, number of users to support) on the amount of time coordinators spend on instructional support.

Staff Development

Staff development is important because what teachers know and can do is the most important influence on what students learn (National Commission on Teaching and America’s Future, 1996). Additionally, the renewal of staff members’ professional skills is fundamental to improvement (Guskey & Huberman, 1995). Guskey (2000) defines staff development as “those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students (p. 16).” Relating this model to ICT seems to indicate that ICT will not impact student learning unless teachers are well versed on ICT integration into the curriculum.

This review of staff development literature that informs this study is organized into four areas: (a) staff development and its impact on teacher knowledge and attitudes in ICT; (b) the components of an effective staff development program; (c) the evaluation of staff development, and (d) factors impacting the conduct of staff development.
Impacts on Knowledge and Attitudes

In support of the importance of staff development, Mathews (2000) studied approximately 3,000 teachers in 55 Southeastern Idaho school districts to determine the effects of gender, academic degree, years of experience, school level, computer literacy, and computer ability on computer usage by teachers. He found that both computer literacy and ability were significant predictors of computer usage by teachers.

This finding fits in with the findings of a major study based on a national sample of teachers conducted by the National Center for Education Statistics (NCES). The NCES conducted a national survey of teachers to compile a comprehensive report on teachers' use of technology. There were two important findings in this study. First, teachers who reported spending at least nine hours of time in ICT staff development in the last three years felt well prepared or very well prepared to use ICT. As the amount of professional developed increased, so did the teachers' reports of preparedness. Of those teachers who reported spending 32 or more hours in staff development in the last three years, 66% reported feeling well or very well prepared to use ICT (National Center for Education Statistics, 2000).

Literacy and ability were also found to impact teachers' confidence about using computers in a study of 187 middle school teachers (Moallem & Micallef, 1997). Moallem and Micallef (1997) reported that teachers who completed the most ICT workshops (30 to 40 hours) indicated they were the most confident in their ICT skills. Additionally, Shelton and Jones (1996) found that providing rigorous staff development was one of the four key factors affecting the use of technology in the Fort Worth, Texas, Independent School District.
More recent data suggest that there is still much ICT staff development work to be done. While teachers report that technology is effective for teaching their subject(s) (76%), improving academic performance (68%), and improving performance on standardized tests (58%), only 54% of teachers report integrating computers into their curriculum (CDW-G, 2005). CDW-G's own study may include some clues as to why such a large percentage of teachers find technology effective but just over half of teachers report integrating ICT into their curricula. Over 28% of teachers reported being inadequately trained, or not trained at all, to use instructional software. A similar 28% reported being inadequately trained, or not trained at all, to integrate computers into lessons. Additionally, 61% of teachers report having "too few" computers in their classroom for students to share or take turns on. This finding may indicate that there isn't yet a critical mass of computers in a large number of classrooms to allow for integration. Finally, the CDW-G (2005) study found that 31% of teachers in 2005 report receiving no ICT staff development in the previous year and only 42% report receiving up to eight hours of ICT staff development in the previous year. Up to eight hours could mean that some of those teachers received only one or two hours of ICT staff development in the previous year. Despite the fact that 28% of teachers reported being inadequately trained to integrate computers into lessons, 73% of these same teachers report getting 8 hours or less of ICT staff development in the prior year (CDW-G, 2005). Previously cited studies report that rigorous staff development (Shelton & Jones, 1996), and completing 30 or more hours of ICT staff development (Moallem & Micallef, 1997; National Center for Education Statistics, 2000) contributed to confidence in ICT skills and use of ICT by teachers.
Effective Staff Development Programs

Thomas Guskey and Dennis Sparks’ Model of the Relationship Between Staff Development and Improvements in Student Learning (1996) provides a useful lens to explain the major elements of staff development and their inter-relationships. Guskey and Sparks identified four components of effective staff development programs. First, the program must have a clear focus on learning and learners, whether they be children or adults. Second, the program must have an emphasis on individuals and organizational change. Third, an effective staff development program must aim for a series of small changes guided by a grand vision. Finally, effective programs offer ongoing staff development that is embedded into as many areas of the school’s efforts as possible. Each of these four components ultimately play a role in student learning. According to this model, improved student learning is most influenced by teacher knowledge and practice, which is directly influenced by the quality of staff development. In turn, the quality of staff development is dependent on its content, process, and context.

Guskey (2000) lists seven approaches that provide options for educators in their staff development programs and may be applied to ICT. Effective staff development can include one or multiple combinations of these approaches: (a) training, (b) observation and assessment, (c) involvement in a professional development process, (d) study groups, (e) inquiry/action research, (f) individually guided activities, and (g) mentoring. The descriptions and limitations of each appear below.

Training may be conducted in several formats. Guskey (2000) lists small or large group presentations or discussions, seminars, demonstrations, role-playing, simulations, and micro-teaching as forms of training. Effective training usually includes exploration of
theory, demonstrations or modeling of skills, simulated practice, feedback on performance, and coaching (Joyce & Showers, 1995). Shortcomings of training include few opportunities for individualization to suit particular teachers' needs or levels of expertise. Also, training sessions must include additional follow-up activities to ensure feedback necessary for sustained implementation of the idea (Guskey, 2000).

Observation and assessment as a staff development approach uses peer observation to provide educators feedback on performance. Clinical supervision and peer coaching are examples of this approach (Guskey, 2000), that help to break down the isolation of individuals in a school. The observer gains expertise by watching, providing feedback, and discussing the experience. The person being observed gains another point of view on their performance (Showers & Joyce, 1996). This approach works best when the observations are focused on specific issues and when there is long-term follow up. Shortcomings of this model are that it requires a large investment of time, it may be difficult to coordinate the schedules of both parties, and the process of observation must be clearly separated from the formal evaluation process (Guskey, 2000).

Involving educators in the process of developing or reviewing a curriculum, improvement planning, or problem solving allows educators to gain new knowledge through reading, research, discussion, and observation. This approach is most effective if there is a direct relevance to the educators' responsibilities or interest because the solutions that result are more likely to succeed (Guskey, 2000). This approach is limited because it usually involves a small portion of staff members at any given time. It may also fail if personal opinions are allowed to take precedence over research and knowledge of best practices (Guskey, 2000).
The study group approach to staff development usually involves dividing the staff into groups of four to six members for the purpose of studying a particular issue or problem. Groups then share their findings with other staff members. The major functions of this approach are to implement curriculum and instructional innovations, plan improvement efforts, and research teaching and learning (Murphy, 1992). Effective study groups are well organized, focused, and have sufficient time to complete their assignments. Those using this model must guard against a few individuals who may take over a group or those who may allow their opinions to substitute for research (Guskey, 2000).

Inquiry/Action research is an approach in which individual educators search for answers to pressing questions by: (a) selecting a problem to solve or question to answer, (b) collecting and interpreting information related to the question, (c) studying the literature or research, (d) determining possible actions to take based on the evidence that are most likely to achieve the goal, (e) taking the decided upon action, and (f) documenting the results (Calhoun, 1994). This process requires a great deal of time and commitment on the part of individuals involved (Guskey, 2000).

In the individually guided activities approach to staff development each educator determines his or her own individual professional development goals and then selects the activities and processes to achieve them. Each individual must: (a) identify a need or interest, (b) develop a plan to meet the need or interest, (c) conduct the learning activities, and (d) assess whether or not their needs were met by their actions or research (Sparks & Loucks-Horsley, 1989). This approach is flexible enough to allow individuals to meet their own needs and interests while providing self-analysis, personal reflection, and
decision-making. Personal histories, video/audio self-assessment, journal writing, and role-playing are some of the strategies that may be employed in this model (Langer & Colton, 1994).

Mentoring is the pairing of an experienced and successful educator with a less experienced colleague. The two meet regularly to share ideas and strategies for effectiveness and success. This approach may involve observations and is most effective when both individuals collaborate on developing goals and procedures for their relationship (Guskey, 2000). This approach works best when both parties have a similar background and when both can allocate enough time to work together.

Each of the above approaches has benefits and limitations. One or more approaches may be employed at any given time in staff development program. Indeed, taking advantage of more than one model may yield the most significant results (Guskey, 2000). No matter which approach, or approaches, is implemented, taking a methodical approach to the program, follow-through, and evaluation of the program are keys to success. This study seeks to learn more about the types of staff development provided by coordinators at various levels.

Evaluation of Staff Development

There are five levels of staff development evaluation (Guskey, 2000; National Staff Development Council, 2001). These levels, from the lowest level to the highest level, are: (a) participants’ reactions, (b) participants’ learning, (c) organization support and change, (d) participants’ use of the new knowledge and skills, and (e) student learning or outcomes. If staff development is to improve learning or impact teaching or teachers,
change in some or all of these five levels may be required. Unfortunately, most staff
development programs begin and end with evaluation of level one only, the participants’
reactions (National Staff Development Council, 2001). Each of the five levels of staff
development are important for different reasons and require the evaluator to ask unique
questions.

Evaluation of level one, participants’ reactions, is usually measured by questionnaire
immediately following a session. This level of evaluation is perhaps the least important
because it deals with the initial satisfaction of the participants with the experience. Did
they like it? Will it be useful? Was the leader knowledgeable? This information can be
used to improve the design and delivery of the session, but does not evaluate the learning
of the participants, which is even more important (Guskey, 2000).

Level two evaluation measures the new knowledge and skills of the participants. A
quiz, demonstration, case analysis, or reflection may be used to evaluate participants’
learning. This is important because teacher knowledge and skill can make an impact on
the organization and possibly lead to change (Guskey, 2000).

Organization support and change, level three, measures an organization’s advocacy,
support, facilitation, and recognition of the staff development effort. It asks if sufficient
resources were available, did the staff development have an impact on the organization,
and was the implementation facilitated and supported. Questionnaires, interviews,
meeting minutes, or focus group discussions may measure effectiveness at this level. This
level of evaluation informs change efforts, documents and improves support, and helps
with the next level, participants’ use of the new knowledge or skills (Guskey, 2000).
Level four, participants’ use of the new knowledge or skills, is extremely important because unless this new knowledge or skill is applied it can not have an impact on student learning which is the primary function of the school. Evidence for this level of evaluation may include questionnaires, participant portfolios, direct observation, structured interviews, video or audio tapes (Guskey, 2000).

The fifth, final and most important level of evaluation of staff development is student learning outcomes. These outcomes stem from the cognitive, affective, or psychomotor domains of learning. At this level, questions are asked about student learning, well-being, confidence, attendance, or achievement through questionnaires, interviews with students or parents, and test scores (Guskey, 2000).

Staff development in any area, including ICT, should make use of these five levels of evaluation to ensure impact on teachers, the school, teacher knowledge or behavior in the classroom, and student outcomes for it to be most effective. This is not to suggest that such five-level evaluation is the exclusively the duty of the technology coordinator. Clearly, however, this is one of the many tasks competing for the coordinator’s time.

Factors Impacting Staff Development

While the necessity to support so many computers, students, and teachers seems clearly to be one of the chief impediments to coordinators spending time on staff development and instructional support, there are other factors impacting on the amount of time spent on staff development.

Staff development in schools takes place within the context of the organizational culture of the school (Guskey, 2000). Therefore, ICT staff development in schools is
dependent on many of the same factors as other educational innovations such as leadership and support (Fullan, 2001), especially from the principal (Guskey, 2000), adequate time for staff development (Moallem & Micallef, 1997; Anderson et al., 2000; National Education Commission on Time and Learning, 1994), and the availability and skill of a technology coordinator (Anderson et al., 1999; Fuller, 2000).

The present study seeks to add to the above research by focusing on the barriers and enabling conditions for staff development and recommendations for quality technology coordinator practices.

Diffusion of Educational Innovations

The technology coordinator plays a role within the school’s culture, either informally or formally. Since most coordinators are teachers with or without classroom teaching responsibilities, they operate within a school without the authority of an administrator (Moursund, 1992). In their role as teachers, coordinators have been characterized as change agents helping schools to implement the broad innovation that is ICT. A change agent is a person working within an organizational culture who influences decision-making concerning the implementation of an innovation (Rogers, 2003). Teachers are often the preferred source of ideas by other teachers (Fullan, 2001). It therefore seems to make sense that a coordinator, who is usually a teacher, is in a position to be a change agent.

As pressure to use ICT effectively with students increases, more teachers will have to adapt to a new paradigm of teaching methodology. Adapting to these new paradigms means that teachers must change. Resistance to change is a natural human characteristic
and this change may be facilitated by another teacher who understands the demands of classroom teaching and who also understands how to use ICT with students.

The spread and adoption of an innovation, such as the use of ICT in education, can be examined through the lens of Diffusion Theory (Rogers, 2003). Diffusion is the process by which an innovation is communicated through the members of a social system, such as a school. There are four elements of the diffusion process: the innovation, the communication channels used, time, and the social system.

The rate of diffusion and adoption depend largely on the five characteristics of an innovation. The first characteristic is relative advantage, the extent to which an innovation is perceived to be better than the old way of doing things. The second characteristic is compatibility, the perceived consistency of the innovation with established values, needs, and experiences of potential adopters. The next characteristic is complexity, the potential adopters' perceived ease or difficulty understanding the innovation. The fourth, trialability, is the degree to which an innovation can be tried before a commitment is made to its use. Finally, observability is the degree to which the benefits of the innovation are visible (Rogers, 2003).

Communication channels are important in Diffusion Theory because they are the paths on which information flows between and among individuals. Rogers (2003) identifies two types of channels: mass media channels and interpersonal channels. Mass media are any means of rapid information transmission such as television, radio, or newspapers. Interpersonal channels are characterized as face-to-face exchanges of information between members of a system. Interpersonal channels are slower, but often more effective means of communication about innovations than mass media because
people evaluate innovations subjectively based on their opinions of other members of the system who are similar to themselves. Rogers (2003) uses the term homophily to identify the extent to which people are similar in attributes such as beliefs. Such similarities between people working together often result in more effective communication and thus Diffusion Theory postulates that the diffusion of innovations is most effective when it results from communication between homophilous individuals.

Homophily may account for increases in teacher use of ICT with students as a result of the instructional support of a technology coordinator who is homophilous with classroom teachers. Fuller examined this effect (2000) using data from a national probability sample of 6,085 students in grades five and eleven, and their schools’ technology coordinators in the 294 schools represented (167 elementary and 127 high schools). She analyzed the amount of time students spent using ICT each week and the amount of time coordinators reported performing the tasks of maintenance, teaching students, supervising students, teaching teachers, selecting materials, adapting software, writing lesson plans, and supporting teachers each week. Using regression analysis she found that there was a positive effect of technology coordinator time spent supporting teachers in grade five, but not in grade eleven. Fuller (2000) found no effect on students’ time spent using ICT each week and the amount of time the coordinator dedicated to maintenance, to teaching students, to selecting materials, or to writing/adopting educational software. She also found that the amount of time coordinators reported spending each week supervising students, teaching teachers about ICT, and writing lesson plans that integrate ICT predicted students’ weekly use of ICT. Although that increase was most pronounced at grade level five. Fuller concluded that because the
coordinators were classroom teachers themselves and therefore understood the curriculum, the elementary coordinators were the most homophilous with the fifth grade teachers. High school coordinators were most often computer lab teachers or teachers of a single subject and therefore not as homophilous with all classroom teachers due to being single subject teaching specialists. Therefore, the elementary coordinators were better able to influence classroom teachers to use ICT than the high school coordinators (Fuller, 2000).

The next element of the diffusion process is time. Time is a part of the innovation-decision process, a potential adopter’s innovativeness, and the rate of adoption. Diffusion Theory (Rogers, 2003) postulates that an individual will take five steps in the innovation-decision process. First, that individual will gain knowledge of the innovation. Second, the individual will form an opinion about the innovation as a result of persuasion. Third, the individual will make a decision to adopt or reject an innovation. Fourth, if the individual adopts, implementation will occur. Finally, after implementation, individuals will seek confirmation of their decision. Information is key during these steps to decrease the amount of uncertainty about the innovation. In ICT innovations, the technology coordinator is often the person providing the information. Innovativeness is the degree to which a person will adopt the innovation. The first people in a social system to adopt an innovation are called the innovators. Innovators are followed by the early adopters, then the early majority, the late majority, and finally the laggards in adoption (Rogers, 2003). The rate of adoption is the speed at which the members of a social system adopt the innovation over time.
The final element of Diffusion Theory is the social system, defined as interrelated people engaged in a common goal (Rogers, 2003). There are two elements of the social system: the social structure and the communication structure. The social structure of a system is its formal hierarchy. This structure determines who interacts with whom and thus who influences whom to adopt an innovation. The communication structure of a system determines who will communicate with whom, often based on homophily. People in a system are likely to talk with others who are most like them. Both the social structure and the communication structure provide for paths of diffusion. Opinion leaders are people in a system who are often more innovative than their peers and usually possess more knowledge about an innovation (Rogers, 2003). Opinion leaders often function as contacts for change agents, people whom most influence decisions on the adoption of an innovation.

Based on Diffusion Theory, it follows that technology coordinators are in a position to be opinion leaders and change agents based on their position in the social structure and the communication structure of an organization (Strudler, 1995-1996). In addition, technology coordinators who are perceived by teachers to be homophilous with them would have an advantage in diffusing an innovation or conducting staff development (Fuller, 2000). Elements of homophily may include social class, sex, background, education, attitude, and race (McCroskey, Richmond, & Daly, 1975; McPherson, Smith-Lovin, & Cook, 2001; Rogers, 2003). McCroskey et al. (1975) created the Perceived Homophily Measure (PHM) based on studies asking subjects to rate group members at work and a non-group member at work who was an opinion leader. The second part of their study followed similar procedures to have participants rate subjects they did not
know. The result was the PHM, a 16 item seven-point semantic differential scale representing four dimensions of homophily: attitude, value, appearance, and background. The attitude dimension of the PHM has had the highest reliability with Elliot (1979) reporting a coefficient alpha of .88 and other researchers reporting similar alphas (Gudykunst, 1985; Gudykunst, Yang, & Nishida, 1985).

The present study builds on diffusion theory and the work of Fuller (2000) to examine attitude homophily as a possible predictor of instructional support. Value, appearance, and background homophily were not examined because the associated items for those constructs on the Perceived Homophily Measure did not readily lend themselves for modification or for the purposes of this study. Given that technology coordinators are in a position to be both change agents and opinion leaders, it would follow that coordinator attitude homophily with teachers would have an affect on instructional support.
CHAPTER 3

METHODOLOGY

Research Design

This study sought to build upon previous work to better understand the role of the school-level technology coordinator at the elementary, middle, and high school levels. The work of Strudler, Falba, and Hearrington (2005) indicates that technology coordinators spend most of their time performing technical support tasks rather than instructional support tasks, mainly due to the large numbers of computers, teachers, and students they have to support. These findings are corroborated by Ronnkvist, Dexter, and Anderson (2000). School technology coordinators juggle their technical and instructional support roles, often spending the majority of their time performing technical support, because teachers and students simply cannot use information and communication technologies (ICT) if they are not functional. Therefore, staff development and instructional support are often lower priorities. There is evidence that if technology coordinators were able to perform more staff development and provide more instructional support that teachers and students may make greater use of ICT (Fuller, 2000). This study sought to identify the barriers and enabling conditions to staff development and instructional support impacting technology coordinators and, ultimately, identify ways
technology coordinators may overcome these barriers and provide staff development and instructional support to their staffs.

Questions and Hypotheses

This study has seven research questions that are listed below, along with hypotheses pertaining to each question.

Question One: What are the characteristics of the technology coordinator position, by school level (elementary, middle, or high school) and those who fulfill that role?

Hypothesis One: Most elementary coordinators have a self-contained classroom teaching license and therefore are teaching generalists.

Hypothesis Two: Middle school coordinators have a mixture of self-contained classroom teaching licenses and single subject teaching licenses. Some are teaching generalists and some are single subject specialists.

Hypothesis Three: High school coordinators, almost exclusively, have single subject teaching licenses and are therefore single subject specialists.

Question Two: How do technology coordinators, by school level, report spending their time?

Hypothesis One: Technology coordinators at all levels will report spending a greater percentage of their time on technology support tasks rather than on instructional support or staff development tasks.
Hypothesis Two: The percentage of time reportedly spent on instructional support and staff development will decrease as the school level increases.

Question Three: What are the barriers and enabling conditions to technical support, by school level, as perceived by technology coordinators?

Hypothesis One: Too much equipment to support will be the most reported barrier to technical support at all levels.

Hypothesis Two: Help from other teachers will be the most reported factor enabling technical support at all levels.

Hypothesis Three: As coordinators gain experience they will report fewer barriers to technical support.

Hypothesis Four: As coordinators gain experience they will report more enabling factors to technical support.

Question Four: What are the barriers and enabling conditions to instructional support, by school level, as perceived by technology coordinators?

Hypothesis One: Supporting too many users and computers will be the most reported barriers to instructional support at all levels.

Hypothesis Two: Having a network of teachers to assist with technical support will be the most reported factor enabling instructional support at all levels.

Hypothesis Three: As coordinators gain experience they will report fewer barriers to instructional support.
**Hypothesis Four:** As coordinators gain experience they will report more enabling factors to instructional support.

Question Five: What are the barriers and enabling conditions to staff development, by school level, as perceived by technology coordinators?

**Hypothesis One:** Supporting too many users and computers will be the most reported barriers to staff development.

**Hypothesis Two:** Having a network of teachers to assist with technical support will be the most reported factor enabling staff development.

**Hypothesis Three:** As coordinators gain experience they will report fewer barriers to staff development.

**Hypothesis Four:** As coordinators gain experience they will report more enabling factors to staff development.

Question Six: What is the relationship between the number of computer users, the number of networked learning programs, the number of computers, and the percentage of hours of instructional support provided?

**Hypothesis One:** The greatest predictor of percentage of hours of instructional support provided will be the number of computers.

Question Seven: What is the relationship between perceived homophily, the perceived role of the technology coordinator, the perceived role expectation of the supervisor, and the percentage of hours of instructional support provided?
Hypothesis One: The greatest predictor of percentage of hours of instructional support provided will be the perceived role expectation of the supervisor.

Participants

This study sampled 134 school-level technology coordinators from a large school district in the southwestern United States, using a paper questionnaire administered at a meeting, to answer the research questions. The school district was chosen as a convenient means of gathering data from school-level technology coordinators known to serve full time in that capacity, without regular classroom teaching duties.

The selection of technology coordinators from schools in this large school district represents a convenience sample (McMillan, 2004). This type of sample prohibits the generalization of results to other populations of technology coordinators or schools, unless it can be demonstrated that these coordinators or schools are representative of a larger population.

