THE INFLUENCE OF TECHNOLOGY TEACHER LEADERS IN BUILDING CAPACITY FOR TECHNOLOGY INTEGRATION IN SCHOOLS:

A CASE STUDY

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SIGNATURE PAGE

DISSEMINATION: THE INFLUENCE OF TECHNOLOGY TEACHER LEADERS IN BUILDING CAPACITY FOR TECHNOLOGY INTEGRATION IN SCHOOLS: A CASE STUDY

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This dissertation is dedicated to my three sons Natraun, Jaryus and Cayden for their patience, unwavering love and support. You all were my motivation and inspiration on my doctoral journey. It is my hope that you all realize all of your dreams and make your marks in this world.
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ABSTRACT

The purpose of this study was to explore the factors that inhibit or support teachers leaders who support their colleagues as they learn to use and integrate technology in their classrooms. A mixed-methods approach was used to gather quantitative and qualitative data from participants in the Pewter Unified School District’s Technology Teacher Leader Program. Collection of the district’s survey data and artifacts were used to highlight the necessary conditions needed for TTLs to be effective in their role. The research questions were designed to highlight the challenges and supports technology teacher leaders (TTLs) confronted when trying to lead from within and out of their classrooms. TTLs, principals, and teachers contributed their experiences and reflections on their involvement their district’s Technology Teacher Leaders Program, which were analyzed for emerging themes.

This study aimed to add to the body of research on effective models of support for teacher leaders charged with modeling the use and integration of technology in their own and their colleagues’ classrooms. The findings suggest teacher leaders of technology who lead from within the classroom need reliable technology, timely technical support, release time from their classrooms during the day to model teaching with technology for teachers, and more opportunities to facilitate authentic learning opportunities that include hands on practice with integration technology.
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Chapter 1: Introduction to the Problem

Teacher leadership has been found to be essential to school improvement and reform efforts (Harris & Muijs, 2003; Marzano, Waters, & McNulty, 2005; Salazar, 2010; York-Barr & Duke, 2004). York-Barr and Duke (2004) have defined teacher leadership as “the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of the school community to improve teaching and learning practices with the aim of increased student learning and achievement” (pp. 287-288). Teacher leaders often work directly with teachers as coaches or mentors to support them with planning, modeling, team teaching, and providing feedback (Dole, 2004, p. 462). Reeves (2009) surveyed 300 teachers and administrators and found that direct modeling by teacher leaders was the most powerful factor in influencing the classroom practices of professional educators (p. 1).

Teacher leaders provide specific types of support to schools, whether they are classroom teachers at school sites or out of the classroom serving as district support. Researchers have investigated various forms of teacher leadership. Harris and Muijs (2003) noted in the US, Canada, and Australia, the concepts of dispersed, distributed, and teacher leadership are well developed and grounded in research evidence. Over the past decade, researchers have described the various characteristics and roles of teacher leaders within different models of teacher leadership. Harris (2003) noted four dimensions of teacher leadership as brokering, participative, mediating, and having the ability to forge relationships depending on the context of their support (p. 6). In 2011, the Teacher Leadership Exploratory Consortium (TLE Consortium) developed Teacher Leader Model Standards listing critical dimensions of teacher leadership and various functions of
teacher leaders such as adult learning models, negotiation, collaboration paradigms, learning communities, facilitation skills, advocacy, and professional development/learning (p. 4).

Jackson, Burrus, Bassett, and Roberts (2010) noted the varying definitions of teacher leadership among researchers seen in Table 1.

Table 1
Definitions of teacher leadership (Jackson, Burrus, Bassett, & Roberts, 2010)