Focus group participants were chosen from those coordinators who indicated a willingness to volunteer to participate on the questionnaire. Maximum variation purposeful sampling (Gall, Gall, & Borg, 1999) was employed to select 14 participants out of 19 who volunteered. This type of sampling was used to have participants who exhibit the entire range of variation in the population of coordinators in the district. Categories used in selection were: (a) years of experience as a coordinator, (b) total years as an educator (c) gender, and (d) school level. Five volunteers were not chosen because they had not completed at least one year as a coordinator. Due to the number of volunteers, two focus group sessions were scheduled. Individual volunteers were invited
to attend one of the two sessions based on these four demographics. It was the researcher’s intent to create the most balanced groups possible to elicit input and generate discussion among a diverse set of coordinators at each session. Chapter four provides further details about focus group participants.

Definition of Terms

Homophily

The degree to which two or more individuals who interact are similar in certain attributes (Rogers, 2003). This study will measure technology coordinator perception of homophily with classroom teachers through their self-reported ability to help teachers write lesson plans, understand the subjects classroom teachers teach, and relate the use of ICT to teachers of varying grade levels and subjects.

Information and Communications Technology (ICT)

The technology used to handle information and aid communication (Dictionary.com, 2003). For the purposes of this study, the term ICT is used to include computers, computer networks, and associated software and hardware, such as scanners, digital cameras, and other peripheral devices, that may be used as teaching tools, learning tools, management tools, or productivity tools in a school.

Instructional support

A service provided, usually to teachers, to help them use ICT with students. Such support may include lesson planning, finding appropriate web sites, building WebQuests,
modeling a teaching technique using ICT, or helping a teacher teach a lesson in a computer lab. This type of support is usually limited to helping one, or a very few, teacher(s) at a time to use ICT in an instructional way.

Role expectation

The set of tasks and priorities a supervisor expects the technology coordinator to perform. This study is focused on two main role expectations: (a) instructional support and staff development, and (b) technical support and tasks related to technology support such as installing, troubleshooting, and maintaining hardware and software.

Role orientation

The set of tasks and priorities a technology coordinator believes he or she should most be performing. This study is focused on two possible role orientations: (a) instructional support and staff development, and (b) technical support and tasks related to technology support such as installing, troubleshooting, and maintaining hardware and software.

Staff development

The processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students (Guskey, 2000) is the definition of staff development used in this study. As used in this study, staff development primarily implies instruction given to small or large groups of teachers, although a range of other means of teaching teachers may be used.
Technology Coordinator

The person currently holding the position titled “Educational Computing Strategist” in a school that is a part of this district. This person is a licensed teacher fully released from classroom teaching duties to perform the role of coordinator.

Technical Support

A service provided involving troubleshooting an ICT hardware or software problem, fixing such a problem, researching ways to fix hardware or software problems, placing a work order to have someone else fix such a problem, installing, configuring, or setting up hardware or software.

Time Expenditure.

The percentage of time a coordinator reports spending doing different tasks. These tasks include: (a) curriculum support and staff development; (b) technical support and tasks related to technology support such as installing, troubleshooting, and maintaining hardware and software; and (c) planning, attending meetings, or learning new tasks.

Instruments

Questionnaire

The Technology Coordinator Instrument (TCI) was designed by the researcher to measure all of the factors of interest in this study. The 44-item questionnaire was adapted from the work of Becker and Anderson (1998) and the subsequent work of Strudler et al. (2005). Additionally, elements of the Perceived Homophily Measure (McCroskey et al.,
1975) and the Standards for Staff Development (National Staff Development Council, 2001) were included. The full version of the TCI appears in Appendix A. The first segment of the TCI, Demographics, consists of 16 items that measure the characteristic factors such as school level, years of technology coordinator experience, full-time equivalency and other demographics of interest. The second segment of the TCI, Duties, Characteristics, and Perceptions, consists of 29 items designed to measure the factors enabling and inhibiting the provision of the aspects of ICT support, and job characteristics designed to elicit information to help answer the research questions.

Specifically, this second segment of the TCI contains questions on (a) support duties (technical, instructional, and staff development, respectively), (b) homophily (labeled as Perceptions of Self/Staff in the questionnaire), (c) perceived roles a technology coordinator plays in his or her school, and (d) time expenditure.

Support Duties. The section of the TCI consists of 15 questions designed to measure technical support (five questions), instructional support (five questions), and staff development (five questions). The five questions about technical support ask for the coordinators’ level of agreement about having enough time to provide technical support, factors perceived by the coordinator as being barriers to providing good technical support, and factors perceived by the coordinator as enabling them to provide good technical support. The five questions about instructional support ask for the coordinators’ level of agreement about having enough time to provide instructional support, factors perceived by the coordinator as being barriers to providing good instructional support, and factors perceived by the coordinator as enabling them to provide good instructional support. Similarly, the five questions about staff development ask for the coordinator’s
level of agreement about having enough time to provide staff development, factors perceived as being barriers to providing good staff development, and factors perceived as enabling them to provide good staff development. The barriers and enabling factors chosen for these last two questions are based on the NSDC’s Standards for Staff Development (National Staff Development Council, 2001).

**Homophily.** Teacher knowledge and practice directly impacts student learning (Guskey and Sparks, 2002) and technology coordinators who provide instructional support to teachers can increase student use of ICT (Fuller, 2000). Instructional support provided by technology coordinators for teachers increases predictability and structure, therefore reducing uncertainty and aiding the diffusion of ICT. Diffusion Theory postulates that information is most effectively communicated between individuals who are most similar (Rogers, 2003). This degree of similarity, called homophily, may therefore play a role in instructional support. This area of the TCI contains four items designed to measure attitude homophily. Attitude homophily is the most highly reliable scale from the Perceived Homophily Measure (McCroskey, et. al., 1975), the source from which the items in the TCI were based. The researcher modified the items to apply to teachers at the same school where the technology coordinator works rather than a particular person, as McCroskey et al. originally intended. The Attitude dimension of the instrument has a reported coefficient alpha of .88 (Elliot, 1979). Each item in the questionnaire has a statement about teachers in the school on one side of the page, a seven point number continuum in the middle of the page, and an opposite statement on the other side of the page. An example item measuring attitude homophily appears below:
Participants were to circle the number indicating their agreement with the statements. If they very strongly agree with the left-hand statement, they would circle a one; if they very strongly agree with the right-hand statement, they would circle a seven. Participants who have neutral opinions about the item would circle a four, and so on.

**Perceived Roles.** This area of the TCI consists of one item designed to measure the role the technology coordinator views him or herself as fulfilling in the school and one item designed to measure the technology coordinator’s perception of the role that his or her supervisor expects him or her to play. This study is concerned with two possible roles: providing technical support or providing instructional support and staff development. The first item asks participants to rate their belief of what their role in the school is on a seven-point continuum from teaching, guiding, and assisting teachers in the integration of technology on the left, to fixing, maintaining, managing, and installing technology tools on the right. The next item in this section asks participants to identify the role they believe their supervisor primarily expects them to perform, using the same continuum. These two questions are followed by a question asking how many times per school year the technology coordinator provides, or plans to provide, staff development not related to instruction. The next question is designed to elicit the number of times per school year a coordinator provides, or plans to provide, staff development related to the instruction of students. This section of the TCI ends with a question designed to identify the position of the coordinator’s direct supervisor. Answer choices for this question range are (a) a district-level administrator, (b) the school’s principal, (c) the school’s assistant
principal, (d) a dean at the school, or (e) other. If the answer choice is other, there is a
space for the participant to write in their response.

*Time Expenditure.* This sub-section of the TCI consists of a matrix with boxes
arranged in a column for the participants to enter the percentage of time they spent doing
nine types of tasks in three categories: instructional content, technical content, and other
tasks. To the right of the column about actual time spent, there is another column of
boxes for the participants to enter the percentage of time they desired to spend in each of
those types of tasks. Participants were instructed to total the percentage of hours in each
column (actual percentage of time spent and desired percentage of time spent) at the
bottom. They were asked to ensure each column totaled 100% and to adjust the numbers
if they did not make sense or if they did not represent a typical month.

Finally, the last item on the TCI asked if coordinators were willing to participate in a
focus group session about staff development and instructional support. If they were
interested in volunteering to participate in the focus group interview they were asked to
provide their name and email address so they could be contacted to schedule the group
meeting.

Focus Group Moderator’s Guide

In order to ensure that the focus group interviews addressed the research questions, a
moderator’s guide was constructed. The focus group moderator’s guide was designed to
inform the following research questions:

*Question One:* What are the characteristics of the technology coordinator
position, by school level, and those who fulfill that role?
Question Two: How do technology coordinators, by school level, report spending their time?

Question Three: What are the barriers and enabling conditions to technical support, by school level, as perceived by technology coordinators?

Question Four: What are the barriers and enabling conditions to instructional support, by school level, as perceived by technology coordinators?

Question Five: What are the barriers and enabling conditions to staff development, by school level, as perceived by technology coordinators?

Following the guidelines set forth by Vaughn, Schumm, and Sinaguh (1996) the moderator's guide contained the following sections: (a) introduction, (b) warm-up, (c) clarification of terms, (d) questions, (e) wrap-up, (f) member check, and (g) closing. The complete moderator's guide can be found in Appendix B.

Introduction. The purpose of the introduction was to provide an overview of the topics to be discussed, to establish guidelines of the conduct of the interview, and to set the tone of the interview (Vaughn et al., 1996). The researcher specified the approximate length of the session and asked all participants to respect the opinions of their fellow group members. Volunteers were assured their participation would be anonymous and that their comments would not be identified in print by their actual names. Participants were asked to keep the content of the session private and not to talk about the opinions or responses of group members outside of the session. The researcher asked the participants to speak loudly and clearly so the session could be recorded.
Warm-Up. The warm-up portion of the moderator's guide was designed to set the participants at ease and to introduce each member of the group to the other members (Vaughn et al., 1996). The moderator's guide called for each member of the focus group to introduce him or herself and to provide an overview of their experience as a technology coordinator.

Clarification of Terms. The third section of the moderator's guide was designed to clarify the terms that were likely to be discussed to avoid confusion, increase reliability, and to save time (Vaughn et al., 1996). Key terms that were explained during this part of the conduct of the session were: ICT, technical support, instructional support, and staff development.

Questions. The fourth section of the moderator's guide, questions, was designed to provide a sequence of questions for the group to discuss that would inform the research questions. Participants were asked about the factors that accounted for the feeling of not having enough time to provide technical support. They were asked to come to a consensus on the definitions for unsatisfactory, satisfactory, and exemplary technical support. These technical support questions were repeated for the constructs of instructional support and staff development. Finally, participants were asked to discuss the sorts of tasks they performed that fit into the categories of urgent and important, urgent and not important, not urgent and important, and not urgent and not important.

Wrap-Up. The next section of the moderator's guide, wrap-up, was designed to summarize and identify the major themes that developed during the session and provide an opportunity for participants to complete any conversational points they felt were incomplete (Vaughn et al., 1996).
**Member Check.** The sixth section of the guide, member check, was designed to provide an opportunity to review the group’s opinions, to check participant consensus, and to verify the researcher’s understanding of participant feelings and opinions (Vaughn et al., 1996). In this section of the interview volunteers were read a summary of the group’s opinions about technical support, instructional support, staff development, and examples of the sorts of tasks they perform.

**Closing.** Finally, closing statements was the seventh section of the moderator’s guide. This section was designed to remind participants to keep the information discussed anonymous and confidential (Vaughn et al., 1996). Participants were reminded that pseudonyms would be used to identify their responses in the results of the study. Any questions the participants had were answered and the researcher thanked the participants for their participation.

**Pilot Testing**

**Questionnaire Pilot Testing**

The TCI was created and pilot tested, for the purpose of ensuring ease of administration and understandability to the participants, in two phases: (a) the Internet phase, and (b) the paper phase.

**Internet pilot testing.** After the TCI was created on paper, the initial goal was to administer it online using a commercially available web-based tool. Prices to use such tools ranged from $300 to well over $1,000. The features offered by the many online survey services and the types of questions they allow one to ask are very similar. The researcher obtained a professional subscription to zoomerang.com because it was feature rich and had the best educational pricing. The questionnaire was replicated online, within
the limits of the tool. It wasn’t possible, however, to create side-by-side columns of boxes for the percentage of time a TC actually spends doing some tasks and the percentage of time they desire to spend doing that task. Additionally, the format of questions, with a statement on the left and right and a continuum of numbers from 1 to 7 in between, could not be replicated online. However, the instrument was replicated as well as it could have been in preparation for pilot testing.

The instrument was pilot tested by five volunteers who were former technology coordinators in the school district being studied. In order to obtain pilot input from people who had worked at each school level, two of the volunteers were former elementary school coordinators, two were former middle school coordinators, and one was a former high school coordinator. Former technology coordinators were chosen to avoid bias in the actual population and because they knew the duties and responsibilities of the position well enough to answer the questions. Each person logged into the tool, answered the questions, and were asked to take notes or make suggestions about any question or instructions they found ambiguous or poorly worded. They were also asked to provide feedback about the experience of completing the questionnaire online. Feedback from the pilot testers led to the rewording of directions for three questions, and the revision of five questions. Times for completion of the online instrument ranged from 30 to 45 minutes. Most significantly, three of the five testers had problems with the survey tool failing to load the next page resulting in these three having to start all over again. All of the testers reported that question 43, a report of actual and desired percentages of time spent performing different types of tasks, was too difficult to do online because they could not easily compare their actual and desired percentages and because the online tool didn’t
automatically sum the percentages. Because of this feedback, online administration of the questionnaire was scrapped in favor of a paper-based instrument.

**Paper Pilot Testing.** Based on the Internet pilot testing, the ambiguous or poorly worded directions and questions were revised. Three of the five original pilot testers agreed to pilot the paper instrument and two new pilot testers were found. Two were former elementary school coordinators, two were former middle school coordinators, and one was a former high school coordinator. Each was provided with a copy of the paper survey and was asked to make comments and suggestions about any directions or questions they felt were ambiguous or poorly worded.

Feedback from this group led to the inclusion of a definition of the terms information and communications technology (ICT), technical support, instructional support, and staff development in the final version of the instrument. This group reported being able to complete the questionnaire in 20 to 30 minutes. Additionally, because many of the questions in the section about perceptions of enabling factors and barriers were similarly worded, feedback from this group led to the bolding of the words barriers and enabling in the questions to increase clarity. Finally, the words technical support, instructional support, and staff development were written in all capital letters for the same reason, due to feedback from this group.

Moderator’s Guide Pilot Testing

After the moderator’s guide was created, two volunteers who were former technology coordinators in the school district being studied agreed to participate in a mock focus group session. One was a former elementary school technology coordinator and the other
was a former middle school technology coordinator. Each volunteer was asked to write down any suggestions for improvement during the session. The researcher conducted the mock session according to the guide, except an audio recording of the session wasn’t made. At the end of the session, which took 72 minutes to complete, the volunteers were asked to provide feedback on the clarity of the questions and the conduct of the session. They were each provided with a copy of the moderator’s guide to review as they provided feedback.

The pilot focus group participants provided some specific feedback that led to slight modification of the moderator’s guide. They felt that the questions were appropriate and that a typical school-level technology coordinator would be able to discuss the questions in the guide. However, they were concerned about the overlap of the areas of instructional support, technical support, and staff development. They suggested that the researcher verbally emphasize the need to consider each duty independently of the other two, even though they are interrelated. This was done in each of the two focus group sessions. Finally, the pilot participants suggested having the actual focus group participants record their responses on individual post-it notes and then post their written notes onto a blank matrix for the question using the time management matrix prior to discussion. This suggestion was implemented during the actual focus group sessions as well.

Data Analysis

A description of each of the seven research questions, along with a brief description of the method of analysis, and the data source to be used in the analysis, appears below.
The full Technology Coordinator Instrument (TCI) questionnaire is located in Appendix A. The focus group interview moderator’s guide is located in Appendix B.

**Question One.** What are the characteristics of the technology coordinator position, by school level (elementary, middle, or high school) and those who fulfill that role?

*H₁*: Most elementary coordinators have a self-contained classroom teaching license and therefore are teaching generalists.

*Analysis*: Descriptive statistics (frequency, mean, and distributions) were used as appropriate.

*Data Source*: TCI items 1-15, 38, 39, 42.

*H₂*: Middle school coordinators have a mixture of self-contained classroom teaching licenses and single subject teaching licenses. Some are teaching generalists and some are single subject specialists.

*Analysis*: Descriptive statistics (frequency, mean, and distributions) were used as appropriate.

*Data Source*: TCI items 1-15, 38, 39, 42.

*H₃*: High school coordinators, almost exclusively, have single subject teaching licenses and are therefore single subject specialists.

*Analysis*: Descriptive statistics (frequency, mean, and distributions) were used as appropriate.

*Data Source*: TCI items 1-15, 38, 39, 42.

**Question Two.** How do technology coordinators, by school level, report spending their time?
$H_1$: Technology coordinators at all levels will report spending a greater percentage of their time on technology support tasks rather than on instructional support or staff development tasks.

*Analysis:* Descriptive statistics (frequency, mean, and distributions) were used as appropriate. Focus group data were analyzed using the constant comparative method and the HyperRESEARCH computer program.

*Data Source:* TCI items 16, 21, 26, 36, 37, 40, 41, and 43. The focus group question on time management was used.

$H_2$: The percentage of time reportedly spent on instructional support and staff development will decrease as the school level increases.

*Analysis:* Descriptive statistics (frequency, mean, and distributions) were used as appropriate. Focus group data were analyzed using the constant comparative method and the HyperRESEARCH computer program.

*Data Source:* TCI items 16, 21, 26, 36, 37, 40, 41, and 43. The focus group question on time management was used.

**Question Three.** What are the barriers and enabling conditions to technical support, by school level, as perceived by technology coordinators?

$H_1$: Too much equipment to support will be the most reported barrier to technical support at all levels.

*Analysis:* Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported barriers was cross-tabulated with the percentage of hours worked to create a continuum. Focus
group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

Data Source: TCI items 17, 18, and 43. Also, focus group data was used.

H3: Help from other teachers will be the most reported factor enabling instructional support at all levels.

Analysis: Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported enabling factors was cross-tabulated with the percentage of hours worked to create a continuum. Focus group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

Data Source: TCI items 19, 20, and 43. Also, focus group data was used.

H3: As coordinators gain experience they will report fewer barriers to technical support.

Analysis: Total reported barriers to technical support were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 22, 23.

H3: As coordinators gain experience they will report more enabling factors to technical support.
Analysis: Total reported enabling factors to technical support were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 24, 25.

Question Four. What are the barriers and enabling conditions to instructional support, by school level, as perceived by technology coordinators?

H1: Supporting too many users and computers will be the most reported barriers to instructional support at all levels.

Analysis: Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported barriers was cross-tabulated with the percentage of hours worked to create a continuum. Focus group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

Data Source: TCI items 22-25, and 43. Also, focus group data was used.

H2: Having a network of teachers to assist with technical support will be the most reported factor enabling instructional support at all levels.

Analysis: Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported enabling factors was cross-tabulated with the percentage of hours worked to create a continuum. Focus
group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

Data Source: TCI items 22-25, and 43. Also, focus group data was used.

H$_3$: As coordinators gain experience they will report fewer barriers to instructional support.

Analysis: Total reported barriers to instructional support were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 22, 23.

H$_4$: As coordinators gain experience they will report more enabling factors to instructional support.

Analysis: Total reported enabling factors to instructional support were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 24, 25.
**Question Five.** What are the barriers and enabling conditions to staff development, by school level, as perceived by technology coordinators?

$H_1$. Supporting too many users and computers will be the most reported barriers to staff development.

*Analysis:* Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported barriers was cross-tabulated with the percentage of hours worked to create a continuum. Focus group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

*Data Source:* TCI items 27-28 and 43. Also, focus group data was used.

$H_2$. Having a network of teachers to assist with technical support will be the most reported factor enabling staff development.

*Analysis:* Descriptive statistics (frequency, mean, and distributions) were used as appropriate. The total number of reported enabling factors was cross-tabulated with the percentage of hours worked to create a continuum. Focus group data was analyzed using the constant comparative method and the HyperRESEARCH computer program.

*Data Source:* TCI items 29-30, and 43. Also, focus group data was used.

$H_3$. As coordinators gain experience they will report fewer barriers to staff development.

*Analysis:* Total reported enabling factors to staff development were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a
coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 27, 28.

H4 As coordinators gain experience they will report more enabling factors to staff development.

Analysis: Total reported enabling factors to staff development were compared to the number of years of service using a correlation analysis. This analysis was performed on the number of years a person has served as a coordinator at his or her current school, the total number of years a person has served as a coordinator at any school, and the total number of years they were a classroom teacher before becoming a coordinator.

Data Source: TCI items 3, 4, 29, 30.

Question Six. What is the relationship between the number of computer users, the number of networked learning programs, the number of computers, and the percentage of hours of instructional support provided?

H4 The greatest predictor of percentage of hours of instructional support provided will be the number of computers.

Analysis: The method of analysis was stepwise multiple regression.

Data Source: TCI items 12–15, and 43.
**Question Seven.** What is the relationship between perceived homophily, the perceived role of the technology coordinator, the perceived role expectation of the supervisor, and the percentage of hours of instructional support provided?

H1. The greatest predictor of percentage of hours of instructional support provided will be perceived supervisor role expectation.

*Analysis:* The method of analysis was stepwise multiple regression.

*Data Source:* TCI items 31-34, 38, 39, and 43.

**Procedures**

This research project was conducted in two phases: Phase I was the gathering of mostly quantitative data using a questionnaire, and (b) Phase II employed two focus groups to gather qualitative data to inform findings for research questions two, three, four, and five.

**Phase I**

The researcher administered the TCI in a group setting – a regularly scheduled meeting of all technology coordinators – as a traditional paper and pencil questionnaire. Those technology coordinators who were not present were sent the questionnaire through the mail. Responses were coded and entered into a statistics program called Statistical Package for the Social Sciences (SPSS).

Coordinators attending the meeting were asked to voluntarily participate in this study. All requirements of the UNLV Human Subjects Protocol were followed, and UNLV Human Subjects Committee approval was obtained before gathering data. The
technology coordinators were asked to sign the informed consent form, or not to sign the form if they felt their signature might identify them. Signatures were not required by the UNLV Human Subjects Committee since the participants' signatures could have compromised their anonymity. Those coordinators not present at the meeting were sent the TCI through the mail, with the consent form attached.

Phase II

Based on questionnaire data, the researcher constructed a focus group moderator's guide designed to provide data to further inform and triangulate the findings for research questions two (time expenditure), three (barriers and enabling conditions to technical support), four (barriers and enabling conditions to instructional support), and five (barriers and enabling conditions to staff development). A total of 19 participants indicated a willingness on the questionnaire to serve as a focus group member. Five volunteers were not invited to participate because they had zero years of experience as a coordinator.

Two focus group meetings were scheduled, each with seven invited participants. However, due to various scheduling difficulties and last minute personal problems, only four participants actually showed up at each meeting. The meetings took place in a middle school library after school hours on days when it was not utilized and with the permission of the school principal.

The sessions were tape recorded and then transcribed verbatim. The transcribed text was analyzed using the HyperRESEARCH Qualitative Analysis Tool. Following the constant comparison method (Strauss, 1987), patterns were identified in the textual data.
through a process of repeated readings and highlighting of selections of text to be coded. The codes were based on the research questions initially, and additional codes were developed and applied based on emerging and repeated patterns or concepts in the textual data. Responses from each focus group were compared with each other and applicable survey data to ensure the trustworthiness (Lincoln & Guba, 1985) of the focus group interview data.

Summary

In summary, this study examined data gathered from participating school-level technology coordinators (N = 134) in a large countywide school district in the southwestern United States. The researcher administered a paper questionnaire and conducted two focus groups of volunteer participants. Descriptive statistics, multiple regression analyses, and the qualitative technique of constant comparision analysis were used to answer the seven research questions.
CHAPTER 4

RESULTS

This study examined technical support, instructional support, and staff development provided by school-level technology coordinators at the elementary, middle, and high school levels in a large, countywide, southwestern United States school district. Research was conducted in two stages. Phase I consisted of administering a questionnaire to school-level technology coordinators and Phase II consisted of conducting two focus group sessions involving eight of those coordinators, four in each session, who worked at all three school levels. The results of Phase I and Phase II are described together, by research question, in this chapter.

Seven research questions guided the study:

1. What are the characteristics of the technology coordinator position, by school level (elementary, middle, or high school) and those who fulfill that role?
2. How do technology coordinators, by school level, report spending their time?
3. What are the barriers and enabling conditions to technical support, by school level, as perceived by technology coordinators?
4. What are the barriers and enabling conditions to instructional support, by school level, as perceived by technology coordinators?
5. What are the barriers and enabling conditions to staff development, by school level, as perceived by technology coordinators?

6. What is the relationship between the number of computer users, the number of networked learning programs, the number of computers, and the percentage of hours of instructional support provided?

7. What is the relationship between perceived homophily, the perceived role of the technology coordinator, the perceived role expectation of the supervisor, and the percentage of hours of instructional support provided?

This chapter is presented in seven parts, one part to present the results of the analyses performed to answer each research question listed above.

Part 1: Characteristics of the Participants and Position

This section of the chapter presents the (a) participant demographics of those completing the questionnaire and participating in the focus groups, (b) motivations to do the job of technology coordinator, (c) participant beliefs about their primary role orientation as technology coordinator (instructional support provider or technical support provider), (d) participant beliefs about their supervisor's primary role expectation of the technology coordinator position (instructional support provider or technical support provider), and (e) an analysis of teaching licenses held by coordinators at each level to answer each of the three hypotheses for this research question.
Participant Demographics

The TCI was administered in August 2005, at a large district-wide meeting of all school-level technology coordinators. Every coordinator present at the meeting was asked to participate. Every coordinator not present at the meeting was sent the same cover letter and questionnaire that was presented to those at the meeting. The number of completed questionnaires was 134 out of the population of 195 technology coordinators in the district. The overall return rate was 69%. Table 1 shows the rates of return by school level.

Table 1

<table>
<thead>
<tr>
<th>Level</th>
<th>Sample</th>
<th>Population</th>
<th>Return Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School</td>
<td>76</td>
<td>97</td>
<td>78%</td>
</tr>
<tr>
<td>Middle School</td>
<td>30</td>
<td>49</td>
<td>61%</td>
</tr>
<tr>
<td>High School</td>
<td>28</td>
<td>49</td>
<td>57%</td>
</tr>
<tr>
<td>Overall</td>
<td>134</td>
<td>195</td>
<td>69%</td>
</tr>
</tbody>
</table>

Note. Percentages rounded to the nearest whole number.

Twelve coordinators (6%) present at the meeting verbally told the researcher that they did not complete the questionnaire because they felt too new to the position to provide meaningful feedback. Reasons for non-response among coordinators not at the meeting and not returning the questionnaire were determined by responses to a follow-up email message. These 49 non-responders were asked for their reason for not completing the questionnaire. They were asked if they didn’t respond to the questionnaire because (a)
they didn’t have time to complete it, (b) they were worried about their anonymity, (c) they were uninterested, (d) they felt unable to provide meaningful feedback, or (e) some other reason. A total of 14 non-responders (29%) replied that they didn’t have time to complete the questionnaire, while the remaining non-responders failed to reply.

Experience. On the TCI, participants were asked the number of years they were a classroom teacher before becoming a full-time coordinator, the number of years they have served as a coordinator full or part-time, and the number of years they have served as the coordinator at their current school. Coordinators serving in secondary schools (middle and high schools) reported the greatest mean number of years as classroom teachers before becoming coordinators, the greatest mean number of years as a coordinator, and the greatest mean number of years as a coordinator at their current school. The mean number of years participants reported teaching in a classroom before becoming a full time coordinator was 10.1. The mean number of years participants reported serving as a coordinator, whether full or part-time was 5.2. Finally, the mean number of years participants reported serving as technology coordinator at their current school was 2.9. Table 2 shows the mean number of years of experience participants reported in each of these three categories by grade level.
Table 2

Mean Years of Experience by School Level

<table>
<thead>
<tr>
<th></th>
<th>Classroom Teacher</th>
<th>Coordinator Service</th>
<th>Current School Coordinator Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School</td>
<td>9.6</td>
<td>4.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Middle School</td>
<td>9.8</td>
<td>5.6</td>
<td>3.3</td>
</tr>
<tr>
<td>High School</td>
<td>11.5</td>
<td>5.8</td>
<td>3.2</td>
</tr>
<tr>
<td>All</td>
<td>10.1</td>
<td>5.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Characteristics. Items three through five on the questionnaire asked participants about their gender, age, and level of college education attained. The most typical participant was a male (51%), 41 to 50 years of age (34%), with 32 semester hours of education beyond a master’s degree (59%). Table 3 shows the frequency and percent of participants in each of these three categories by school level.
Table 3
Demographic Characteristics of Survey Participants by School Level

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>School Level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elementary</td>
<td>Middle</td>
<td>High</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>44.0</td>
<td>16</td>
<td>53.3</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>42</td>
<td>56.0</td>
<td>14</td>
<td>46.7</td>
<td>9</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 30</td>
<td>7</td>
<td>9.2</td>
<td>5</td>
<td>16.7</td>
<td>0</td>
</tr>
<tr>
<td>31 to 40</td>
<td>27</td>
<td>35.5</td>
<td>6</td>
<td>20.0</td>
<td>8</td>
</tr>
<tr>
<td>41 to 50</td>
<td>28</td>
<td>36.8</td>
<td>7</td>
<td>23.3</td>
<td>11</td>
</tr>
<tr>
<td>51 and up</td>
<td>14</td>
<td>18.4</td>
<td>12</td>
<td>40.0</td>
<td>9</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA</td>
<td>1</td>
<td>1.3</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>BA + 16</td>
<td>1</td>
<td>1.3</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>BA + 32</td>
<td>4</td>
<td>5.3</td>
<td>4</td>
<td>13.8</td>
<td>2</td>
</tr>
<tr>
<td>MA</td>
<td>18</td>
<td>23.7</td>
<td>4</td>
<td>13.8</td>
<td>4</td>
</tr>
<tr>
<td>MA + 16</td>
<td>6</td>
<td>7.9</td>
<td>4</td>
<td>13.8</td>
<td>1</td>
</tr>
<tr>
<td>MA + 32</td>
<td>46</td>
<td>60.5</td>
<td>17</td>
<td>58.6</td>
<td>16</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
</tbody>
</table>
Focus Group Participants. There were two focus group sessions with four participants in each session. To ensure anonymity each focus group participant was assigned a pseudonym. Table 4 details the participants’ selected characteristics, in alphabetical order by session.

Table 4

<table>
<thead>
<tr>
<th>Name</th>
<th>Session</th>
<th>TC Years</th>
<th>Total Years</th>
<th>Gender</th>
<th>School Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beth</td>
<td>A</td>
<td>8</td>
<td>25</td>
<td>F</td>
<td>Middle School</td>
</tr>
<tr>
<td>Ellen</td>
<td>A</td>
<td>5</td>
<td>15</td>
<td>F</td>
<td>High School</td>
</tr>
<tr>
<td>Jack</td>
<td>A</td>
<td>12</td>
<td>20</td>
<td>M</td>
<td>Elementary School</td>
</tr>
<tr>
<td>Mark</td>
<td>A</td>
<td>3</td>
<td>10</td>
<td>M</td>
<td>Middle School</td>
</tr>
<tr>
<td>Cindy</td>
<td>B</td>
<td>7</td>
<td>12</td>
<td>F</td>
<td>Elementary School</td>
</tr>
<tr>
<td>Frank</td>
<td>B</td>
<td>4</td>
<td>19</td>
<td>M</td>
<td>High School</td>
</tr>
<tr>
<td>Harold</td>
<td>B</td>
<td>18</td>
<td>24</td>
<td>M</td>
<td>Middle School</td>
</tr>
<tr>
<td>Kelli</td>
<td>B</td>
<td>1</td>
<td>15</td>
<td>F</td>
<td>Elementary School</td>
</tr>
</tbody>
</table>

Support Burden. Items 12 through 15 on the questionnaire asked participants how many students, adults (teachers and staff), networked learning programs, and computers they supported. The number of students coordinators supported ranged from 22 to 6,000 and the number of computers supported ranged from 100 to 2,000. Table 5 shows the range, mean, and standard deviation of the quantity coordinators reported supporting in each of the above four categories by school level.

71
Table 5
Descriptive Statistics by School Level for Students, Staff, Networked Programs, and Computers Supported by Technology Coordinators

<table>
<thead>
<tr>
<th>School Level</th>
<th>Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students Supported</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>750–2700</td>
<td>1531</td>
<td>371</td>
</tr>
<tr>
<td>Middle</td>
<td>580–2000</td>
<td>1409</td>
<td>265</td>
</tr>
<tr>
<td>High</td>
<td>22–6000</td>
<td>2117</td>
<td>1407</td>
</tr>
<tr>
<td>All</td>
<td>22–6000</td>
<td>1629</td>
<td>758</td>
</tr>
</tbody>
</table>

| **Staff Supported** |         |      |                    |
| Elementary         | 50–260  | 110  | 36                 |
| Middle             | 45–130  | 90   | 21                 |
| High               | 15–250  | 120  | 65                 |
| All                | 15–260  | 108  | 43                 |

| **Networked Programs Supported** |         |      |                    |
| Elementary           | 0–18    | 5    | 3.4                |
| Middle               | 1–15    | 5    | 3.0                |
| High                 | 0–40    | 6    | 8.1                |
| All                  | 0–40    | 5    | 4.7                |

| **Computers Supported** |         |      |                    |
| Elementary           | 100–600 | 284  | 104                |
| Middle               | 100–1,000 | 393 | 164                |
| High                 | 100–2,000 | 573 | 421                |
| All                  | 100–2,000 | 373 | 252                |

Note. All values rounded up to the nearest reported place value.

Item number seven on the questionnaire asked participants how many schools they served as coordinator. Elementary coordinators reported serving between one and four schools, with a mode of two. With the exception of three participants, all middle and high school coordinators reported serving only one school.

One way to lessen the support burden would be to have one or more teachers helping to perform the various duties of a coordinator. Elementary level participants reported a range of zero to two teachers helping them, with the mode being zero, and the mean
being .19. Middle school participants reported a range of zero to one teachers helping them, with the mode being zero, and the mean being .13. High school participants reported a range of zero to four teachers helping them, with the mode being zero, and the mean being .96.

**Motivation.** Question 35 of the TCI asked participants what their motivations were for being a technology coordinator. A total of 116 participants (86%) answered this question, with some providing more than one response. Participants wrote in a wide variety of answers, which were analyzed and placed into general categories. Then the categories were analyzed and some were consolidated. A final set of 11 categories emerged, with a total of 164 responses compiled. Some answers fit into multiple categories, so the numbers don’t add up to 116. Table 6 presents the 11 categories and the number of participant responses in each category.

Table 6

<table>
<thead>
<tr>
<th>Reason or Motivation</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helping others use technology</td>
<td>25</td>
</tr>
<tr>
<td>I enjoy helping teachers</td>
<td>24</td>
</tr>
<tr>
<td>Using and/or working with technology</td>
<td>24</td>
</tr>
<tr>
<td>The job presents challenges and/or an opportunity to solve problems</td>
<td>23</td>
</tr>
<tr>
<td>Using/integrating ICT in classrooms</td>
<td>23</td>
</tr>
<tr>
<td>A belief in the importance of ICT in education</td>
<td>19</td>
</tr>
</tbody>
</table>
Table 6 (continued)

<table>
<thead>
<tr>
<th>Reason or Motivation</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The opportunity to be out of the classroom and have a different routine.</td>
<td>10</td>
</tr>
<tr>
<td>I enjoy providing staff development.</td>
<td>7</td>
</tr>
<tr>
<td>The opportunity to have a greater impact or influence.</td>
<td>6</td>
</tr>
<tr>
<td>I would rather teach adults than students.</td>
<td>2</td>
</tr>
<tr>
<td>It is less stressful than a former private sector job.</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. Some responses may have fit into more than one category and therefore may be counted twice.

*Role Orientation.* Participants were asked in question 38 of the questionnaire what they believed their role was as a coordinator. They were presented with a continuum ranging from 1, indicating a very strong belief that their primary role is to provide instructional support, to 7, indicating a very strong belief that their primary role is to provide technical support. A response of “4” indicates a neutral, undecided, or unsure answer. A response of 1 to 3 indicates participant belief leaning towards a primary role that is more geared toward instructional support than technical support. A response of 5 to 7 indicates participant belief leaning towards a primary role that is more geared toward technical support than instructional support.

Elementary school coordinators were more likely to believe their role is instructional support (49%), than technical support (38%). Middle school coordinators were exactly split between those two roles with the same percentage responding instructional support as technical support (39%). High school coordinators were more likely to respond that their role is technical support (60%) rather than instructional support (32%). When considered as a whole, coordinators are almost evenly balanced in their orientation with 44% reporting an instructional orientation to their jobs and 43% reporting a technical...
orientation to their job. Table 7 presents participant responses to this question, by school level.

Table 7
Reported Role Orientation of Participants by School Level

<table>
<thead>
<tr>
<th>School Level</th>
<th>Number Choosing Each Response</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; -- Instructional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Elementary (N=71)</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Middle (N=28)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>High (N=25)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>All (N=124)</td>
<td>18</td>
<td>26</td>
</tr>
</tbody>
</table>

*Role Expectation.* Participants were asked in item 39 of the questionnaire how they believed their supervisor viewed their role as a coordinator. They were presented with a continuum ranging from 1, indicating a very strong belief that their supervisor viewed their primary role as providing instructional support, to 7, indicating a very strong belief that their supervisor viewed their primary role as providing technical support. A response of “4” indicates a neutral, undecided, or unsure answer. A response of 1 to 3 indicates a participant perception that their supervisor expected them to be more geared toward instructional support than technical support. A response of 5 to 7 indicates a perception that their supervisor expects them to be more geared toward technical support than instructional support.
Coordinators were asked who their direct supervisor was in item 42. Most participants reported being supervised by their school’s principal (79%), followed by an assistant principal (11%), with deans or other administrators making up the remainder.

Elementary school coordinators were more likely to believe their supervisor expected them to perform primarily technical support (61%), than instructional support (27%). Middle school coordinators were nearly split on their beliefs. They believed their supervisor expected them to perform primarily technical support (45%) rather than instructional support (41%). High school coordinators were more likely to believe their supervisor expected them to perform primarily technical support (72%) rather than instructional support (20%). When all coordinators were considered, they were more likely to believe their supervisor expected them to perform primarily technical support (59%) rather than instructional support (27%). Table 8 presents participant beliefs about their supervisor’s role expectation, by school level.

Table 8
Coordinator Perceived Supervisor Role Expectation by School Level

<table>
<thead>
<tr>
<th>School Level</th>
<th>Number Choosing Each Response</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Instructional (1-4)</td>
<td>Technical (5-7)</td>
</tr>
<tr>
<td>Elementary (N=71)</td>
<td>1 10 8 9 14 18 11</td>
<td>4.7</td>
</tr>
<tr>
<td>Middle (N=29)</td>
<td>5 0 7 4 2 6 5</td>
<td>4.2</td>
</tr>
<tr>
<td>High (N=25)</td>
<td>4 0 1 2 3 7 8</td>
<td>5.1</td>
</tr>
<tr>
<td>All (N=125)</td>
<td>10 10 16 15 19 31 24</td>
<td>4.7</td>
</tr>
</tbody>
</table>
Type of Teaching License. A person must first be a teacher in order to be a technology coordinator in the school district in which the participants worked. Participants were asked in question number one of the questionnaire about the type of teaching license they held. Response options included (a) a K-8 elementary license, (b) a secondary (7-12th grade) single subject teaching license, or (c) a K-12 single subject teaching license. The researcher hypothesized that elementary school coordinators would hold K-8 teaching licenses primarily, that middle school coordinators would hold a mixture of K-8 licenses and K-12 single subject licenses, and that high school coordinators would hold secondary single subject teaching licenses primarily. These are logical hypotheses and they are important to the analysis of a later research question concerning homophily. Table 9 shows the types of teaching licenses participants reported holding by school level.

Table 9
Coordinator Teaching License Held by School Level

<table>
<thead>
<tr>
<th>School Level</th>
<th>Type of License</th>
<th>K-8</th>
<th>Percent</th>
<th>7-12 Single Subject</th>
<th>Number</th>
<th>Percent</th>
<th>K-12 Single Subject</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary (N=75)</td>
<td></td>
<td>68</td>
<td>89.5%</td>
<td>2</td>
<td>2.6%</td>
<td>5</td>
<td>6.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle (N=30)</td>
<td></td>
<td>14</td>
<td>46.7%</td>
<td>14</td>
<td>46.7%</td>
<td>2</td>
<td>6.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (N=28)</td>
<td></td>
<td>0</td>
<td>0%</td>
<td>17</td>
<td>60.7%</td>
<td>11</td>
<td>39.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All (N=133)</td>
<td></td>
<td>82</td>
<td>62%</td>
<td>33</td>
<td>24.6%</td>
<td>18</td>
<td>13.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Percentages may not add up to 100 due to rounding.
All three hypotheses were correct. Elementary school level technology coordinators were most likely to hold a K–8 teaching license (89.5%), middle school coordinators held a combination of K–8 (46.7%) and K–12 (46.7%) licenses, and high school coordinators held predominantly secondary single subject teaching licenses (60.7%).

The top four most reported secondary single subject teaching licenses were: Business (N=14), math (N=9), science (N=7), and social studies (N=5). No other secondary single subject license was reported by more than two participants. Three participants reported holding a K–12 special education license and one reported holding a K–12 library media specialist license.

Part 2: Time Expenditure

This section presents the participants’ reported time expenditure in four sections: technical support, instructional support, staff development, and miscellaneous uses of time. Focus group data are included to inform the results of the questionnaire.

Technical Support

On the questionnaire participants were asked about their perceptions about having enough time to take care of their technical support duties, the actual percentage of time they spent on technical support tasks, and the percentage of time they would prefer to spend on technical support tasks. In the focus group participants were asked for their definitions of exemplary, satisfactory, and unsatisfactory levels of technical support. Both questionnaire and focus group results are presented.

Adequate Technical Support Time. Participants were asked in item 16 of the questionnaire to rate their agreement with the statement, “I have enough time to take care
of my technical support duties…” on a five-point Likert scale. The scale contained the choices strongly agree, somewhat agree, neutral, somewhat disagree, and strongly disagree. The sum of both agree responses (25.8%) and both disagree responses (65.9%) indicates that coordinators don’t perceive having enough time to provide quality technical support. Complete results are presented in Table 10.

Table 10

Participant Perception of Having Sufficient Time to Perform Technical Support by School Level

<table>
<thead>
<tr>
<th>Response</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>3</td>
<td>4.0</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Somewhat Agree</td>
<td>22</td>
<td>29.0</td>
<td>6</td>
<td>20.7</td>
</tr>
<tr>
<td>Neutral</td>
<td>5</td>
<td>6.6</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>Somewhat Disagree</td>
<td>28</td>
<td>36.8</td>
<td>8</td>
<td>27.6</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>18</td>
<td>23.7</td>
<td>11</td>
<td>37.9</td>
</tr>
</tbody>
</table>

Note. Columns may not add up to 100% due to rounding.

Actual Technical Support Time. Item 43 of the questionnaire asked the participants the percentage of time they spent performing various tasks, including technical support. The item uses the term “technical content.” Item 43, Section II, part “a” and part “b” are the two categories comprising technical support. Part “a” includes, “Installing, maintaining, or troubleshooting hardware and software.” Part “b” included, “Providing...
one-on-one help to teachers or staff members with technical support issues." Table 11 presents the percentage of time participant reported spending on technical support tasks.

Table 11
Percentage of Time Participants Reported
Spending on Technical Support Tasks by School Level

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing, maintaining, or troubleshooting hardware and software</td>
<td>44.5</td>
<td>37.6</td>
<td>47.8</td>
<td>43.8</td>
</tr>
<tr>
<td>Providing one-on-one help to teachers or staff members with technical support issues.</td>
<td>16.9</td>
<td>24.7</td>
<td>18.8</td>
<td>18.7</td>
</tr>
<tr>
<td>Total</td>
<td>61.4</td>
<td>62.3</td>
<td>66.6</td>
<td>62.5</td>
</tr>
</tbody>
</table>

Desired Technical Support Time. Item 43 of the questionnaire also asked participants the percentage of time they desired to spend on these same two technical support tasks. Table 12 shows the desired percentage of time participants would prefer to spend on each of these two tasks.
Table 12

Percentage of Time Participants Reported Desiring to Spend on Technical Support Tasks by School Level

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing, maintaining, or troubleshooting hardware and software</td>
<td>14.4</td>
<td>16.6</td>
<td>17.4</td>
<td>15.3</td>
</tr>
<tr>
<td>Providing one-on-one help to teachers or staff members with technical support issues.</td>
<td>10.9</td>
<td>13.6</td>
<td>13.6</td>
<td>11.9</td>
</tr>
<tr>
<td>Total</td>
<td>25.3</td>
<td>30.2</td>
<td>31</td>
<td>27.2</td>
</tr>
</tbody>
</table>

Focus Group Perspective on Technical Support. Focus group participants discussed the issue of time and having enough of it to perform technical support. Ellen, a high school coordinator, said, “There are a thousand and one small daily issues that come up and eat up the time of the [coordinator].” To better understand how coordinators spend their time and the pressures placed upon them, this section will address time to perform technical support, coordinator feelings of frustration due to lack of time, and the collective desire of both focus groups to have additional work days added to their contract.

Technical Support Time. As part of their duties, coordinators spend a large percentage of their time performing technical support. Participants discussed the fact that they spend so much time in this area and Cindy told her group her theory about why that is. She said, “The lack of time is attributed to the increase in REPORTED problems [Emphasis added by researcher to reflect the speaker’s emphasis]. In the past, teachers could work around
using the computer by making copies or handwriting. The district is requiring more tasks be completed using technology - daily attendance on ClassXP, Standards Based Report card using EasyGrade Pro.”