<table>
<thead>
<tr>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers become leaders when they function efficiently in professional learning communities to impact student learning, contribute to school improvement, inspire excellence in practice, and empower stakeholders to participate in educational improvement.</td>
<td>Childs-Bowen et al. (2000)</td>
</tr>
<tr>
<td>Teacher leadership facilitates principled action to foster whole-school success. Teacher leaders transform teaching and learning and tie the school and community together, and advance the community’s social mission and quality of life.</td>
<td>Crowther et al. (2002)</td>
</tr>
<tr>
<td>Teacher leadership is a set of skills demonstrated by teachers who are able to influence students outside of the classroom and beyond.</td>
<td>Danielson (2006)</td>
</tr>
<tr>
<td>Teacher leadership encompasses “inter-related domains of commitment and knowledge.” Thus, there is a commitment to moral purpose, continuous learning, knowledge of learning processes, as well as an understanding of the educational context and change processes.</td>
<td>Fullan (1994)</td>
</tr>
<tr>
<td>Teacher leadership is a mobilization of the available attributes of teachers to strengthen student performance at the ground level. Teacher leaders work toward collaboration and shared leadership in the daily activities in the school.</td>
<td>Institute for Educational Leadership (2001)</td>
</tr>
<tr>
<td>Teacher leaders lead within and outside of the classroom. A teacher leader is a member and contributor to a community of teacher learners. They are influential in the continued improvement of educational practice.</td>
<td>Katzenmeyer &amp; Moller (2001)</td>
</tr>
<tr>
<td>Teacher leaders hold influence outside of the classroom and are autonomous in their own work. Still, they do not engage in managerial or supervisory tasks.</td>
<td>Murphy (2005)</td>
</tr>
<tr>
<td>Teacher leaders have the ability to encourage other teachers and colleagues to change and begin to think about taking part in things they ordinarily would not consider.</td>
<td>Wasley (1991)</td>
</tr>
<tr>
<td>Teacher leadership is an idea that emphasizes that teachers hold an important and central position within the schools.</td>
<td>York-Barr &amp; Duke (2004)</td>
</tr>
</tbody>
</table>
Technology Teacher Leaders (TTLs)

Researchers have identified a need for expert technology teacher leaders who can train and support teachers with integrating technology in their classrooms. The support efforts of teacher leaders of technology are important to teachers’ development of computer literacy skills and increased effectiveness in the utilization of technology tools to enhance their pedagogy. On the other hand, the gains may have come at the expense of overburdening teacher leaders in this role (Sheppard, Seifert, & Wakeham, 2014). More research is needed on teacher leader models that support teachers’ effective integration of technology (Gorder, 2008; Dexter, Seashore, & Anderson, 2003; McLeod & Richardson, 2011).

Teacher leadership as a pathway to school reform is noted in research as scholars and administrators recognized that teachers possess the knowledge and expertise for improving instruction and student outcomes (Datnow & Costellano, 2001; Harris, 2005; Reeves, 2009; Salazar, 2010; Teacher Leadership Exploratory Consortium, 2011; York-Barr & Duke, 2004). Schools benefit from teacher leaders who are content experts in core subjects such as English language arts, math, and social studies and are skillful in providing opportunities for authentic professional development for their colleagues. Researchers found that teachers’ lack of opportunities to engage in high quality professional development impeded teacher’s integration of technology (Noeth & Volkov, 2004; Staples, Pugach, & Himes, 2005). Also, access to technical support from dedicated, well-trained on-site technology personnel and coordinators remained an obstacle to teachers’ technology integration skills (Ertmer, 1999; Gorder, 2008; Oldfield, 2010; Schiller, 2002; Schoolnet 2010; Staples, Pugach, & Himes, 2005).
Challenges for Teacher Technology Leaders

A study conducted in Newfoundland and Labrador, Canada by Sheppard, Seifert, and Wakeham (2014) found that:

‘a majority of principals in the study acknowledged the important leadership role played by teachers within their own school, whether as individuals or as team members, who willingly supported their colleagues with their expertise, acted as key decision makers regarding hardware and software acquisitions, provided professional development for others, or had sought partnerships and various sources of funding for technology related acquisitions’ (pp. 3-4).

The authors voiced time as a problem for TTLs, both in limited assigned time to help other teachers and time needed for their own classroom teaching responsibilities.

Additional challenges noted by the researchers in this case study were as follows:

1. Limited access to hardware and software and outdated school infrastructure;
2. Lack of technology preparation in teacher education programs, and little exposure to learning how to apply emerging technologies to facilitate teaching and learning in the classroom;
3. Pace of changing technologies that require constant upgrades and ongoing maintenance and repair of hardware and software,
4. Limited, differential access to professional development.
5. Little time released from classroom teaching responsibilities to provide relevant, ongoing professional development for their colleagues; and
6. Principals perceived technology to have both a positive and negative impact on their work and personal lives, causing difficulty separating their work and personal lives, thus causing increased stress levels. (p. 9)

Statement of the Problem

The challenge for schools has been providing professional development that support teachers as they leverage the implementation of the Common Core Standards and effectively integrate technology to facilitate student learning to meet 21st century student learning goals (Bellanca & Brandt, 2010; Cuban, 2001; Gunn & Hollingsworth, 2013; Mouza, 2009). This has been problematic for schools as they continue to invest in technology, but have yet to realize its potential due to lack of training and support geared to meet teachers’ diverse needs. School districts have created teacher leadership positions to address the need for teacher support and to ensure teachers are prepared to deliver high quality instruction utilizing technology.