Jack concurred, and added more reasons for the lack of time:

Part of the problem that makes it more difficult is the amount of technology and of differing ages [pause] But to keep it all up and support it with teachers forgetting their passwords, forgetting how to log this stuff in [pause] printers going out, network going down, all the various things that happens in the whole building there are lots of times I am buried. I'm still getting things up and running for the first of the school year...

Jack’s statement implied that there are several technical issues that he is struggling with. Kelli continued the discussion about time by expressing the number of tasks a coordinator has to do. She said, “I think part of it are the demands that are made upon our time. There are so many things we are asked to do. We really don’t have a job description per se.” Of course, the school-level technology coordinator position does have a job description, but Kelli expressed the frustration of many.

There was general consensus with Harold’s statement that, “Right now we're on the verge of technical support being the bulk of what's happening. I see a whole lot less questions for requests for hand outs for in-services and advertisement for PDE's.” Participant discussion supported the finding that a large percentage of time was spent on technical support and that there was not enough time to do that aspect of the job well.

Beth’s statement makes the point that technical support time is increasing because there is an:
...increase in the amount of technology being deployed that we need to take care of, time with day to day operations of the school, i.e. passwords, printing issues, one on one in the classroom, technology issues that come up, setting up in the labs, special programs, etc., time, teachers new to the district that just need training on day to day technology operations. I have 26 new ones this year.

Participant discussion enumerates the myriad of tasks faced by the typical coordinator. Technical tasks discussed included taking care of individual machines, computer labs, and some issues that are day-to-day nuisances. Printers and passwords were the most commonly mentioned recurring technical support nuisances. Ellen, discussing passwords, commented, “The amount of time you have to spend because somebody forgot a password, can't log in, those sort of things... doing that 4 times a day you've lost an hour or whatever.”

Feelings of Frustration. Coordinators expressed their frustration with the technical support tasks before them. One participant explained, “Everyone wants their thing done now.” Another added, “It is overwhelming at the beginning of the school year when everything has to be done NOW [Emphasis added by researcher to reflect speaker’s emphasis].” Frank stated, “With all the various things that happen in the whole building, there are lots of times I am buried.” Jack reported feeling burned out at the end of the school year and he feels others are burned out too.

At the end of last year I was really fried with the job. [pause] I got on my motorcycle and didn’t come back until August and that gave me a real fresh perspective. I know there are people that have spent their whole
Additional workdays. In order to meet their technical support needs, participants reached a wide consensus that they needed extra workdays in order to be ready for the start of the school year. The reason for the extra days was to conduct maintenance, installation, relocation, and inventory when students and teachers did not occupy their schools. Participants expressed the idea that having these extra days would enable them to ultimately perform more staff development. Ellen explained, "[Coordinators] need more time to get their technical jobs done over the summer so they can be more of a staff developer during the school year." This is triangulated by the finding in Phase I in which 42% of participants reported needing extra work-days in order to provide better instructional support. Additionally, 40% of participants reported that a lack of extra pay and the ability to have flexible work schedules was a barrier to instructional support.

Levels of Technical Support. Focus group participants were asked to discuss three hypothetical levels of technical support: exemplary, satisfactory, and unsatisfactory as a means of providing a richer description of the technical support issue. Very quickly participants came to the consensus that the quality of technical support was best measured in time.

In a statement that represented the consensus of both groups, Frank said, "The time to get something repaired in exemplary technical support... would be in 24 hours." When the researcher probed for an exemplary measure of technical support for issues beyond the coordinator’s capabilities, the consensus was that district-level technical support should respond to a work order within 24 hours. Besides time, the other measure of
quality decided upon was the percentage of hardware that is working at any given time. Participants agreed that at least 90% of all hardware had to be operational at any given time to be exemplary. To help facilitate such response and readiness rates participants felt more training of coordinators, more training of teachers, better dissemination of common problems and their solutions, and more technical support personnel were needed.

Time and percentage were once again the factors decided upon to measure satisfactory technical support. The consensus seemed to be that 72 hours to get technical problems resolved was satisfactory. Cindy, agreeing with the 72 hour metric, stated, “The problem is if you go beyond two or three days with computers down, people start to adjust.” Expanding on this idea she remarked, “I don't know, you reach a point... where a problem existed for such a length of time that people have modified their work where they weren't using the technology anymore.” Adding his weight to this point, Herald asserted:

If you go beyond 72 hours, you're getting into an unsatisfactory level. I'm saying probably if the computer went down on Monday and I told the teacher that we would have that up no later than the first thing Thursday, they would probably buy that. But if I told them it was going to be down until next Monday, they would find some other way to do their job.

Finding another way to do a job that should have been done using technology was not satisfactory to participants. In addition to the time metric of 72 hours, participants stayed with the traditional teacher grading scale and agreed that at least 80% of all hardware should be up and running to be considered satisfactory.
Time greater than 72 hours to repair or replace a troubled piece of hardware was considered unsatisfactory, as was having less than 80% of hardware working. Put into perspective, a computer lab of 30 computers could have 27 of them working and be exemplary. To be merely satisfactory, that same lab would need to have at least 24 computers working. An unsatisfactory technical support condition would exist if 23 or fewer computers worked in this hypothetical lab of 30 computers.

Instructional Support

On the questionnaire participants were asked about their perceptions about having enough time to take care of their instructional support duties, the actual percentage of time they spent on instructional support tasks, and the percentage of time they would prefer to spend on instructional support tasks. In the focus group participants were asked for their definitions of exemplary, satisfactory, and unsatisfactory levels of instructional support. Each of these topics are presented in this section.

*Adequate Instructional Support Time.* Item 21 on the questionnaire asked participants to respond to the statement, “I have enough time to adequately take care of my instructional support duties, such as helping teachers integrate technology...” Participants could choose a response from a five-point Likert scale from strongly agree to strongly disagree. A ‘1’ represents strongly agree, a ‘3’ represents a neutral response, and a ‘5’ represents strongly disagree. Participants clearly responded that they don’t have enough time to take care of their instructional support duties. Table 13 presents participant responses to this question, by school level.
Table 13

Participant Perception of Having Sufficient Time to Perform Instructional Support by School Level

<table>
<thead>
<tr>
<th>Response</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elementary</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>2</td>
</tr>
<tr>
<td>Somewhat Agree</td>
<td>9</td>
</tr>
<tr>
<td>Neutral</td>
<td>6</td>
</tr>
<tr>
<td>Somewhat Disagree</td>
<td>25</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>33</td>
</tr>
</tbody>
</table>

*Actual & Desired Instructional Support Time.* Item 43, Section I, Part “a” of the questionnaire asked participants to report the percentage of time they spent providing instructional support and the percentage of time they desired to spend providing instructional support. Overall, participants desired spending nearly three times as many hours providing instructional support than they reported actually spending. The item asked participants how much time they actually spent and desired to spend assisting teachers with content-area specific software and/or providing pedagogical help and expertise for the use of such software. Table 14 presents the percentages of time participants reported actually spending and desiring to spend on instructional support.
Table 14

Percentage of Time Participants Reported Spending and
Desiring to Spend on Instructional Support by School Level

<table>
<thead>
<tr>
<th></th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>8.6</td>
<td>9.9</td>
<td>6.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Desired</td>
<td>23.7</td>
<td>24.7</td>
<td>24.5</td>
<td>24.1</td>
</tr>
</tbody>
</table>

Levels of Instructional Support. The heart of discussion in the focus groups was the availability of the coordinator to help teachers plan for and teach lessons using technology. Mark, a middle school coordinator with three years of experience doing the job, used the phrase “instructional partner” to describe what he believed should be the core of the job. His comments were the beginning of a definition of exemplary instructional support in his group session.

Exemplary instructional support would then be having the ECS teach the teacher how to use all the technology that is a part of the lesson or unit. It would also mean being present in the lab or classroom to get the unit started and being available for consultation throughout the lesson. You would have to be the instructional partner of the teachers.

When prompted for a more specific measure of exemplary instructional support by the researcher, Ellen said, “I feel it would be exemplary if teachers could make an appointment to design a lesson or unit of instruction with the [coordinator] and be pretty well assured that meeting wouldn’t be canceled by a technical support issue.” All agreed that all instructional support hinged upon the need for the coordinator to be “…viewed as
a skilled educator who could model technology use and assist teachers with the inclusion of technology into their curriculum.” There was a consensus that having the coordinator routinely involved in the planning time of teachers was important. Harold commented, “Teachers with good instructional support wouldn't be afraid of failure because they know that's all part of using technology.” He gave an example of the sort of support a coordinator should be able to give to individual teachers.

I was talking to a teacher [who] came back and she was all excited because she took a class. She said, “I'd love to use Power Points if only it didn't take so long to make each one.” I said, “Well if you just do an outline and attach a theme [pause]. She said, “You can do that?” I said, “yeah.” I showed her real quick and she's like, “Gee I can go home and do a Power Point in 15 minutes and be ready for the next day.” But that was one of those things, the one on one. She had a question and I could show her.

After this discussion of what quality instructional support looks like, the researcher steered it toward a way of measuring the quality of instructional support.

Time once again became the measure of quality. One participant stated, “Exemplary [instructional support] would be, a teacher has a question and you can immediately respond.” Participants seemed to agree that having a “fast response” to a request for technical support 90% of the time was the closest they could come to a measure of quality for exemplary instructional support. Most in the focus group sessions felt that defining measures for satisfactory instructional support was too difficult. This was
because participants could not see a time when instructional support would take priority over technical support with the current structure of the position.

Summing up this viewpoint, Frank stated, "I know that ideally the primary purpose of an ECS is instructional support, but the reality is that things need to be up and working [first]." Everyone agreed the technical support burden left coordinators little time to provide instructional support. But, there was strong agreement that not being able to provide any instructional support would indeed be unsatisfactory.

Staff Development

On the questionnaire participants were asked about their perceptions regarding having enough time to take care of their staff development duties, the actual percentage of time they spent on staff development tasks, and the percentage of time they would prefer to spend on staff development tasks. In the focus group participants were asked for their definitions of exemplary, satisfactory, and unsatisfactory levels of staff development. Each of these topics are presented in this section.

*Adequate Staff Development Time.* Item 26 of the questionnaire asked participants to agree or disagree with the following statement: "I have enough time to adequately take care of my staff development duties, such as planning staff development, conducting staff development, monitoring the effectiveness of staff development, following up on staff development with teachers, or coordinating staff development activities." Participants were asked to provide their answer on the following five-point Likert scale from strongly agree to strongly disagree. Table 15 presents participant responses to this question, by school level.
Table 15

Participant Perception of Having Sufficient Time to Perform Staff Development by School Level

<table>
<thead>
<tr>
<th>Response</th>
<th>Elementary</th>
<th></th>
<th>Middle</th>
<th></th>
<th>High</th>
<th></th>
<th>All</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>1</td>
<td>1.4</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Somewhat Agree</td>
<td>10</td>
<td>13.7</td>
<td>5</td>
<td>17.2</td>
<td>2</td>
<td>7.4</td>
<td>17</td>
<td>13.2</td>
</tr>
<tr>
<td>Neutral</td>
<td>10</td>
<td>13.7</td>
<td>3</td>
<td>10.3</td>
<td>6</td>
<td>22.2</td>
<td>19</td>
<td>14.7</td>
</tr>
<tr>
<td>Somewhat Disagree</td>
<td>28</td>
<td>38.4</td>
<td>11</td>
<td>37.9</td>
<td>8</td>
<td>29.6</td>
<td>47</td>
<td>36.4</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>24</td>
<td>32.9</td>
<td>10</td>
<td>34.5</td>
<td>11</td>
<td>40.7</td>
<td>45</td>
<td>34.9</td>
</tr>
</tbody>
</table>

_Actual Staff Development Time._ Item 43 of the questionnaire asked participants to report the percentage of time they spent on staff development tasks. Item 43, Section I, Part “b” asked about time spent providing scheduled professional development on pedagogy or strategies for technology integration. Item 43, Section II, Part “c” asked about time spent providing professional development on hardware or software that was not related to technology integration. These two questions provide a snapshot of the percentages of time spent on staff development as it pertains to the educational use of technology and the personal or administrative uses of technology. Table 16 shows the participants’ responses to these two questions, by school level.
Table 16
Percentage of Time Participants Reported Spending on Staff Development Tasks by School Level

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing scheduled professional development related to ICT integration</td>
<td>6.3</td>
<td>7.1</td>
<td>3.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Providing scheduled professional development related to personal or administrative uses of ICT</td>
<td>5.0</td>
<td>5.3</td>
<td>5.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Total</td>
<td>11.3</td>
<td>12.3</td>
<td>9.8</td>
<td>11.2</td>
</tr>
</tbody>
</table>

*Desired Staff Development Time.* Participants were also asked in Item 43 of the questionnaire to provide the percentage of time they desired to spend on staff development tasks. Again, they were asked to respond to this question in two areas: staff development related to ICT integration in the curriculum, and ICT usage by teachers or staff members for personal or administrative uses. Table 17 shows participant responses to these items, by school level.

Table 17
Percentage of Time Participants Desired Spending on Staff Development Tasks by School Level

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing scheduled professional development related to ICT integration</td>
<td>15.1</td>
<td>16.8</td>
<td>12.2</td>
<td>14.9</td>
</tr>
<tr>
<td>Providing scheduled professional development related to personal or administrative uses of ICT</td>
<td>7.3</td>
<td>6.2</td>
<td>6.2</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td>22.4</td>
<td>23.0</td>
<td>18.5</td>
<td>21.8</td>
</tr>
</tbody>
</table>

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Levels of Staff Development. Those attending a focus group discussion were asked to talk about staff development and to come up with a measure of quality for exemplary and satisfactory staff development. Participants felt that before such a standard could be set, there had to be a standard for what teachers, administrators, and support staff should know how to do using ICT. There seemed to be agreement with one participant’s statement that “If you were to look at a school that was having successful staff development, you would have good strong foundation of educational technology skills.”

Two measures of quality were considered for a staff development program designed to achieve such a foundation of technology skills. The first measure was obvious to everyone – time. Various measures of time needed for exemplary staff development were put forth. These measures ranged from having everyone on staff attend one 10 to 20-minute session each week, to everyone attending monthly, an hour in duration. Cindy had the most specific ideas:

Formal staff development would be provided during the instructional day every week. Teachers would have an additional "tech time" to their regular prep time. In addition, weekly trainings would be available on a voluntary basis before or after school. Also, the school would have classes for credit every 2-3 months.

When pressed for a consensus on a measure of time, there was widespread agreement on an hour each month.
Miscellaneous Time Expenditure

On the questionnaire participants were asked about the actual percentage of time they spent on miscellaneous tasks, and the percentage of time they would prefer to spend on these sorts of tasks. In the focus group participants were asked to place tasks into one of four categories: important and urgent, important and not urgent, not important and urgent, not important and not urgent. These categories each represent one of the four quadrant of Covey’s Time Management Matrix from his book The Seven Habits of Highly Effective People (Covey, 1989). Each of these topics are presented in this section.

Reported Miscellaneous Time Expenditure. Part III of item 43 on the questionnaire asked participants to provide the percentage of time they actually spent on four miscellaneous tasks. Those tasks were: (a) planning or coordinating for future tasks such as the school technology plan or technology plan, (b) learning new skills or knowledge related to the technology coordinator position, (c) time spent in meetings, and (d) other tasks. Table 18 displays the percentage of time participants reporting spending on each of these four categories, by school level.

Table 18
Percentage of Time Participants Reported Spending on Miscellaneous Tasks by School Level

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning or coordinating for future events</td>
<td>5.7</td>
<td>6.1</td>
<td>7.1</td>
<td>6.0</td>
</tr>
<tr>
<td>Learning new skills or knowledge</td>
<td>5.5</td>
<td>5.4</td>
<td>5.1</td>
<td>5.4</td>
</tr>
<tr>
<td>Attending meetings</td>
<td>4.5</td>
<td>4.2</td>
<td>4.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Other tasks</td>
<td>1.4</td>
<td>1.7</td>
<td>0.4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

A space was provided on the questionnaire for participants to describe the other tasks they perform that are not included elsewhere in item 43. A total of 22 participants entered
a percentage of time value, but only one actually entered a description. The description this participant wrote in was “advising clubs or activities.”

**Desired Miscellaneous Time Expenditure.** Participants were also asked to report the percentage of time they desired to spend on these same four miscellaneous tasks as in the previous section. Table 19 presents the percentage of time participants reported desiring to spend on these tasks by school level.

<table>
<thead>
<tr>
<th>Task</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning or coordinating for future events</td>
<td>8.5</td>
<td>10.4</td>
<td>7.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Learning new skills or knowledge</td>
<td>9.1</td>
<td>9.6</td>
<td>9.0</td>
<td>9.2</td>
</tr>
<tr>
<td>Attending meetings</td>
<td>3.6</td>
<td>2.8</td>
<td>2.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Other tasks</td>
<td>1.3</td>
<td>0.3</td>
<td>0.4</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**Time Management Matrix.** As a means of getting another look at how coordinators view the events that make up their days and prioritize their time, Covey’s (1989) Time Management Matrix (see Table 20) was used. The researcher explained the matrix and the quadrants. Quadrant I of the matrix contains tasks that are urgent and important. Quadrant II of the matrix contains tasks that are not urgent but are important. Quadrant III of the matrix contains tasks that are urgent and not important. Quadrant IV tasks are not urgent and not important. Tasks in Quadrants III and IV tend to distract one from the important tasks of the first two quadrants (Covey, 1989). Participants were given post-it
notes and asked to write one task on each post-it. Further, they were asked to place at least one post-it note in each quadrant. A consensus was reached concerning the types of tasks that fit into each quadrant of the matrix. Beth summarized the discussion by stating, “All of the tasks listed are important to someone or at sometime, but may not fit into our core duties.” Participants felt that the tasks listed in the matrix were correctly placed. However, there was strong agreement that most of their time was, and would continue to be, spent in Quadrant I (urgent and important tasks) even though more of their time should be in Quadrant II (not urgent but important tasks). Table 20 shows the time management matrix from the perspective of the participants.

Part 3: Barriers and Enabling Conditions to Technical Support

This section presents the (a) reported barriers to providing technical support, (b) the reported conditions that enable technical support, and (c) an analysis of the number of barriers and enabling conditions broken down by the percentage of hours coordinators reported spending on technical support. Data from the focus group sessions related to technical support are integrated with the data gathered from the questionnaire.

Technical Support Barriers. Participants were asked in items 17 and 18 of the questionnaire to identify all of the barriers to technical support they perceived. Between the two items there were 16 choices. Participants also had the opportunity to write in other factors they felt were barriers that were not listed.
Table 20

Participant Described Tasks of the Time Management Matrix

<table>
<thead>
<tr>
<th>Quadrant I: Urgent &amp; Important</th>
<th>Quadrant II: Not Urgent &amp; Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Restarting the server</td>
<td>• Improve skills and knowledge</td>
</tr>
<tr>
<td>• Restoring network access</td>
<td>• Planning</td>
</tr>
<tr>
<td>• Troubleshooting problems with networked learning programs</td>
<td>• Updating the inventory</td>
</tr>
<tr>
<td>• Troubleshooting or restoring access to network-based programs</td>
<td>• Developing relationships with teachers and others</td>
</tr>
<tr>
<td>• Troubleshooting or restoring use of important programs</td>
<td>• Upgrading and updating software - especially network client and antivirus software</td>
</tr>
<tr>
<td>• Restoring or recovering important data or files</td>
<td>• Training others on site to help reduce the tech support burden</td>
</tr>
<tr>
<td>• Troubleshooting and restoring a user’s ability to print</td>
<td>• Creating bug-free images</td>
</tr>
<tr>
<td></td>
<td>• Staff development</td>
</tr>
<tr>
<td></td>
<td>• Co-authoring lessons or co-teaching</td>
</tr>
<tr>
<td></td>
<td>• Maintaining records and documentation</td>
</tr>
<tr>
<td></td>
<td>• Website production/updates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quadrant III: Urgent &amp; Not Important</th>
<th>Quadrant IV: Not Urgent &amp; Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Helping solve a problem in the production of a document</td>
<td>• Relocating computers</td>
</tr>
<tr>
<td>• Spending too much time troubleshooting individual issues instead of calling in a work order</td>
<td>• Some meetings</td>
</tr>
<tr>
<td>• Some email</td>
<td>• Phone calls from sales people</td>
</tr>
<tr>
<td>• Some phone calls</td>
<td>• Creating desktop shortcuts for people</td>
</tr>
<tr>
<td></td>
<td>• Most snail mail</td>
</tr>
<tr>
<td></td>
<td>• Filling out time logs</td>
</tr>
</tbody>
</table>

A total of eight participants (five elementary, one middle, and two high school) responded that they didn’t perceive any barriers to providing technical support. The average number of barriers reported at all levels was five with the range being from zero to eleven. Table 21 shows the percentage of participants reporting each technical support barrier, by school level.
Table 21
Percentage of Participants Reporting Each Technical Support Barrier by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of extra work days</td>
<td>72.4</td>
<td>86.7</td>
<td>85.7</td>
<td>78.4</td>
</tr>
<tr>
<td>Too much equipment to support</td>
<td>46.1</td>
<td>46.7</td>
<td>50.0</td>
<td>47.1</td>
</tr>
<tr>
<td>Lack of staff development</td>
<td>39.5</td>
<td>50.0</td>
<td>35.7</td>
<td>41.0</td>
</tr>
<tr>
<td>Old or outdated hardware</td>
<td>44.7</td>
<td>36.7</td>
<td>32.1</td>
<td>40.3</td>
</tr>
<tr>
<td>Directed to perform other duties</td>
<td>34.2</td>
<td>33.3</td>
<td>39.1</td>
<td>35.1</td>
</tr>
<tr>
<td>Too many users to support</td>
<td>29.0</td>
<td>23.3</td>
<td>32.1</td>
<td>28.4</td>
</tr>
<tr>
<td>Lack of hardware/software training for me</td>
<td>26.3</td>
<td>30.0</td>
<td>25.0</td>
<td>26.9</td>
</tr>
<tr>
<td>Lack of minor hardware (cables, mini-switches, etc.)</td>
<td>30.7</td>
<td>23.3</td>
<td>21.4</td>
<td>26.9</td>
</tr>
<tr>
<td>Old or outdated software</td>
<td>26.3</td>
<td>26.7</td>
<td>21.4</td>
<td>25.4</td>
</tr>
<tr>
<td>Lack of personal management tools (inventories, lists, etc.)</td>
<td>18.4</td>
<td>16.7</td>
<td>35.7</td>
<td>21.6</td>
</tr>
<tr>
<td>Lack of timely district technical support</td>
<td>18.4</td>
<td>23.3</td>
<td>17.9</td>
<td>19.4</td>
</tr>
<tr>
<td>Lack of procedures for staff to follow</td>
<td>15.8</td>
<td>0.0</td>
<td>10.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Lack of management/support software</td>
<td>6.6</td>
<td>16.7</td>
<td>14.3</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Participants had an opportunity to write in other barriers to technical support that were not listed in the instrument. There were 11 barriers written in. Table 22 shows the frequency of each barrier listed by participants.

Coordinators reported the need to have extra days on their contract to adequately do their jobs on the questionnaire. They also reported that the amount of equipment they have to support was the greatest barrier to technical support. Focus group data provided some possible explanations for these questionnaire results.
Table 22

Write-In Barriers to Technical Support Listed by Frequency

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working at more than one school or site</td>
<td>3</td>
</tr>
<tr>
<td>Lack of a technology budget</td>
<td>2</td>
</tr>
<tr>
<td>Site infrastructure inadequate or not up to district standards</td>
<td>2</td>
</tr>
<tr>
<td>Lack of a second coordinator onsite</td>
<td>2</td>
</tr>
<tr>
<td>No administrative support for ICT staff development</td>
<td>2</td>
</tr>
<tr>
<td>Lack of administrative ICT leadership or vision</td>
<td>2</td>
</tr>
<tr>
<td>Lack of office or work space for the coordinator</td>
<td>2</td>
</tr>
<tr>
<td>Lack of administrative understanding of ICT</td>
<td>1</td>
</tr>
<tr>
<td>Coordinator lack of experience</td>
<td>1</td>
</tr>
<tr>
<td>Too much software to support</td>
<td>1</td>
</tr>
<tr>
<td>Lack of medical coverage for injuries sustained while working on non-contracted days or times</td>
<td>1</td>
</tr>
</tbody>
</table>

One statement by Harold, the most experienced coordinator participating in the focus groups, summarized the barriers to technical support and expressed the frustrations of participants:

Part of the problem that makes it more difficult is the amount of technology and of differing ages being in my building and the fact that we actually got to the point where I now have more computers than I have space to put them in... But to keep it all up and support it with teachers
forgetting their passwords, forgetting how to log this stuff in [pause],
printers going out, network going down, all the various things that
happens in the whole building there are lots of times I am buried. I'm still
getting things up and running from the first of the school year and we're
half way through the first quarter.

*Technical Support Enablers.* Participants were asked in items 19 and 20 of the
questionnaire to identify all of the factors that they perceived enabled them to provide
technical support. Between the two items there were 15 choices. Participants had the
opportunity to write in other factors they felt were enablers that were not listed. The
average number of enablers reported at all levels was five with the range being from zero
to twelve. Table 23 shows the percentage of participants reporting each technical support
enabler, by school level.
Table 23

Percentage of Participants Reporting Each Technical Support Enabler by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong administrative support</td>
<td>71.1</td>
<td>76.7</td>
<td>57.1</td>
<td>69.4</td>
</tr>
<tr>
<td>Hardware and software training that has helped me</td>
<td>59.2</td>
<td>66.7</td>
<td>50.0</td>
<td>59.0</td>
</tr>
<tr>
<td>Help from other teachers</td>
<td>40.8</td>
<td>60.0</td>
<td>64.3</td>
<td>50.0</td>
</tr>
<tr>
<td>Timely school district technical support</td>
<td>48.7</td>
<td>46.7</td>
<td>39.3</td>
<td>46.3</td>
</tr>
<tr>
<td>My own management tools such as inventories or lists</td>
<td>43.4</td>
<td>36.7</td>
<td>39.3</td>
<td>41.0</td>
</tr>
<tr>
<td>Clear procedures for my staff to follow</td>
<td>29.0</td>
<td>53.3</td>
<td>42.9</td>
<td>37.3</td>
</tr>
<tr>
<td>Availability of minor hardware such as cables or switches, or ability to quickly acquire when needed</td>
<td>27.6</td>
<td>36.7</td>
<td>46.4</td>
<td>33.6</td>
</tr>
<tr>
<td>Teacher staff development</td>
<td>25.0</td>
<td>23.3</td>
<td>32.1</td>
<td>26.1</td>
</tr>
<tr>
<td>Help from students</td>
<td>4.0</td>
<td>36.7</td>
<td>64.3</td>
<td>23.9</td>
</tr>
<tr>
<td>Availability of management software</td>
<td>18.4</td>
<td>26.7</td>
<td>17.9</td>
<td>20.2</td>
</tr>
<tr>
<td>Help from one or more other coordinators at my school – full or part time</td>
<td>17.1</td>
<td>10.0</td>
<td>28.6</td>
<td>17.9</td>
</tr>
<tr>
<td>Flexible work day hours</td>
<td>14.5</td>
<td>10.0</td>
<td>25.0</td>
<td>15.7</td>
</tr>
<tr>
<td>I've been directed to concentrate on technical support</td>
<td>9.2</td>
<td>20.0</td>
<td>21.4</td>
<td>14.2</td>
</tr>
<tr>
<td>Extra days to work when not in session</td>
<td>9.2</td>
<td>13.3</td>
<td>14.3</td>
<td>11.2</td>
</tr>
</tbody>
</table>
Participants had an opportunity to write in other enabling factors to technical support that were not listed in the instrument. There were eight different enablers written in. Table 24 shows the frequency of each enabling factor written in more than once by all participants.

Table 24

<table>
<thead>
<tr>
<th>Enabler</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help from other site coordinators</td>
<td>12</td>
</tr>
<tr>
<td>Working extra time</td>
<td>3</td>
</tr>
</tbody>
</table>

**Technical Support Time by Factors.** In item 43 of the questionnaire participants reported the percentage of time they spent providing technical support. The mean percentage of time all participants reported spending on technical support tasks was 62.5. On the other hand, they reported desiring to spend 27.2% of their time on such tasks. It was hypothesized by the researcher that as coordinators gain experience they would report fewer barriers to technical support. The data, however, do not support this hypothesis based on an analysis using Pearson’s correlation coefficient, \( r(129) = -.02, p = .79 \).

It was also hypothesized by the researcher that as coordinators gain experience they would report more enabling factors to technical support. The data do not support this hypothesis. An analysis using Pearson’s correlation coefficient, \( r(130) = .131, p = .136 \),
shows no relationship between the number of years as a coordinator and the number of enabling factors to technical support. Such factors may be beyond the scope of influence of school-level coordinators.

Paradoxically, there was also no relationship between the percentage of hours spent providing technical support and the number of perceived barriers. This observation is supported by a correlation analysis, \( r(94) = .105, p = .307 \). Regardless of how many barriers participants reported perceiving, the number of barriers do not seem to affect the amount of time spent providing technical support. This could be because the barriers listed in the questionnaire were not comprehensive.

There was also no relationship between the percentage of hours spent providing technical support and the number of perceived enabling factors. The results of a Pearson correlation analysis support this observation, \( r(94) = .04, p = .679 \). Again, this could be because the enabling factors listed in the questionnaire were not comprehensive. It could also indicate that the technical support burden is so great that the number of enabling factors are not enough to mitigate their time expenditure.

Part 4: Barriers and Enabling Conditions to Instructional Support

This section of the chapter presents the (a) reported barriers to providing instructional support, (b) the conditions that coordinators reported enable them to provide instructional support, (c) an analysis of the number of barriers and enabling conditions and years of experience as a coordinator by the percentage of hours coordinators reported spending on instructional support, and (d) instructional support strategies used. Data from the focus
group sessions related to instructional support are integrated with the data gathered from the questionnaire.

Instructions Support Barriers. Items 22 and 23 of the questionnaire asked participants to circle each factor they perceived as a barrier to providing a higher level of instructional support than they currently provided. One of the choices was “I do not perceive any barriers to providing instructional support.” A total of four participants responded that they did not perceive any instructional support barriers. There were 17 factors listed between these two items. Table 25 shows each barrier and the percentage of participants circling them, by school level.

Table 25
Percentage of Participants Reporting Each Instructional Support Barrier by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical support duties are a priority over instructional support</td>
<td>72.4</td>
<td>63.3</td>
<td>50.0</td>
<td>65.7</td>
</tr>
<tr>
<td>Teachers need more staff development before more instructional support is demanded</td>
<td>51.3</td>
<td>36.7</td>
<td>35.7</td>
<td>44.8</td>
</tr>
<tr>
<td>Few or no opportunity for extra work days</td>
<td>39.5</td>
<td>50.0</td>
<td>39.3</td>
<td>41.8</td>
</tr>
<tr>
<td>Technical support is a priority to my administration</td>
<td>38.2</td>
<td>43.4</td>
<td>46.4</td>
<td>41.0</td>
</tr>
<tr>
<td>Few or no opportunity for extra pay or to work a flexible schedule</td>
<td>36.8</td>
<td>43.3</td>
<td>46.4</td>
<td>40.3</td>
</tr>
<tr>
<td>Little administrative demand on teachers to seek instructional support</td>
<td>34.2</td>
<td>30.0</td>
<td>32.1</td>
<td>32.8</td>
</tr>
<tr>
<td>Teachers are not interested in using ICT with students</td>
<td>36.8</td>
<td>26.7</td>
<td>14.3</td>
<td>29.9</td>
</tr>
<tr>
<td>School doesn't have enough hardware to entice teachers to use ICT with students</td>
<td>31.6</td>
<td>23.3</td>
<td>25.0</td>
<td>28.4</td>
</tr>
<tr>
<td>I need more training on subject/curriculum-specific software</td>
<td>17.1</td>
<td>50.0</td>
<td>32.1</td>
<td>27.6</td>
</tr>
<tr>
<td>Being better organized could help me provide better instructional support</td>
<td>25.0</td>
<td>20.0</td>
<td>25.0</td>
<td>23.9</td>
</tr>
</tbody>
</table>

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### Table 25 (continued)

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need more training on curriculum-related hardware</td>
<td>17.1</td>
<td>33.3</td>
<td>32.1</td>
<td>23.8</td>
</tr>
<tr>
<td>I need more training on implementing specific teaching or learning strategies with ICT</td>
<td>18.4</td>
<td>30.0</td>
<td>28.6</td>
<td>23.1</td>
</tr>
<tr>
<td>Lack of school vision or goals for integration</td>
<td>22.4</td>
<td>20.0</td>
<td>25.0</td>
<td>22.4</td>
</tr>
<tr>
<td>Lack of a network of teachers already integrating ICT</td>
<td>23.7</td>
<td>23.3</td>
<td>10.7</td>
<td>20.9</td>
</tr>
<tr>
<td>Not enough curriculum-related software to entice teachers</td>
<td>21.1</td>
<td>16.7</td>
<td>21.4</td>
<td>20.2</td>
</tr>
<tr>
<td>I am not knowledgeable enough about all subject/discipline areas to provide instructional support</td>
<td>6.6</td>
<td>16.7</td>
<td>25.0</td>
<td>12.7</td>
</tr>
<tr>
<td>I need more training on adult learning or effective staff development practices</td>
<td>13.2</td>
<td>10.0</td>
<td>14.3</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Note. Each participant could choose as many barriers as applied to their situations.

An option was provided for participants to write in a barrier that was not listed as a choice in these two items. A total of 33 participants wrote their own response. Responses were analyzed and similar responses were aggregated. Table 26 shows the barriers that were listed more than once, by frequency, written-in by participants.

### Table 26
Most Frequently Listed Write-In Instructional Support Barriers Listed by Frequency

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers lack time to use ICT</td>
<td>9</td>
</tr>
<tr>
<td>Little demand for instructional support due to poor facilities or infrastructure</td>
<td>5</td>
</tr>
<tr>
<td>Participants don’t have time to provide instructional support</td>
<td>5</td>
</tr>
<tr>
<td>Lack of administrative support</td>
<td>3</td>
</tr>
<tr>
<td>Teachers are less likely to use ICT due to increased test score pressure</td>
<td>3</td>
</tr>
<tr>
<td>Participants not included in teacher planning process</td>
<td>2</td>
</tr>
</tbody>
</table>
Consistent with the survey findings, focus group participants agreed the technical support burden was the greatest factor preventing more instructional support. One participant said, “The [coordinator] should be an instructional designer and a learning strategist and a leader/manager of staff development programs. The techie role has to go away for this to happen.” Another participant, agreeing with the importance of instructional support, offered a possible way to achieve it:

For me, the ideal role for [the coordinator] is to do basic troubleshooting, have time to repair equipment and/or write work-orders for equipment repair, and give teachers/staff instructional support. At least 50% of the time should be on instructional support. If that number ever drops below 50% (in my case it's probably only 15% or so) then an additional [coordinator] is needed.

Instructional Support Enablers. Items 24 and 25 of the questionnaire were designed to gather coordinators’ perceptions of the factors that enable them to provide the level of instructional support they currently provide. They were asked to circle each of the 18 responses that described their situation. Table 27 shows the percentage of participants reporting each enabling factor.
Table 27  
Percentage of Participants Reporting Each Instructional Support Enabler by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am knowledgeable in all subject areas</td>
<td>55.3</td>
<td>33.3</td>
<td>35.7</td>
<td>46.3</td>
</tr>
<tr>
<td>I am well organized</td>
<td>46.1</td>
<td>50.0</td>
<td>42.9</td>
<td>46.3</td>
</tr>
<tr>
<td>I am knowledgeable about curriculum specific software</td>
<td>55.3</td>
<td>30.0</td>
<td>32.1</td>
<td>44.8</td>
</tr>
<tr>
<td>I know about implementing specific teaching/learning strategies using ICT</td>
<td>44.7</td>
<td>46.7</td>
<td>32.1</td>
<td>42.5</td>
</tr>
<tr>
<td>Teachers are interested in using ICT</td>
<td>34.2</td>
<td>43.3</td>
<td>35.7</td>
<td>36.6</td>
</tr>
<tr>
<td>I know about curriculum-related hardware</td>
<td>38.2</td>
<td>33.3</td>
<td>28.6</td>
<td>35.1</td>
</tr>
<tr>
<td>My school has a network of teachers already integrating ICT to help with instructional support</td>
<td>29.0</td>
<td>33.3</td>
<td>50.0</td>
<td>34.3</td>
</tr>
<tr>
<td>I know about adult learning/effective staff development practices</td>
<td>29.0</td>
<td>36.7</td>
<td>25.7</td>
<td>32.1</td>
</tr>
<tr>
<td>Our school has enough hardware to entice teachers to use ICT with students</td>
<td>27.6</td>
<td>33.3</td>
<td>28.6</td>
<td>29.1</td>
</tr>
<tr>
<td>Our school has a vision for ICT</td>
<td>15.8</td>
<td>43.3</td>
<td>50.0</td>
<td>29.1</td>
</tr>
<tr>
<td>Our school has enough curriculum-related software</td>
<td>27.6</td>
<td>33.3</td>
<td>28.6</td>
<td>29.1</td>
</tr>
<tr>
<td>My administration expects teachers to seek instructional support from me</td>
<td>19.7</td>
<td>26.7</td>
<td>25.0</td>
<td>22.4</td>
</tr>
<tr>
<td>My instructional support duties are a priority to my administration</td>
<td>10.5</td>
<td>13.3</td>
<td>10.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Help from one or more other coordinators at my school</td>
<td>6.6</td>
<td>10.0</td>
<td>25.0</td>
<td>11.2</td>
</tr>
<tr>
<td>A good staff development program</td>
<td>5.3</td>
<td>16.7</td>
<td>14.3</td>
<td>9.7</td>
</tr>
<tr>
<td>I can work for extra pay or a work a flexible schedule</td>
<td>7.9</td>
<td>10.0</td>
<td>10.7</td>
<td>9.0</td>
</tr>
<tr>
<td>Instructional support is a priority over technical support to me</td>
<td>4.0</td>
<td>10.0</td>
<td>17.9</td>
<td>8.2</td>
</tr>
<tr>
<td>I have opportunities to work extra days</td>
<td>7.9</td>
<td>3.3</td>
<td>3.6</td>
<td>6.0</td>
</tr>
</tbody>
</table>

The final choice in item 25 provided space for participants to write in any perceived enabling factors not previously listed in the item. Four participants entered a response. Each response occurred only once. The first response was, “Teachers are persuading their peers to teach with technology more often.” Another response was, “I model lessons for non-tech teachers.” In a similar vein, a third participant wrote, “I follow-up on teachers
teaching a tech lesson for the first time.” The final response was, “I co-teach lessons with teachers the first time they use technology.”

Instructional Support Analysis. In item 43 of the questionnaire participants reported the percentage of time they spent providing instructional support. The mean percentage of time all participants reported spending on instructional support tasks was 8.5. On the other hand, they reported desiring to spend 24.1% of their time on such tasks. The correlation between the time spent providing instructional support and the number of barriers to instructional support was weak and not significant. An analysis using Pearson’s correlation coefficient supported this observation, $r(96) = -.169$, $p = .097$. However, the relationship between time spent providing instructional support and the number of enabling factors a participant perceived was positive and statistically significant, $r(96) = .257$, $p = .011$. As the number of perceived enabling factors increase so does the percentage of time participants reported spending on instructional support.

Aside from barriers and enabling factors, there is a significant and positive relationship between the number of years a participant reported being a technology coordinator, whether full or part time, and the percentage of time they reported spending providing instructional support. An analysis using Pearson’s correlation coefficient support this observation, $r(96) = .292$, $p = .004$.

Instructional Support Strategies. Item 37 of the questionnaire asked participants to rank the strategies they used to provide instructional support. Participants were asked if they did not use a strategy, if they used the strategy sometimes, often, or quite often. Each response was scored from a zero to a three. A response indicating no usage was scored as a zero and a response indicating a strategy was used quite often was scored as a three.
Mean usage scores were calculated for each instructional support strategy. Table 28 shows the three strategies by school level and ranked in descending order of reported usage.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finding resources for teachers</td>
<td>1.6</td>
<td>2.0</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Creating online resources for teachers</td>
<td>1.4</td>
<td>1.2</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Model lesson creation</td>
<td>0.7</td>
<td>0.7</td>
<td>0.3</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Note. Scores range from 0 to 3; higher scores indicate greater usage.

Part 5: Barriers and Enabling Conditions to Staff Development

This section presents the (a) reported barriers to providing staff development, (b) the conditions that coordinators reported enable them to provide staff development, (c) an analysis of the number of barriers and enabling conditions broken down by the percentage of hours coordinators reported spending on staff development, and (d) strategies coordinators reported using to conduct staff development. Data from the focus group sessions related to staff development are integrated with the data gathered from the questionnaire.

Staff Development Barriers. Items 27 and 28 of the questionnaire asked participants to circle each factor they perceived as a barrier to providing a higher level of staff
development than they currently provided. One of the choices was “I do not perceive any barriers to providing staff development.” A total of 18 participants (13%) responded that they did not perceive any staff development barriers. There were 12 factors listed between these two items. Table 29 shows each barrier and the percentage of participants circling them, by school level.

Table 29
Percentage of Reporting Each Staff Development (SD) Barrier by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD program is not given enough time or resources to improve ICT integration</td>
<td>67.1</td>
<td>60.0</td>
<td>57.1</td>
<td>63.4</td>
</tr>
<tr>
<td>SD program doesn't include teacher practice of skills learned with feedback</td>
<td>52.6</td>
<td>46.7</td>
<td>57.1</td>
<td>52.2</td>
</tr>
<tr>
<td>Teachers don't work as teams in our SD program</td>
<td>40.8</td>
<td>36.7</td>
<td>46.4</td>
<td>41.0</td>
</tr>
<tr>
<td>SD program doesn't give teachers enough knowledge to implement ICT effectively</td>
<td>30.1</td>
<td>33.3</td>
<td>32.1</td>
<td>31.3</td>
</tr>
<tr>
<td>Our program doesn't gather data to determine priorities or monitor progress</td>
<td>23.7</td>
<td>33.3</td>
<td>35.7</td>
<td>28.4</td>
</tr>
<tr>
<td>Our program doesn't help teachers differentiate learning or assess student progress</td>
<td>27.6</td>
<td>23.3</td>
<td>21.4</td>
<td>25.4</td>
</tr>
<tr>
<td>We cannot provide data showing impact on the community or the students</td>
<td>19.7</td>
<td>30.0</td>
<td>32.1</td>
<td>24.6</td>
</tr>
<tr>
<td>Our program doesn't enable teachers to use ICT to involve parents</td>
<td>27.6</td>
<td>16.7</td>
<td>14.3</td>
<td>22.4</td>
</tr>
<tr>
<td>Our program doesn't develop ICT teacher leaders</td>
<td>23.7</td>
<td>10.0</td>
<td>21.4</td>
<td>20.2</td>
</tr>
<tr>
<td>Our program doesn't include research-based methods or activities</td>
<td>17.1</td>
<td>20.0</td>
<td>14.3</td>
<td>17.2</td>
</tr>
<tr>
<td>Our SD program doesn't use adult learning principals and a variety of learning processes</td>
<td>11.8</td>
<td>10.0</td>
<td>14.3</td>
<td>12.0</td>
</tr>
<tr>
<td>Our SD program is not aligned to our school goals</td>
<td>11.8</td>
<td>6.7</td>
<td>14.3</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Several of the participants wrote in that time was a barrier to staff development. Since this was a choice listed in the item, it was not listed in the table of other responses. The 10 ‘other’ responses that participants wrote in for this item are shown in Table 30.
Table 30

Write-In Staff Development Barriers Listed by Frequency

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of administrative support for ICT staff development</td>
<td>4</td>
</tr>
<tr>
<td>My technical support duties take precedence</td>
<td>2</td>
</tr>
<tr>
<td>Teachers are not required to attend ICT staff development</td>
<td>2</td>
</tr>
<tr>
<td>Too much one-shot training</td>
<td>1</td>
</tr>
<tr>
<td>Lack of upgraded computers in classrooms</td>
<td>1</td>
</tr>
</tbody>
</table>

Consistent with survey data, focus group participants felt the major barrier to staff development was a lack of scheduled staff development time. Participants agreed that school administrators had to be the people driving the staff development schedule. Opinions on what such a schedule would look like were widely divergent. Some participants felt that there should be staff development scheduled every day and that teachers should have to attend a session once a week. Others advocated for a monthly staff development of at least one hour in length for each teacher. A few felt that there should be time set aside during each of the four district designated staff development days.

**Staff Development Enablers.** Participants were asked in items 29 and 30 to circle each factor they perceived as enabling them to provide the level of staff development they were currently providing. Table 31 shows the percentage reporting each enabler by school level.
### Table 31
Percentage Reporting Each Staff Development (SD) Enabler by School Level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our SD program is aligned to our school goals</td>
<td>22.4</td>
<td>50.0</td>
<td>32.1</td>
<td>30.6</td>
</tr>
<tr>
<td>Our SD program enables teachers to integrate ICT</td>
<td>25.0</td>
<td>23.3</td>
<td>35.7</td>
<td>26.9</td>
</tr>
<tr>
<td>Our program gives teachers chances to learn in teams or groups</td>
<td>21.1</td>
<td>36.7</td>
<td>21.4</td>
<td>24.6</td>
</tr>
<tr>
<td>Our SD program gives teachers chances to practice new skills with feedback until those skills are habitual</td>
<td>21.1</td>
<td>36.7</td>
<td>7.1</td>
<td>21.6</td>
</tr>
<tr>
<td>Our SD program enables our teachers to reach out to parents using ICT to involve them</td>
<td>11.8</td>
<td>33.3</td>
<td>28.6</td>
<td>20.2</td>
</tr>
<tr>
<td>Our program develops teacher ICT leaders</td>
<td>13.2</td>
<td>30.0</td>
<td>25.0</td>
<td>19.4</td>
</tr>
<tr>
<td>We gather data from teachers/students to determine priorities and monitor progress</td>
<td>27.6</td>
<td>6.7</td>
<td>10.7</td>
<td>19.4</td>
</tr>
<tr>
<td>Our program provides teachers with instructional methods/activities based on research</td>
<td>17.1</td>
<td>20.0</td>
<td>25.0</td>
<td>19.4</td>
</tr>
<tr>
<td>Our program enables teachers to differentiate instruction and assess learning with ICT</td>
<td>11.8</td>
<td>23.3</td>
<td>14.3</td>
<td>14.9</td>
</tr>
<tr>
<td>Our program is given enough time and resources</td>
<td>10.5</td>
<td>3.3</td>
<td>17.9</td>
<td>10.5</td>
</tr>
<tr>
<td>Our program can provide data showing an impact on the school community and students</td>
<td>5.3</td>
<td>10.0</td>
<td>3.6</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Staff Development Analysis.** The mean time participants reported spending on staff development in item 42 of the questionnaire was examined in relationship to the total number of barriers and enabling factors reported. Additionally, the number of enabling factors reported was analyzed in relationship to the number of years a participant served as a coordinator at their current school, overall time as a coordinator, and number of years as a classroom teacher before becoming a coordinator. The percentage of time a participant reported spending on staff development had no relationship to the number of barriers they reported. This observation is supported by a correlation analysis, $r(127) = -.106$, $p = .306$. The percentage of time participants reported spending on staff development also had no relationship to the number of enabling factors they reported,
\[ r(91) = .146, p = .164. \] The number of enabling factors reported by participants had no relationship to the number of years they reported serving as coordinator at their current school, \[ r(125) = .146, p = .102. \] Also, the number of enabling factors reported by participants had no relationship to the total number of years participants reported spending as a coordinator, \[ r(125) = .122, p = .127. \] Finally, the number of enabling factors to staff development had no relationship to the number of years a participant reported serving as a classroom teacher, \[ r(124) = -.084, p = .350. \]

**Staff Development Strategies.** Item 37 on the questionnaire asked participants to rank the seven strategies they used for staff development. Participants were asked if they did not use a strategy, if they used the strategy sometimes, often, or quite often. These responses were assigned a value ranging from zero for non-use to three for quite often. The mean usage of each strategy was calculated by school level of the participant. The strategy that was most often reported by all participants was individual training with a mean usage score of 2.3 out of 3. The least used strategy was observing lessons and providing feedback to the teachers of those lessons with a mean usage score of 0.4 out of 3. Table 32 shows the mean values for all strategies by school level and ranked ordered from most used to least used.
Table 32

Mean Staff Development Strategy Usage Score by School Level

<table>
<thead>
<tr>
<th>Strategy</th>
<th>ES</th>
<th>MS</th>
<th>HS</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual training</td>
<td>2.4</td>
<td>2.2</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Small group training</td>
<td>1.9</td>
<td>2.1</td>
<td>1.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Large group training</td>
<td>2.0</td>
<td>1.9</td>
<td>1.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Mentoring one or more teachers</td>
<td>1.3</td>
<td>1.4</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Integrated lesson modeling</td>
<td>0.9</td>
<td>0.8</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>One computer classroom training</td>
<td>0.6</td>
<td>1.1</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td>Observing lessons and providing feedback</td>
<td>0.3</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Note. Scores range from 0 to 3; higher scores indicate greater usage.

Part 6: Relationship Between Selected Technical Support Conditions and Instructional Support

This section of the chapter presents the results of a step-wise multiple regression analysis of the relationship between the number of computer users a coordinator supports, the number of networked learning programs a coordinator supports, the number of computers a coordinator supports, and the percentage of hours of instructional support provided by a technology coordinator. Cases with missing values were excluded from this analysis listwise, resulting in 90 usable cases.

The dependent variable is the reported percentage of hours of instructional support provided. The first independent variable is the number of computer users a participant reported supporting. The second independent variable is the number of networked
learning programs the participant reported supporting. The third independent variable is the number of computers a participant reported supporting. Table 33 shows the correlations and descriptive statistics for this analysis.

Table 33

<table>
<thead>
<tr>
<th>Variables</th>
<th>Percentage of Hours</th>
<th>Number of Users</th>
<th>Networked Programs</th>
<th>Number of Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Users</td>
<td>Pearson r</td>
<td>-.171</td>
<td>1.000</td>
<td>.033</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.053</td>
<td></td>
<td>.380</td>
</tr>
<tr>
<td>Networked Programs</td>
<td>Pearson r</td>
<td>-.187</td>
<td>.033</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.039</td>
<td>.380</td>
<td></td>
</tr>
<tr>
<td>Num. Computers</td>
<td>Pearson r</td>
<td>-.260</td>
<td>.427</td>
<td>.329</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.007</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td>MEAN</td>
<td></td>
<td>8.40</td>
<td>1711.80</td>
<td>4.99</td>
</tr>
<tr>
<td>STDEV</td>
<td></td>
<td>6.19</td>
<td>693.05</td>
<td>3.57</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

Note. Significance values are 1-tailed.
Using an entry criteria of less than or equal to .05, only the third independent variable significantly explained the dependent variable. The number of computers a participant reported supporting had a significant relationship to the percentage of time spent providing instructional support, $b = -8.38$, $t(86) = -2.52$, $p = .013$. As the number of computers increased, the time spent providing instructional support decreased. The number of computers supported also explained a significant proportion of variance in the percentage of instructional support provided, $R^2 = .068$, $F(1, 88) = 6.37$, $p = .013$. Although the correlation between the number of computers supported and instructional support time is significant, the proportion of variance explained is small at just under seven percent.

Part 7: Relationship Between Coordinator Perceptions and Instructional Support

This section of the chapter presents the results of a step-wise multiple regression analysis of the relationship between perceived homophily, the perceived role of the technology coordinator, the perceived role expectation of the supervisor, and the percentage of hours of instructional support provided by a technology coordinator. Cases with missing values were excluded from this analysis listwise, resulting in 88 usable cases.

The dependent variable is the reported percentage of hours of instructional support provided. The first independent variable is perceived homophily. The second independent variable is the participant’s perception of his or her role as a technology coordinator. The third independent variable is the participant’s perceived role expectation of his or her
supervisor. Both perceived role and perceived role expectation are based on a seven-point continuum ranging from instructional support to technical support. Table 34 shows the correlations and descriptive statistics for this analysis.

Table 34

Effect of Homophily, Role Orientation, and Perceived Role Expectation on Hours of Instructional Support

<table>
<thead>
<tr>
<th>Variables</th>
<th>Instructional Support</th>
<th>Homophily</th>
<th>Role Orientation</th>
<th>Role Expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homophily</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson $r$</td>
<td>-.156</td>
<td>1.000</td>
<td>-.214</td>
<td>-.107</td>
</tr>
<tr>
<td>Sig.</td>
<td>.073</td>
<td>.023</td>
<td>.160</td>
<td></td>
</tr>
<tr>
<td>Role Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson $r$</td>
<td>-.218</td>
<td>-.214</td>
<td>1.000</td>
<td>.446</td>
</tr>
<tr>
<td>Sig.</td>
<td>.021</td>
<td>.023</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Role Expectation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson $r$</td>
<td>-.242</td>
<td>-.107</td>
<td>.446</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig.</td>
<td>.012</td>
<td>.160</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>8.81</td>
<td>17.07</td>
<td>4.06</td>
<td>4.89</td>
</tr>
<tr>
<td>STDEV</td>
<td>6.29</td>
<td>2.94</td>
<td>2.06</td>
<td>1.87</td>
</tr>
<tr>
<td>N</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
</tr>
</tbody>
</table>

Note. Significance values are 1-tailed.
Using an entry criteria of less than or equal to .05, only perceived role expectation significantly explained the percentage of hours spent on instructional support. The participants perception of his or her supervisor’s role expectation explained the percentage of time spent providing instructional support, \( b = -.813, t(84) = -2.31, p = .023 \). As supervisors role expectation toward technical support increased, the percentage of time coordinators reported providing instructional support decreased. The perceived role expectation also explained a significant proportion of variance in the percentage of instructional support provided, \( R^2 = .059, F(1, 86) = 5.35, p = .023 \). Although significant, the proportion of variance explained is small at just under six percent.
CHAPTER 5

DISCUSSION

The findings of this research are discussed in five parts. Key findings are discussed and compared to prior research in Part 1. In Part 2, the implications of the findings are examined for those involved in the management and implementation of information and communications technologies (ICT) in schools. Part 3 contains recommendations for implementation of the coordinator position. The limitations of the present study are presented in Part 4. Suggestions for further research are provided in Part 5.

Part 1: Discussion of Results

This part of the chapter is broken into six sections, one for each of the overarching findings of the study. First, the historical context of the site-based technology coordinator position will be introduced. Second, the competing priorities and expectations of the position will be discussed. Third, the issue of time will be considered. Fourth, factors impacting technical support, arranged on a continuum, will be presented. Fifth, factors impacting instructional support, arranged on a continuum, will be presented. Finally, sixth, factors impacting staff development, arranged on a continuum, will be presented.
Context

Each secondary school in the district studied had one full-time technology coordinator. Elementary schools also had a technology coordinator, but they typically shared their coordinator with another school. In rare cases elementary coordinators covered more than two schools. The coordinators were all certified teachers with experience using technology as an educational tool. The school district chose to place teachers in these positions so that the coordinators could leverage their experience in the classroom to help other teachers use technology. Another reason teachers were placed in these positions was to keep a learning-focused orientation to the use of information and communication technologies (ICT) in the schools. When the position was created the goal was to have a licensed teacher on hand to primarily provide staff development and instructional support. The coordinator was to provide what the district termed “level one” technical support. This term was used to mean fixing problems that could be easily fixed in a few minutes and calling for technical support for more difficult problems.

Findings suggest that the promise of having a coordinator on site to provide instructional support and staff development has yet to be fully realized. Indeed, as the results of this study show, coordinators are mired in technical support tasks. While most coordinators attempt to provide as much staff development and instructional support as possible, many systemic problems hinder their attempts to do so.

Competing Priorities and Expectations

While the original purpose of the position was to provide teachers with staff development and instructional support, actual coordinator practice shows an emphasis on
technical support. One of the possible reasons for this may be found in the reported role orientation of participants and the perceived expectation of their administrative supervisors. The orientations are on a seven-point continuum from technical support, to neutral, to instructional support. Participants in this study reported a mixed orientation to their role. However, participants at all levels reported a perceived expectation that their administration expected them to focus primarily on technical support. Table 35 shows the primary role orientation of participants by school level and the percentage reporting that orientation. The table also shows the perceived administrative expectation and the percentage of coordinators reporting that perception by level.

Table 35
Participant Support Orientations and Perceived Support Expectations by School Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Self Orientation</th>
<th>Perceived Role Expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>Instructional Support (49%)</td>
<td>Technical Support (61%)</td>
</tr>
<tr>
<td>Middle</td>
<td>Balanced</td>
<td>Technical Support (45%)</td>
</tr>
<tr>
<td>High</td>
<td>Technical Support (60%)</td>
<td>Technical Support (72%)</td>
</tr>
</tbody>
</table>

Note. The remaining responses in each category were either neutral or for the opposite orientation.

The only sub-group of participants to report an orientation towards instructional support was elementary school coordinators. However, quantitative data provide evidence that the perceived expectation of the administration may explain time expenditure. Therefore, since administrators at all levels are perceived to expect
coordinators to provide technical support at the expense of instructional support, coordinators naturally follow suit. But, administrator expectation explains a small portion of the time spent by coordinators.

Spending a large percentage of time on technical support tasks is a trend supported in the literature. Strudler et al. (2005) found that the percentage of time spent on installing, troubleshooting, and maintaining hardware and software increased from 29.6% in 1999 to about 60% in 2004. The current study found that participants report spending just over 62% of their time on technical support tasks in 2005, lending credence to the trend.

Focus group discussions further illuminated this trend by providing a possible explanation for the amount of time spent on technical support. Participants noted that the reason for the increases in time spent in this area is the increase in the number of reported technical problems. According to this logic, teachers are reporting technical issues now they may have overlooked in the past because in the past they weren’t required to use ICT. However, ICT usage is now expected for many aspects of a teacher’s job, such as grade reporting and attendance. Technical glitches cannot be overlooked now because the teachers must use the technology. Additionally, focus group discussions also teased out a new phenomenon, which the researcher will call “technology proliferation.” Technology proliferation is the concept that more and more of what is done in schools is reliant on the use of ICT. The typical coordinator reported supporting 4.7 networked learning programs. These are programs that are used for language arts and mathematics instruction, primarily. If there is a technical issue with a computer, and a teacher is using one of these programs, it probably means that one or more students are unable to make use of the program and will not get the full advantage of participating in the lesson. If
there is a problem with the program itself, it means that entire classes of students may not be able to take part in the intended lesson. Perhaps this is why focus group participants listed troubleshooting or restoring access to network-based programs in the urgent and important quadrant of the time management matrix. Under such circumstances it is no wonder coordinators spend such a large percentage of their time on technical support and find it difficult to break away from those tasks.

While participants are indeed spending a large portion of their time on technical support, this fact is contrary to the original intent of the position and to the position description itself. Coordinators were originally expected to provide level one technical support, and request help for an issue if it takes more than a few minutes of their time. Being the first responder to a mean of 284 computers at the elementary level, 393 computers at the middle school level, and 573 computers at the high school level may mean the concept of “level one” support needs to be re-thought.

A final possible contributing factor to the reason why participants find it hard to break away from their technical support role may come from diffusion theory. Participants at all levels reported a certain level of homophily with their comrades in the classroom. While the data do not support homophily as a statistically significant way of explaining the time coordinators spend, it seems logical. As former classroom teachers themselves, coordinators can easily understand the immediate need for technical issues to be resolved. Being homophilous with teachers would engender a certain empathy and motivation to fix the issue as soon as possible. However, homophily is likely to be a significant factor in instructional support, if the technical support burden is reduced enough to allow coordinators to shift their focus.
Actual and Desired Time Expenditure

Coordinators at all levels reported not having enough time to provide technical support, staff development, or instructional support. Both survey and focus group data confirm that there is a time crunch. Indeed, greater than 60% of participants reported disagreeing that they had enough time in each of those areas. The time crunch phenomenon was widely reported at each level, as shown in table 36.

Table 36
Percentage Reporting Not Enough Time to Perform Technical Support (TS), Instructional Support (IS), and Staff Development (SD) by School Level

<table>
<thead>
<tr>
<th>Level</th>
<th>TS</th>
<th>IS</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School</td>
<td>61%</td>
<td>76%</td>
<td>69%</td>
</tr>
<tr>
<td>Middle School</td>
<td>64%</td>
<td>74%</td>
<td>70%</td>
</tr>
<tr>
<td>High School</td>
<td>79%</td>
<td>71%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Other data support the notion that there is a time crunch affecting the performance of quality services by participants of this study. Not having extra workdays beyond the regular teachers’ contract year was the single most reported barrier to technical support (78%) and the third most reported barrier to instructional support (42%).

Reported actual and desired time expenditures provide additional support for this time crunch phenomenon. Participants were asked to report the percentage of their time they actually spent during a typical month on various tasks. They were also asked to report the
The percentage of time coordinators desire to spend on the major functions of the position appear more in line with the original job description and intent for the role of the site-based coordinator. Obtaining the time for increased instructional support and staff development would clearly require a reduction in the amount of time spent on technical support. It may also require other system-wide changes to permit the increased staff development time.

The literature supports the importance of quality support because of its impact on the frequency, variety, and increased use of technology in the classroom (Dexter, Anderson,
& Ronnkvist, 2002). Quality support includes access to one-on-one personal guidance and help, frequent teacher participation in ICT staff development, staff development focused on instruction and integration, as well as access to functioning technology (Dexter et al., 2002).

This sort of quality support is currently not being provided in the population studied because of the emphasis on technical support. Another way to look at the use of time is to examine how the coordinators prioritize their time. A tool for doing this is Covey’s Time Management Matrix (Covey, 1989). Most technical support tasks fall into Quadrant I, tasks that are urgent and important. One focus group participant stated that most of the time coordinators spend would probably continue to be focused on urgent and important tasks as long as the role was focused on technical support. However, Covey points out that spending most of your time in Quadrant I is not efficient. He recommends spending as much time in Quadrant II tasks, important and not urgent, as possible. Most instructional support and staff development tasks fit into Quadrant II.

Barriers and Enabling Conditions to Technical Support

The presence of quality support has been shown to be a significant predictor of teacher use of technology with students (Dexter et al., 2002). Data analyses by Dexter et al. (2002) also demonstrate that quality support can be a significant predictor of teacher professional use of technology. While the job description of coordinators studied indicates their role is intended to be more instructional and less technical in nature, quality technical support is clearly important.
The Technology Support Index (TSI), created by the International Society for Technology in Education (ISTE), lends credence to the importance of quality technical support. The TSI recommends a ratio of one technician to every 75 computers in a school (International Society for Technology in Education, 2005). A similar ratio is common in business and industry. A ratio of one technician to every 50 computers is supposedly the norm in the private sector (National Center for Education Statistics, 2003). To discuss quality technical support, it is useful to compare the TSI’s recommendation with the conditions reported by participants in this study. The present study did not gather data on the number of technicians available for technical support. However, the fact that coordinators report spending more than 60% of their time on technical support logically indicates a lack of technicians. If coordinators are considered as level one technical support providers, and the data clearly show them functioning as technicians much of the time, the TSI would call for more technicians or more coordinators at each school. At the elementary school level the data indicate there is one coordinator for every 284 computers. At the middle school level this ratio goes up to 1:393, and then 1:573 at the high school level. Using the TSI’s recommendations, there should be nearly three times as many technicians to support ICT in elementary schools as there are elementary school level coordinators. The TSI recommendations would also call for four times as many technicians to support ICT in middle schools as there are middle school coordinators, and six times as many technicians for high school support as there are high school coordinators. It is clearly unlikely that such an increase in personnel would be funded, but it would seem that an increase in staff dedicated to providing technical support is justified.
The data and subsequent analyses do not show a clear reason why some coordinators report having enough time for technical support while most do not. Perhaps those spending less time on technical support are simply more efficient or are more technically knowledgeable than their peers. Further research on the strategies and systems used by coordinators to enable them to perform instructional support and staff development is needed.

In addition to time, participants reported the numbers of barriers and enabling factors they perceived to providing technical support. The number of reported barriers to providing technical support had a greater relationship to time reported spent on technical support than the number of enabling factors reported. The number of reported barriers a coordinator reported had a moderate and statistically significant relationship to coordinators' perceptions of having enough time to provide technical support. This observation is supported by a correlation analysis, \( r(128) = .441, p = .000 \). Thus, as the number of reported barriers increased, the perception of not having enough time also increased. However, the number of enabling factors reported did not have the same association with the perception of having enough time to provide technical support. This observation is supported by a correlation analysis, \( r(129) = .052, p = .555 \). Indeed, the number of perceived enabling factors to technical support had no relationship to the perception of having enough time to provide technical support.

This analysis of technical support barriers and enabling conditions seems to suggest that the presence of enabling factors is not mitigating the perceived barriers to technical support. The pressure to perform technical support seems to be so great that even a combined effect of multiple enabling factors does not result in the perception of having
sufficient time. In effect, coordinators are so busy satisfying the most pressing demands, keeping everything functioning, that the presence of enabling factors may not be apparent.

The only other factor found to be associated with the amount of time spent on technical support is the role orientation of the participant. Participants reported their orientation to the job on a continuum from instructional support to technical support. Those reporting a greater orientation toward technical support also reported spending more time providing technical support. This is supported by a Pearson correlation analysis, $r(93) = .213, p = .039$.

Barriers and Enabling Conditions to Instructional Support

Data indicate that six factors are positively associated with the amount of time spent providing instructional support: (a) total number of years as a coordinator, (b) number of enablers to instructional support reported, (c) number of barriers to instructional support reported, (d) the number of computers supported, (e) the perceived expectation of the supervisor, and (f) the role orientation of the coordinator. Each of these factors are discussed below.

The total number of years a participant reported serving as a coordinator, whether those years were spent full time in that role or as a part time duty, had a moderate but significant relationship to the amount of time a person reported spending on instructional support. This conclusion is based upon a Pearson correlation analysis, $r(95) = .256, p = .011$. The results of this analysis show that as the number of years of experience as a
coordinator increased, so did the amount of time participants reported spending on instructional support.

In addition to years of experience, the number of enablers to instructional support reported also had a moderate but significant relationship to the amount of time a participant reported spending on instructional support. A correlation analysis supports this position, \( r(93) = .235, p = .022 \). As the number of enablers increase, so do the number of hours spent on instructional support.

Barriers to instructional support also have a significant relationship to the percentage of time a participant reported spending on instructional support. This conclusion is supported by a correlation analysis, \( r(95) = -.250, p = .013 \). As the number of barriers reported increased, the percentage of time reportedly spent providing instructional support decreased.

The total number of computers a coordinator reported supporting also had a significant relationship to the percentage of time reportedly spent providing instructional support. Research question six was answered by a multiple regression analysis of the relationship between the number of users supported, the number of networked learning programs supported, the number of computers supported, and the percentage of time participants reported spending providing instructional support. The results of the analysis showed that only the number of computers significantly explained the amount of time spent on instructional support, \( b = -8.38, r(86) = -2.52, p = .013 \). While the effect was statistically significant, the proportion of variance explained was small at just under seven percent, \( R^2 = .068, F(1, 88) = 6.37, p = .013 \).
The participants’ perception of his or her supervisor’s role expectation was significantly associated with the percentage of time spent providing instructional support, $b = .813$, $r(84) = -2.31$, $p = .023$. The perceived role expectation also explained a significant proportion of variance in the time spent, $R^2 = .059$, $F(1, 86) = 5.35$, $p = .023$. Although significant, the proportion of variance explained is small at just under six percent.

The participants’ orientation toward doing the job of coordinator was significantly associated with the percentage of time spent providing instructional support. A Pearson correlation analysis supports this conclusion, $r(93) = -.205$, $p = .046$. Participants reporting a greater orientation toward technical support spent less time on instructional support. Although this relationship is statistically significant, the relationship is weak. However, coordinator orientation to the job, on a continuum from instructional support to technical support, does explain some of the way they reported spending their time. Perhaps some people who are more interested in the technical aspect of the job are attracted to it. This supports the need for a paradigm shift in the orientation of the position.

It appears from these findings that enabling quality instructional support is complex and requires the involvement of multiple people—but it is possible. Instructional support appears to be a function of an experienced coordinator working with supportive school administrators to create a suitable climate for technology integration in conjunction with a reduced technical support burden. It may be that the experience of a coordinator may be compensated for or enhanced by training—this is a question for future research—but many elements of a school’s climate for instructional support appear to be beyond the
coordinator's influence. The implications seem to show a need for administrators to be trained regarding their role in enabling instructional support and reducing the technical support burden. District level technical support can be used to reduce the technical support burden as well.

Barriers and Enabling Conditions to Staff Development

What variables describe those who provide the most staff development in this study? It is an interesting finding that there is no relationship, based on Pearson correlation analyses, between a wide variety of factors and the percentage of time participants reported spending on staff development. Those factors include mean number of computers supported, mean number of networked programs supported, mean number of people supported, mean number of coordinators in a school, perceived homophily, mean number of years as a coordinator, mean number of enabling factors, and mean number of barriers reported to staff development.

The only factors that had a relationship to the percentage of hours a coordinator reported spending on staff development were the number of staff development strategies the coordinator reported using. This is supported by a correlation analysis, \( r(90) = .296, p = .004 \). This moderate, but significant relationship shows that the more staff development strategies coordinators reported using the more time they spent providing staff development. This finding seems logical, though it was beyond the scope of this study to explore the factors influencing the number of staff development strategies used. However, based on focus group discussions it is perhaps reasonable to point out that staff development schedules are often not made by coordinators; they are made by
administrators. Most coordinators reported desiring to spend more time on staff development tasks, but focus group discussions showed frustration at the lack of scheduled ICT staff development.

Part 2: Implications

Recent research shows that school-level technology coordinators are facing greater pressure as time goes on to focus on technical support (Strudler et al., 2005). The literature supports the findings of this study, which show that coordinators are experiencing a time crunch that is mostly due to technology proliferation. Related to these factors is the finding that the majority of coordinators report having an orientation to their job towards technical support tasks, or one that is neutral between technical support and instructional support tasks. Additionally, it is perceived that administrators expect coordinators to place technical support tasks at a higher priority to other tasks. It is not known whether the overwhelming burden of technical support has caused these paradigms to exist or not, but the burden of providing technical support to such a large number of computers combined with technical support role orientations appears pervasive.

The literature on sustaining the innovative uses of ICT in schools can inform the reform of the coordinator position and the entire support paradigm currently in place. In their study on sustainability and transferability of instructional reforms using ICT, Korbak and Espinoza (2003), found:

Systemic factors that were most mentioned included: funding, shared vision; strong leadership that is shared with teachers; public and private

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sector partnerships; professional development that is institutionalized and extensive; high quality technical and instructional support; climate that is supportive of reform efforts; and commitment to exploiting technological capabilities.

Based on these and other findings, providing teachers with quality support, vision, leadership, staff development, and instructional support is necessary to expand and deepen the use of ICT in education. The findings of this study indicate that coordinators perceive the levels of staff development and instructional support as less than optimal, that school-level leadership related to ICT could be improved, and that technical support is increasingly difficult to provide.

Lack of staff ICT knowledge is another implication supported by this study. The development of teachers’ and administrators’ knowledge and abilities with ICT could be increased to reduce technical support and increase the instructional use of ICT with students. For this reason, focus group participants recommended that ISTE standards for ICT be created and adopted district-wide. Such standards would define what teachers and administrators should know and be able to do with ICT and provide a focus for staff development programs. Additionally, such standards would likely have the effect of institutionalizing the staff development role of the coordinator.

Focus group discussions and questionnaire data indicate that many coordinators need staff development designed to help them better perform the management tasks of their position, such as inventory management, technology planning, and running meetings. The data also indicate a need for additional training in the areas of change agentry, instructional design, and providing staff development to adult learners. The literature

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indicates that teachers with a more constructivist orientation to teaching are more likely to make use of ICT in their classrooms (Ravitz, Becker, & Wong, 2000). Preparing coordinators to recognize such teachers and provide them with strategies to help them to teach using technology in their curriculum would likely increase a school’s rate of integration. Such training may also help to change the paradigm of coordinator as technical support person to coordinator as instructional support guru.

The paradigm that exists about the role of the coordinator is largely a matter of goals and vision. Only 29% of participants in the survey agreed that their school had a vision for the use of ICT. Perhaps it is time for the goals and vision related to the site-based technology coordinator to be revisited. If the goal and vision for the position is largely based on providing instructional support and staff development, then data from this study suggest that the ideals of meaningful ICT integration may go unrealized due to technology proliferation and lack of instructional support for teachers.

The role orientation of the coordinator to his or her job is associated to both the amount of time they reported spending on technical support and instructional support. If the goal and vision for the coordinator position is based on providing instructional support, the people chosen to fill the coordinator position may need to be better screened before they are hired. Because the data show the greatest technical support orientation at the secondary school level it is perhaps most important to focus on screening secondary coordinators or on making the instructional support paradigm more clear to that population.

Perhaps the greatest implication of this study is that the ratio of computers to coordinators is too high to enable the desired levels of instructional support. The
Technology Support Index (ISTE, 2005) provides support for this conclusion. Data from this study would support a complete re-evaluation of the site-based coordinator position, especially if the coordinators’ primary purpose is to be instructional support and staff development. Otherwise, the position of site-based technology coordinator is likely to become a technical support provider, according to trends (Strudler et al., 2005). This conclusion is further supported by focus group discussion data. Justifying the use of a teacher in the role of coordinator may be increasingly difficult if the amount of time spent on instructional support and staff development continues to decline.

Part 3: Recommendations

Based on these implications, it is suggested that a change to the paradigm may be needed if the ideal of the coordinator as an on-site staff developer and instructional support provider is to be realized. Findings suggest that the role of the coordinator might be re-defined to its three groups of affiliated people: teachers, administrators, and the coordinators themselves. The researcher has four suggestions for doing this. First the job description could be modified. Second, the technical support structure could be altered. Third, the entire site-based coordinator model could be restructured in such a way that the redesigned system and the strategies it employs ultimately decrease the time coordinators spend on technical support. Fourth, the status of the coordinator position could be altered completely. Each of these options is discussed below.

Perhaps the simplest way to change the paradigm is to change the coordinators’ job description and announce the changes in face-to-face meetings with administrators and coordinators. If this option were implemented, the job description and evaluation rubric
should be changed to specify the primacy of the instructional support role and delineate
the boundaries of the technical support role. Site-based administrators and coordinators
themselves should then explain this new description to teachers in writing and face-to-
face interaction. While changing the job description in such a public way will show the
district’s commitment to the instructional support role, it will not in itself solve the
problem because it will not address the primary root cause—technology proliferation.

While changing the job description and evaluation are very important, failing to
address the technical support issue will likely cause this paradigm shift to fail. Senge
(1990) warns that, “Without systems thinking, the seed of vision falls on harsh soil (p.
12). Thus addressing only the job description will fail because without a systematic
orientation to the problem there will be less than optimal results. Therefore, the
researcher recommends that one of two approaches to restructuring take place. The first
approach is termed the **Dedicated Rover Model**. In this model the current assignment
structure of the coordinators’ would stay in effect to allow for maximum possible staff
development and instructional support. To provide the extra technical support needed
each school would be assigned a dedicated technician. To develop relationships, it might
be best if the technician was the same person each week and that their visits occurred on
a specific schedule. On their assigned days at a particular school, the technician would
work for the coordinator to take care of as many technical issues as possible, image
computers, perform maintenance in computer labs, and lend their technical expertise to
the coordinator however it is needed. High schools might have a dedicated roving
technician two or three days a week, middle schools at least two days a week, and
elementary schools at least once or twice a week. These visits would free up the
coordinator for instructional support tasks much more often and reinforce to administrators and teachers the paradigm of coordinator as instructional support provider.

The Dedicated Rover Model would require an increase in staffing, the cost of which must be measured against the increasingly critical role of ICT in schools.

A second possible approach is called the **Cluster Model**. In this model schools are grouped into clusters of perhaps one high school, two middle schools, and four elementary schools in a cluster. The numbers can be modified as needed. Each school would retain its current coordinator staffing level. One dedicated technician would be added to each cluster to rove to each school in their assigned cluster as needed. Recent high school graduates of district ICT magnet schools could be hired to serve as technicians. Coordinators would be housed at their assigned schools two or three days a week and spend the rest of their time at a location central to the cluster. When not on campus, coordinators would spend their time on instructional design, staff development planning, and online lesson or tutorial creation. Additionally, coordinators would monitor their school networks and use remote management software to fix simple problems and would call the technician to fix more difficult issues. When not on campus, the coordinators could work together on these instructional support tasks and could also go en masse to a single school to provide staff development or complete a large technical support project, such as re-imaging each school at the end of the year. To provide funding for additional cluster-based technicians, the number of coordinators in each cluster could be reduced. In this way, the Cluster Model is the most flexible model and provides a great deal of instructional support and numerous staff development options. This model would likely provide increased technical support, would support the paradigm shift, provide
better instructional support and staff development, and allow for coordinators to attend training designed to help them be better instructional support providers. The disadvantage to this model is a possible reduction in personal knowledge of teachers due to spending fewer days on campus. This may be mitigated by the fact that the coordinator would likely be able to spend significantly more time in classrooms than they reported spending in this study.

The final recommendation for the coordinator position involves changing its level of staffing entirely. Changing the level of the coordinator to a low-level administrative position could result in several favorable system-wide changes. First, it is unlikely people would expect an administrator to be a technical support provider because such a role isn’t administrative in nature. Additionally, as an administrator the coordinator would have more input into school planning related to technology. Having one or more technicians working for a coordinator would be expected, but having support staff members working for teachers is not something usually done. Finally, teachers may be more inclined to listen to teaching suggestions if someone in an administrative capacity made them. For these reasons elevating the coordinator position to administrative status may advance instructional support and elevate a school’s thinking about technology as it continues to increase in importance.

Whether or not any of the above recommendations are implemented, it is clear from the findings that technical support is an area of strength for coordinators. By all accounts they appear to be responding to the increasing needs for immediate technical assistance in support of the ever-increasing number of ICT programs entering their schools. This is supported by findings by Strudler et al. (2005).
Part 4: Limitations of the Study

The present study has seven noteworthy limitations. The first limitation of the study stems from the fact that it largely relied on survey research. Because survey research is based on self-reported data, it can be inaccurate because respondents may have a desire to conceal the truth or they may not have the self-awareness to give accurate information. Therefore, survey data may be distorted or incomplete to an unknown degree (Gall, Gall, & Borg, 1999). Because of this, the present findings may not be generalizable to other coordinators working in other locations.

A second limitation of the study was the small sample of questionnaires returned by middle and high school level coordinators. To discover differences between groups of coordinators working at various levels, or trends that may extend from one level to another, a larger sample is desirable. Because of this limitation, the correlational analyses may have yielded skewed results.

A third limitation was that only one item on the questionnaire was used to measure role orientation and one item was used to measure perceived administrative role expectation. It is possible that combining three or four items to obtain a composite score for each measure may have yielded more accurate results.

A fourth limitation of the study was the experience level of the participants. It was announced at the meeting that there were 30 new technology coordinators starting their jobs the month the questionnaire was administered. It is possible that their lack of first-hand knowledge of the position was a source of unanswered items and it may be
reasonably concluded that the data would have been more complete if it had been
gathered at the end of the prior school year or later in the year in which it was gathered.

A fifth limitation of the study was the method of data collection. Data were gathered
by survey and focus group, both based on participants’ perceptions. These perceptions of
conditions, especially supervisor role expectations and hours spent on tasks, were not
triangulated via interviews, surveys of others at schools, or observations of coordinators
at work. Therefore, the data are subject to individual bias and reporting errors.

A sixth limitation of this study was the small sample of focus group participants and
groups. More participants may have resulted in more divergent opinions and ideas in the
discussions. Additionally, more focus group sessions could have confirmed or refuted the
initial findings. Therefore, it is possible the focus group data could have been skewed by
a small number of participants with similar opinions or even personal agendas.

A seventh limitation of the study was the method of focus group data analysis used.
Although the researcher took steps to increase reliability (having a “member check” at
the end of each session, having participants comment on the findings in a follow-up email
message, and cross-checking between focus groups), it is still a fact that the researcher
individually assigned codes to the transcripts. Therefore, the focus group data analysis
and reporting was subject to the interpretations of the researcher. Comparing results with
another researcher would have increased validity.

Part 5: Recommendations for Further Study

The findings, implications, and limitations of the present study suggest at least four
directions for future research:
1. The present study provided data and descriptions of the barriers and enabling factors to ICT support. A study should be done comparing a small sample of schools with a high number of enabling factors in place. These schools could be identified through a survey of coordinators, district-level staff input, and a survey of principals. Coordinator-developed strategies and systems for ICT management, staff development, and instructional development could help identify best practices for site-based coordinators. Such a study might include surveys and interviews of the students, teachers, coordinators, and administrators at each school to provide a rich description of the barriers and enabling conditions. Such a study could show the benefits of a high degree of technical support, leadership, staff development, and instructional support on students and teachers. It should also be able to provide measures of teacher and student usage of ICT as well as the types of uses of ICT on the direct teaching to constructivist teaching continuum.

2. Further studies of homophily and its relationship to instructional support should be conducted with direct observation of coordinator/teacher interactions rather than relying on the self-reports of participants. Additionally, any instrument used to measure homophily should be administered to teachers and coordinators. Such a study may add to the validity of future studies and enable advances to be made in coordinator training and practice.

3. An examination of the costs of using teachers to provide so much technical support should be conducted. How does the cost of using teachers compare to the cost of using technicians or recent graduates of high school ICT magnet programs? Additionally, would the allocation of resources for a significant increase in teacher and administrator
staff development result in reduced technical support needs and therefore free coordinators to provide instructional support?

4. The present study suggests that coordinators need additional training in conducting staff development using specific methodologies, providing instructional support, and designing integrated lessons using ICT. A program of instruction should be developed to provide coordinators with training on specific skills and strategies in these areas. The effectiveness of this training on changing coordinator beliefs and practices, as well as its effectiveness on changing teacher beliefs and practices could lead to improved methods of instructional support and staff development.
NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an
IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting
subjects, researcher probation suspension of any research protocol at issue, suspension of additional
existing research protocols, invalidation of all research conducted under the research protocol at
issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: March 23, 2005
TO: Dr. Neal Strudler, Curriculum & Instruction
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. Paul Jones, Co-Chair

Protocol Title: School-Level Technology Coordinators and Their Support of
Information and Communications Technologies
Protocol #: 0503-1538

This memorandum is notification that the project referenced above has been reviewed by the UNLV
Social/Behavioral Institutional Review Board (IRB) as indicated in regulatory statutes 45 CFR 46.
The protocol has been reviewed and approved.

The protocol is approved for a period of one year from the date of IRB approval. The expiration date
of this protocol is March 18, 2006. Work on the project may begin as soon as you receive written
notification from the Office for the Protection of Research Subjects (OPRS).

PLEASE NOTE:
Attached to this approval notice is the official Informed Consent/Assent (IC/IA) Form for this study.
The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used
when obtaining consent. Please keep the original for your records.

Should there be any change to the protocol, it will be necessary to submit a Modification Form
through OPRS. No changes may be made to the existing protocol until modifications have been
approved by the IRB.

Should the use of human subjects described in this protocol continue beyond March 18, 2006, it would
be necessary to submit a Continuing Review Request Form 60 days before the expiration date.

If you have questions or require any assistance, please contact the Office for the Protection of Research
Subjects at OPRSHumanSubjects@ccmail.nevada.edu or call 895-2794.
Title of Study: School-level Technology Coordinators and their Support of Information and Communication Technologies (Survey Phase)

Investigator: Neal Strudler, Ph. D., University of Nevada at Las Vegas, Principal Investigator; Doug Hearnrington, M. Ed., University of Nevada at Las Vegas, Associate Investigator

Protocol Number:

Purpose of the Study
You are invited to participate in a study of school technology coordinators. The purpose of the study is to learn more about the role technology coordinators play in schools and to gain information about the people who fill this position.

Participants
You are being asked to participate in this study because of your position as a school-level technology coordinator.

Procedures
If you volunteer to participate in this study, you will be asked to complete a 44-item questionnaire about your duties, role, how you spend your time, and the characteristics of your job. Your responses will be entered into a statistics program, but will not be linked to your name or other identifying information at any time. Your participation will remain anonymous.

Benefits of Participation
There may be no direct benefits to you as a participant in this study. However, your answers will enable us to learn more about the role of school technology coordinators and this information will inform researchers, national groups, practitioners, and policy-makers.

Risks of Participation
This study may include only minimal risks to you as a participant. Because your responses will be anonymous no one will be able to discover your answers or even whether you took the survey. There is a risk that you may become uncomfortable when answering some questions.

Cost/Compensation
There will be no financial cost to you to participate in this study. This study will take between 20 and 50 minutes of your time. You will not be compensated for your time. The University of Nevada, Las Vegas, may not provide compensation or free medical care for an unanticipated injury sustained as a result of participating in this research study.

Contact Information
If you have any questions or concerns about this study, you may contact Doug Hearnrington at 799-3670 or Dr. Neal Strudler at (702) 895-1306.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, you may contact the UNLV Office for the Protection of Research Subjects at (702) 895-2794.
Title of Study: School-level Technology Coordinators and their Support of Information and Communication Technologies (Survey Phase)

Investigator: Neal Strudler, Ph. D., University of Nevada at Las Vegas, Principal Investigator; Doug Hearrington, M. Ed., University of Nevada at Las Vegas, Associate Investigator

Protocol Number:

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

Confidentiality
All information gathered in this study will be kept strictly confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility for 3 years after completion of the study. After the storage time the information will be destroyed.

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

The principal risk in this research would be potential harm resulting from a breach of confidentiality. For this reason, you do not have to sign the Informed Consent. If you wish to be identified with this research study, you may sign.

Signature _______________________________ Date ____________________________
APPENDIX A

QUESTIONNAIRE

School-level Technology Coordinator Study

Please answer all questions by filling in the blank or circling the appropriate answer choice. It is estimated that it will take 20 to 45 minutes to complete this questionnaire.

PART I: DEMOGRAPHICS

1. What kind of teaching license do you hold? Include only your primary teaching license, not any endorsements you have added to your license. Please circle all that apply
   a. I have a K-8 elementary license
   b. I have a secondary single subject license.
   c. My license lets me teach a subject K-12 (i.e. library media specialist or special ed.)

2. If you chose either b or c in question 3 above, what single subject, or subjects, do you have a license to teach?
   __________________________________________________________

3. How long have you served in the capacity of technology coordinator at your current school?
   ________________________________

4. How many years have you been a school technology coordinator? This may include years where you were full-time in this role or where you were asked to be in this role in addition to your other duties (such as being a full-time teacher and being the technology coordinator in addition.)
   ________________________________

5. How many years were you a classroom teacher before you became a full-time school-level technology coordinator?
   ________________________________

6. What is the level of your home school?
   a. Elementary
   b. Middle
   c. High school
7. At how many schools do you currently serve as technology coordinator?
   a. One
   b. Two
   c. Three
   d. More than three

8. Some schools may have more than one technology coordinator. These coordinators may perform overlapping duties or have complementary duties.
   a. How many other people serve in the capacity of technology coordinator at your school or schools? _____________________________
   b. What percentage of their time is dedicated to their technology coordinator duties, i.e., 75 percent or 100 percent? If there is more than one person, please indicate percentages separately. _____________________________

9. What is your gender?
   a. Male
   b. Female

10. What is your age?
    a. Under 30  
    b. Between 31 and 40
    c. Between 41 and 50
    d. Over 50

11. What is your highest level of education completed?
    a. Bachelor's degree
    b. Bachelor's degree + 16 graduate semester hours
    c. Bachelor's degree + 32 graduate semester hours
    d. Master's degree
    e. Master's degree + 16 graduate semester hours
    f. Master's degree + 32 graduate semester hours
    g. Doctoral degree

12. How many students attend your school or schools? Provide the total number if you are at more than one school. _____________________________

13. How many teachers and staff work in your school or schools? Provide the total number if you are at more than one school.

14. How many networked learning programs, often known as Integrated Learning Systems or Computer Assisted Instruction programs, which may be made by companies such as Renaissance Learning, Scholastic, CCC, or Plato, do you support in your school or schools? Provide the total number if you are at more than one school. _____________________________

15. How many computers do you provide support for at your school or schools? Provide the total number if you are at more than one school. _____________________________
PART II: DUTIES, CHARACTERISTICS, AND PERCEPTIONS

Explanations of key terms:

INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT): Digital or electronic tools used to handle information and aid communication. Also, computer-related technologies such as networks, digital cameras, Personal Digital Assistants, and scanners are ICT.

TECHNICAL SUPPORT: A service provided to anyone involving troubleshooting an ICT hardware or software problem, fixing such a problem, researching ways to fix hardware or software problems, placing a work order to have someone else fix such a problem, installing, configuring, or setting up hardware or software.

INSTRUCTIONAL SUPPORT: A service provided, usually to teachers, to help them use ICT with students. Such support may include lesson planning, finding appropriate web sites, building WebQuests, modeling a teaching technique using ICT, or helping a teacher teach a lesson in a computer lab. This type of support is usually limited to helping one, or a very few, teacher(s) at a time to use ICT in an instructional way.

STAFF DEVELOPMENT: Providing various kinds of instruction to teachers, administrators, or staff members at your work location to enable them to acquire or improve ICT skills or the ability to use ICT with students in a more formal setting than would be typical of instructional support.

16. How much do you agree or disagree with this statement? I have enough time to adequately take care of my TECHNICAL SUPPORT DUTIES, such as installing, maintaining, or troubleshooting hardware, software, or the network.
   a. Strongly agree
   b. Somewhat agree
   c. Neutral
   d. Somewhat disagree
   e. Strongly disagree
17. What factors do you perceive as **barriers** to providing the best TECHNICAL SUPPORT you could provide? Please circle all that apply.
   a. I do not perceive any barriers to providing technical support
   b. Too much equipment to support
   c. Lack of staff development
   d. Lack of software designed to assist me in providing technical support
   e. Too many users to support
   f. Lack of timely technical support from my school district
   g. Old or outdated hardware
   h. Old or outdated software
   i. A lack of management tools, such as hardware or software inventories or IP address lists

18. What additional factors do you perceive as **barriers** to providing the best TECHNICAL SUPPORT you could provide? Please circle all that apply.
   a. A lack of procedures at my school or schools for teachers and staff to follow
   b. Lack of hardware or software training available for me to keep up with the technology
   c. I have been directed to perform other duties besides technical support
   d. A lack of hardware, such as cables, mini-switches, CD-ROM duplicators, etc.
   e. A lack of flexible work day hours
   f. A lack of extra days to work when classes are not in session
   g. Other, please explain:

19. What factors do you perceive as **enabling** you to provide the level of TECHNICAL SUPPORT you currently provide? Please circle all that apply.
   a. Help from other teachers
   b. Help from students
   c. Strong administrative support
   d. Staff development of teachers has minimized or assisted me in my technical support role
   e. Availability of necessary management software to assist me in performing my duties
   f. Timely technical support from my school district
   g. Management tools I have developed, such as hardware or software inventories or IP address lists
   h. Clear procedures at my school or schools for teachers and staff to follow
20. What additional factors do you perceive as enabling you to provide the level of TECHNICAL SUPPORT you currently provide? Please circle all that apply.
   a. Hardware or software training that has helped me to keep up with the technology
   b. I have been directed to concentrate on technical support as my priority
   c. Availability of the hardware I need, or ability to quickly acquire the hardware I need, such as cables, mini-switches, CD-ROM duplicators, etc.
   d. Flexible work day hours
   e. Extra days to work when classes are not in session
   f. Help from one or more additional technology coordinators at my school who provide full or part time assistance to me in this area
   g. Other, please explain:

21. How much do you agree or disagree with this statement? I have enough time to adequately take care of my INSTRUCTIONAL SUPPORT DUTIES, such as helping teachers integrate technology, or designing lessons or units of instruction with teachers to help them integrate technology into teaching or learning activities.
   a. Strongly agree
   b. Somewhat agree
   c. Neutral
   d. Somewhat disagree
   e. Strongly disagree

22. What factors do you perceive as barriers to providing a higher level of INSTRUCTIONAL SUPPORT than you provide currently? Please circle all that apply.
   a. I do not perceive any barriers to providing instructional support.
   b. My technical support duties are more of a priority than my instructional support duties
   c. I am not knowledgeable enough in all subject/discipline areas to provide instructional support to all teachers
   d. My technical support duties are a priority as far as my administration is concerned
   e. Few or no opportunities for extra pay or to work a flexible schedule
   f. Few or no opportunities to work extra days
   g. No network of teachers already using technology as a teaching tool available to help with instructional support
   h. I need more training on subject/curriculum specific software
   i. I need more training on curriculum-related hardware
23. What additional factors do you perceive as barriers to providing a higher level of INSTRUCTIONAL SUPPORT than you provide currently? Please circle all that apply.

   a. I need more training on adult learning or effective staff development practices
   b. I need more training on the implementation of specific teaching or learning strategies using technology
   c. Better organization could help me to provide more instructional support
   d. There is little administrative demand on teachers to seek instructional support from me
   e. Teachers are not interested in using technology with their students
   f. Our school does not have a clear vision or goals that include the use of technology with students
   g. Our school does not have enough hardware (computers, LCD projectors, digital cameras, etc) to entice teachers to use technology with their students
   h. Our school does not have enough curriculum-related software to entice teachers to use technology with their students
   i. Our teachers need more staff development before there is a demand for instructional support
   j. Other, please explain:

24. What factors do you perceive as enabling you to provide the level of INSTRUCTIONAL SUPPORT you provide currently? Please circle all that apply.

   a. My instructional support duties are more of a priority than my technical support duties are
   b. I am knowledgeable enough in all subject/discipline areas to provide instructional support to all teachers
   c. My instructional support duties are a priority as far as my administration is concerned
   d. I have opportunities for extra pay or to work a flexible schedule
   e. I have opportunities to work extra days
   f. There is a network of teachers already using technology as a teaching tool available to help with instructional support
   g. I am knowledgeable about subject/curriculum specific software
   h. I am knowledgeable about curriculum-related hardware
   i. I am knowledgeable about adult learning or effective staff development practices
   j. I am knowledgeable about the implementation of specific teaching or learning strategies using technology
25. What additional factors do you perceive as enabling you to provide the level of INSTRUCTIONAL SUPPORT you provide currently? Please circle all that apply.
   a. I am well organized
   b. There is administrative demand on teachers to seek instructional support from me
   c. Teachers are interested in using technology with their students
   d. Our school has a vision or goals that include the use of technology with students
   e. Our school does has enough hardware (computers, LCD projectors, digital cameras, etc) to entice teachers to use technology with their students
   f. Our school has enough curriculum-related software to entice teachers to use technology with their students
   g. Help from one or more additional technology coordinators at my school who provide full or part time assistance to me in this area
   h. Our school has a good staff development program
   i. Other, please explain:

26. How much do you agree or disagree with this statement? I have enough time to adequately take care of my STAFF DEVELOPMENT DUTIES, such as planning staff development, conducting staff development, monitoring the effectiveness of staff development, following up on staff development with teachers, or coordinating staff development activities.
   a. Strongly agree
   b. Somewhat agree
   c. Neutral
   d. Somewhat disagree
   e. Strongly disagree
27. What factors do you perceive as barriers to providing a higher level of STAFF DEVELOPMENT than you provide currently? Please circle all that apply. Except for "a," all choices begin with "our technology-related staff development program..."

a. I do not perceive any barriers to providing staff development
b. ... is NOT aligned to our school goals
c. ... DOES NOT help to develop teachers as leaders in the area of educational technology
d. ... is NOT given enough time and/or resources in our staff development plan to make a difference in how teachers use technology
e. ... DOES NOT gather data from teachers and students to determine priorities and monitor progress
f. ... can NOT provide data showing an impact on the school community or students
g. ... DOES NOT provide teachers with instructional methods or activities that are based on research
h. ... DOES NOT use adult learning principals and a variety of learning processes (which may include, but are not limited to, collaborative lesson design, case studies, workshops, courses, study groups, or professional networks)

28. What additional factors do you perceive as barriers to providing a higher level of STAFF DEVELOPMENT than you provide currently? Please circle all that apply. All choices begin with "our technology-related staff development program..."

a. ... DOES NOT provide teachers with opportunities to practice new skills with feedback on their performance until those skills become habitual
b. ... DOES NOT provide our teachers with opportunities to work as teams or groups to advance their skills, knowledge, or abilities
c. ... DOES NOT provide our teachers with the skills to differentiate learning activities within their classrooms and assess student progress
d. ... DOES NOT provide teachers with enough knowledge to implement appropriate instructional strategies to assist students in meeting standards
e. ... DOES NOT enable our teachers to reach out to parents using technology to involve families and/or others
f. Other, please explain:

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29. What factors do you perceive as enabling you to provide the level of STAFF DEVELOPMENT you provide currently? Please circle all that apply. All choices begin with “our technology-related staff development program...”
   a. ... is aligned to our school goals
   b. ... helps to develop teachers as leaders in the area of educational technology
   c. ... is given enough time and/or resources in our staff development plan to make a difference in how teachers use technology
   d. ... gathers data from teachers and students to determine priorities and monitor progress
   e. ... can provide data showing an impact on the school community or students
   f. ... provides teachers with instructional methods or activities that are based on research

30. What additional factors do you perceive as enabling you to provide the level of STAFF DEVELOPMENT you provide currently? Please circle all that apply. All choices begin with “our technology-related staff development program...”
   a. ... provides teachers with opportunities to practice new skills with feedback on their performance until those skills become habitual
   b. ... provides our teachers with opportunities to work as teams or groups to advance their skills, knowledge, or abilities
   c. ... provides our teachers with the skills to differentiate learning activities within their classrooms and assess student progress
   d. ... provides teachers with enough knowledge to implement appropriate instructional strategies to assist students in meeting standards
   e. ... enables our teachers to reach out to parents using technology to involve families and/or others
   f. Other, please explain:

PERCEPTIONS OF SELF/STAFF & PROGRESS
Instructions: On the scale below, please indicate your feelings about the teachers you work with at your school or schools. Circle the number that best represents your feelings. Numbers “1” and “7” indicate very strong feeling. Numbers “2” and “6” indicate a strong feeling. Numbers “3” and “5” indicate a fairly weak feeling. Number “4” indicates you are undecided or I don’t know. Please work quickly on this section. There are no right or wrong answers.

31. The teachers in my school don’t think like me.

The teachers in my school think like me.
32. The teachers in my school behave like me. 1 2 3 4 5 6 7
The teachers in my school don't behave like me.

33. The teachers in my school are similar to me. 1 2 3 4 5 6 7
The teachers in my school are different from me.

34. The teachers in my school are unlike me. 1 2 3 4 5 6 7
The teachers in my school are like me.

35. What motivates you to be an ECS and why do you do the job?

36. In what core subject areas have you made the most progress in integrating technology? Please rank order the subjects from greatest technology integration progress to least progress. A “1” indicates the greatest progress, a “2” indicates the second greatest amount of progress, etc. Use “N/A” to indicate no significant progress.

<table>
<thead>
<tr>
<th>RANK</th>
<th>SUBJECT AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Math</td>
</tr>
<tr>
<td></td>
<td>Science</td>
</tr>
<tr>
<td></td>
<td>Reading</td>
</tr>
<tr>
<td></td>
<td>English (includes writing)</td>
</tr>
<tr>
<td></td>
<td>Social studies</td>
</tr>
</tbody>
</table>
37. What strategies have you used to provide staff development or instructional support? Please place an “X” in the box on the left to indicate your usage of the strategy to its right. Enter an “XX” for strategies you have used more often. Enter an “XXX” for those strategies you have used most often. Leave the usage level blank if you have not used a particular strategy. Use no more than three “X’s.”

<table>
<thead>
<tr>
<th>USAGE LEVEL</th>
<th>STRATEGY</th>
<th>USAGE LEVEL</th>
<th>STRATEGY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large group training</td>
<td></td>
<td>Observing lessons &amp; providing feedback</td>
</tr>
<tr>
<td></td>
<td>Small group training</td>
<td></td>
<td>Creating online resources for teachers</td>
</tr>
<tr>
<td></td>
<td>Individual training</td>
<td></td>
<td>Mentoring one or more teachers</td>
</tr>
<tr>
<td></td>
<td>Integrated lesson modeling</td>
<td></td>
<td>Finding resources for teachers</td>
</tr>
<tr>
<td></td>
<td>Model lesson creation</td>
<td></td>
<td>One computer classroom training</td>
</tr>
</tbody>
</table>

**EXPECTATION AND ROLES**

Instructions: One the scale below, please indicate your beliefs about the expectations of you and the role you fill at your school or schools. Circle the number that best represents your beliefs. Numbers “1” and “7” indicate very strong belief. Numbers “2” and “6” indicate a strong belief. Numbers “3” and “5” indicate a fairly weak belief. Number “4” indicates you are undecided or I don’t know. Please work quickly on these two questions. There are no right or wrong answers.

38. I believe my role in my school is primarily to teach, assist, and guide teachers to use and integrate technology. 

39. I believe my supervisor/administration sees my role at my school as primarily a person who teaches, assists, and guides teachers to use and integrate technology.
40. How many times per school year do you provide, or plan to provide, scheduled staff
development sessions designed to teach teachers or staff members how to use specific
hardware or software without a specific focus on the instruction of students?

41. How many times per school year do you provide, or plan to provide, scheduled staff
development sessions designed to teach teachers or staff members how to use specific
hardware or software with a specific focus on the instruction of students?

42. Who is your direct supervisor?
   a. A district-level administrator
   b. My school’s principal
   c. My school’s assistant principal
   d. A dean at my school
   e. Other (Please explain):
TIME EXPENDITURE

43. Roughly, what percentage of your time per month, on the average, do you actually spend in each of the following ways? What percentage of your time do you think you should be spending on these tasks? Think about a recent month and record the percentages. Then think of a typical month. If everything you do isn’t represented by your monthly totals, please make the appropriate adjustments to the numbers. When you have completed recording the percentages, if the totals do not seem accurate, please go back and modify your responses.

<table>
<thead>
<tr>
<th>Time Expenditure per Typical Month</th>
<th>Percentage of Actual Time Spent</th>
<th>Desired Percentage of Time Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Instructional Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Assisting teachers with content-area specific software and/or providing pedagogical help and expertise for the use of such software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Providing scheduled professional development on pedagogy or strategies for technology integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II Technical Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Installing, maintaining, or troubleshooting hardware and software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Providing one-on-one help to teachers or staff members with technical support issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Providing scheduled professional development on the operation of hardware or software not related to technology integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Other Tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Time spent planning or coordinating for future tasks such as staff development, the technology plan, school website development, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Time spent learning new skills or knowledge related to your position as technology coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Time spent in meetings (do not include time providing help already counted above)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Other tasks not listed (please describe below):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL PER MONTH (should equal 100%) =**
44. Would you be willing to volunteer to participate in a focus group meeting on the subject of staff development and instructional support? This meeting will be held in two to four weeks and will last for 90 minutes to two hours. Your input at this meeting will remain anonymous. Please circle your choice below.

a. Yes, I am interested in participating in a focus group meeting.
b. No, I am not interested in participating in a focus group meeting.

If your answer was yes, please provide your name so you can be contacted via email about participation in the focus group: ______________________________

Thank you very much for your time. Please ensure all questions were answered and return your completed questionnaire. At the conclusion of this study the results will be provided to the group.
APPENDIX B

FOCUS GROUP MODERATOR'S GUIDE

Introduction

Thank you for taking the time to come together for this focus group discussion with me today. This discussion will probably take about 90 minutes to complete. We have a group of people here today who volunteered to participate in the study and in the focus group. The information from your discussion will be pulled together and used to inform the school-level technology coordinator study I am conducting.

The information you share today will be used for this purpose only. Although I will be tape recording this session and transcribing it, your comments will not be identified by name nor will anyone be able to attribute them to you in any report I prepare. However, although I encourage it, I cannot guarantee such confidentiality from the other participants here. If, for any reason, you don’t feel comfortable sharing something with the whole group, please feel free to contact me outside of the group setting and we will arrange a private interview. Although I cannot guarantee confidentiality from your fellow participants, I strongly urge everyone to keep anything said in this group private. What happens in this focus group should stay in this focus group.

Please note that we are not trying to achieve any kind of consensus within this group, but rather, want to hear all different points of view. You are different people with
different experiences. You will likely have different points of view to share. Please be respectful of your colleagues during this discussion by avoiding side conversations and dominating the discussion.

Before we begin, please try to speak clearly and loud enough for the tape recorder.

Warm-up

Let’s go around the table and introduce yourselves,

Discussion

We are going to discuss technical support, instructional support, staff development, and time management. We are interested in exemplary, satisfactory, and inadequate levels of each type of support. I’ll be here to moderate and guide the discussion. I may jump in from time to time to lead you in another direction, ask a clarifying question, or to bring you back on topic should you stray.

Definitions

*Technical support.* A service provided to anyone involving troubleshooting an ICT hardware or software problem, fixing such a problem, researching ways to fix hardware or software problems, placing a work order to have someone else fix such a problem, installing, configuring, or setting up hardware or software.

*Instructional support.* A service provided, usually to teachers, to help them use ICT with students. Such support may include lesson planning, finding appropriate web sites, building WebQuests, modeling a teaching technique using ICT, or helping a teacher teach a lesson in a computer lab. This type of support is usually limited to helping one, or a very few, teacher(s) at a time to use ICT in an instructional way.
Staff development. The processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students is the definition of staff development used in this study.

Questions

1. What, in your opinion, accounts for coordinator reports of not having enough time to provide technical support?

2. Technical support
   a. Imagine a school operating at an exemplary level of technical support.
      i) How would you describe exemplary technical support in a school?
      ii) What factors could you measure that would indicate exemplary technical support to you?
      iii) What would have to happen to achieve this exemplary level of technical support?
      iv) What training would a COORDINATOR need to be able to provide an exemplary level of technical support?
   b. Imagine a school operating at a satisfactory level of technical support.
      i) How would you describe satisfactory technical support in a school?
      ii) What factors could you measure that would indicate satisfactory technical support to you?
      iii) What one recurring task or issue seems to occupy a great deal of your time or hinder your progress in this area so that, except for this task or issue, if a solution could be found, you could make significant long term progress
on this area?

c. How would you describe inadequate technical support in a school?

3. Instructional support

a. Imagine a school operating at an exemplary level of instructional support.
   i) How would you describe exemplary instructional support in a school?
   ii) What factors could you measure that would indicate exemplary instructional support to you?
   iii) What would have to happen in your school or schools to achieve this exemplary level of instructional support?
   iv) What training would a COORDINATOR need to be able to provide an exemplary level of instructional support?

b. Imagine a school operating at a satisfactory level of instructional support.
   i) How would you describe satisfactory instructional support in a school?
   ii) What factors could you measure that would indicate satisfactory instructional support to you?
   iii) What one recurring task or issue seems to occupy a great deal of your time or hinder your progress in this area so that, except for this task or issue, if a solution could be found, you could make significant long term progress on this area?

c. How would you describe inadequate instructional support in a school?

4. Staff development (as it pertains to ICT and the COORDINATOR)

a. Imagine a school operating at an exemplary level of ICT staff development.
i) How would you describe exemplary ICT staff development in a school?

ii) What factors could you measure that would indicate exemplary ICT staff
development to you?

iii) What would have to happen in your school or schools to achieve this
exemplary level of ICT staff development?

iv) What training would a COORDINATOR need to be able to provide an
exemplary level of ICT staff development?

b. Imagine a school operating at a satisfactory level of ICT staff
development.

i) How would you describe satisfactory ICT staff development in a school?

ii) What factors could you measure that would indicate satisfactory ICT staff
development to you?

iii) What one recurring task or issue seems to occupy a great deal of your time
or hinder your progress in this area so that, except for this task or issue, if
a solution could be found, you could make significant long term progress
on this area?

c. Imagine a school operating at an inadequate level of ICT staff
development.

i) How would you describe inadequate ICT staff development in a school?

ii) What factors could you measure that would indicate inadequate ICT staff
development to you?

5. Time management

a. Pass out the time management matrix from Covey’s Seven Habits of
Highly Effective People. Explain it and discuss it from the perspectives of technical support, instructional support, and staff development.

b. Each person writes one thing on a post it note for each area of the matrix and posts it on a blank matrix.

Note: answers by participants will be written on a post-it note and placed on a blank matrix. An example of the support continua matrix is below.

<table>
<thead>
<tr>
<th></th>
<th>Exemplary</th>
<th>Satisfactory</th>
<th>Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>• Training needed</td>
<td>• Description</td>
<td>• Description</td>
</tr>
<tr>
<td>Support</td>
<td>• Description</td>
<td>• How measured</td>
<td>• How measured</td>
</tr>
<tr>
<td>Instructional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Development</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wrap up

• Discuss and clarify major themes

• Complete any unfinished discussion points

Member check

After this great discussion of technical support, instructional support, and staff development, I would like to find out how each of you feels about the continua as we
have defined them tonight. At this point, I am not looking for further discussion, just a general idea of how many of you feel a certain way. Again, please let me know your opinion.

- First, how many of you feel that the continua seem mostly right at the exemplary levels? The satisfactory levels? The inadequate levels?
- Finally, how many of you feel that the time management matrix seems mostly right in each quadrant?

Closing

As we come to a close I want to remind you all that you will be assigned false names for the purpose of the transcript and data analysis of this meeting so you will remain anonymous. I ask that you refrain from discussing the comments of group members and that you respect the right of each member to remain anonymous. Are there any questions I can answer?

My final question is may I contact you via email if I have a follow up question or two?

Thank you very much for your contributions to this research. This was a very successful session and your responses will be an enormous asset the study. I hope to share my findings at a future meeting so you can see the results. Again, I appreciate your involvement and I wish you all a safe trip home.
APPENDIX C

FOCUS GROUP CODING CATEGORIES

I. TECHNICAL SUPPORT (TS): A service provided to anyone involving troubleshooting an ICT hardware or software problem, fixing such a problem, researching ways to fix hardware or software problems, placing a work order to have someone else fix such a problem, installing, configuring, or setting up hardware or software.

Exemplary TS: Participant perception of a state of support that is better than satisfactory.

Satisfactory TS: Participant perception of an acceptable level of support.

Unsatisfactory TS: Participant perception of an unacceptable level of support.

Training TS: Training needed to enable coordinators to provide better services in this area.

Enabler TS: Participant perception of a factor or condition that currently facilitates or permits support in this area.

Barrier TS: Participant perception of a factor or condition that inhibits or obstructs support in this area.
II. INSTRUCTIONAL SUPPORT (IS): A service provided, usually to teachers, to help them use ICT with students. Such support may include lesson planning, finding appropriate web sites, building WebQuests, modeling a teaching technique using ICT, or helping a teacher teach a lesson in a computer lab. This type of support is usually limited to helping one, or a very few, teacher(s) at a time to use ICT in an instructional way.

Exemplary IS: Participant perception of a state of support that is better than satisfactory.

Satisfactory IS: Participant perception of an acceptable level of support.

Unsatisfactory IS: Participant perception of an unacceptable level of support.

Training IS: Training needed to enable coordinators to provide better services in this area.

Enabler IS: Participant perception of a factor or condition that currently facilitates or permits support in this area.

Barrier IS: Participant perception of a factor or condition that inhibits or obstructs support in this area.

Need IS: Something not currently available or done that is needed in the future to facilitate support in this area.
III. STAFF DEVELOPMENT (SD): The processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students. Staff development is usually provided in a more formal and scheduled way than instructional support.

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exemplary SD</td>
<td>Participant perception of a state of support that is better than satisfactory.</td>
</tr>
<tr>
<td>Satisfactory SD</td>
<td>Participant perception of an acceptable level of support.</td>
</tr>
<tr>
<td>Unsatisfactory SD</td>
<td>Participant perception of an unacceptable level of support.</td>
</tr>
<tr>
<td>Training SD</td>
<td>Training needed to enable coordinators to provide better services in this area.</td>
</tr>
<tr>
<td>Enabler SD</td>
<td>Participant perception of a factor or condition that currently facilitates or permits support in this area.</td>
</tr>
<tr>
<td>Barrier SD</td>
<td>Participant perception of a factor or condition that inhibits or obstructs support in this area.</td>
</tr>
<tr>
<td>Need SD</td>
<td>Something not currently available or done that is needed in the future to facilitate support in this area.</td>
</tr>
</tbody>
</table>

IV. TIME MANAGEMENT (TM): A classification of tasks one performs into one of four general time categories, called quadrants, based on the Time Management Matrix (Covey, 1989).
Quadrant I: Tasks that are urgent and important.
Quadrant II: Tasks that are not urgent and important.
Quadrant III: Tasks that are urgent and not important.
Quadrant IV: Tasks that are not urgent and not important.

V. COORDINATOR ROLE (CR): A comment or perception about the current or future role of the coordinator position.

Possible Future: Participant opinion about the future of the site-based coordinator role or the state of the position.
Recommendation: Participant opinion about changes that can be made to improve the coordinator role or positively impact the facilitation of ICT usage.
Perception: Participant opinion about the perception of others, such as teachers and administrators, concerning the coordinator role.
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