Purpose of the Study

The purpose of the study was to explore the factors that fostered and hindered the efforts of teacher leaders of technology to build capacity for effective technology integration at their school sites as part of a major technology initiative in a large, diverse school district in southern California. Researchers agreed that educational institutions are cognizant of the new and evolving technologies that are produced to make the act of teaching and learning mirror what is going on in the ‘real world’, yet few teachers know how to use them (Cuban, 2001; Hixon & Buckenmeyer, 2009; Smeets, 2005). To prepare teachers for 21st century teaching, school districts must take vital strides to provide teachers with opportunities to familiarize themselves with new technologies and timely
support for integrating technology to enhance their teaching practices. This case study investigated the activities and perceptions of teachers and teacher leaders engaged in implementing technology in classrooms.

**Conceptual Framework**

Bronson’s (2007) framework on teacher leadership “refers to teachers as learners and leaders who influence others toward improved practice and learning for all students” (p. 40). The framework’s three components were used to explore how teacher leaders navigated their defined roles and responsibilities and the impact of their efforts to build their colleague’s capacity to integrate technology for teaching and learning:

1. Influences others- well developed group skills, build collaborative relationships, and reform their work.
2. Facilitates communities of learning- school-wide focus on student learning, work as reflective practitioners.
3. Confronts barriers- acknowledge tensions, professional dialogue, advocate a problem solving approach. (p. 40)

**Research Questions**

The following questions guided the research:

1. What are the factors that influence technology teacher leaders’ efforts to build capacity for technology integration at their school sites?
2. To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?
Significance of the Study

Researchers found considerable evidence on the need for teachers to receive extensive training and support to effectively integrate technology into their teaching practices. Although different models of support have been noted in research, school districts have struggled with varying levels of success in supporting teachers learning to use and integrate technology. Further lacking are models of support to address the challenges and demands placed on teacher leaders who have been charged to provide teachers with this type of support.

This study provided in-depth insight into the conditions necessary to effectively facilitate teacher leaders’ work. Also, the participation of teacher leaders of technology adds to the generalizable knowledge of teacher leadership models. This research study will benefit site administrators and district administrators as they address the challenges of achieving large-scale reform plans to support teachers’ effective integration of technology into their classrooms.

Methodology

The study consisted of analysis of program documents, teacher and TTL logs, and surveys gathered by the district during the first two years of the program’s implementation.

Limitations

The study is a single case of a district that has a two-year Technology Teacher Leadership Initiative the specific context significantly shapes and limits application to other districts.
**Definition of Terms**

For the purpose of this study, the following terms were used.

Educational Technology: Defined in the National Educational Technology Standards (NETS) glossary as: “Educational computing and technology encompasses knowledge about and use of computers and related technologies in (a) delivery, development, prescription, and assessment of instruction; (b) effective uses of computers as an aid to problem solving; (c) school and classroom administration; (d) educational research; (e) electronic information access and exchange; (f) personal and professional productivity; and (g) computer science education” (p. 359).

Effective Integration: The use of technology and related applications to support curricular objectives such as state-adopted curriculum standards. Instruction incorporates the use of technology applications and tools to help students achieve instructional objectives (Cradler & Beuthel, 2000). For the purposes of this study, effective integration will be defined as use of technology to support the National Education Technology standards (NETS) for teachers.

International Society for Technology in Education (ISTE): A nonprofit organization serving educators and education leaders committed to empowering connected learners in a connected world. This organization developed the National Educational Technology Standards (NETS) for teachers.

Teacher Leader: A teacher leader is a teacher who is committed to improving professional learning opportunities for self and others and is willing to ‘go public’ by modeling, sharing and influencing others as a part of his or her day-to-day work on behalf of children (Galland, 2008).
Teacher Leadership: Katzenmayer and Moller (2001) define teacher leadership as “teacher leaders who lead within and outside of the classroom. A teacher leader is a member and contributor to a community of teacher learners. They are influential in the continued improvement of educational practice” (p. 6).

Technology Integration: The use of computing devices for instruction. These can include computing devices such as desktop computers, laptops, handheld computers, software, or the Internet (Hew & Brush, 2007).

Summary

Teachers’ varying levels of computer skills have impacted their use and integration of technology into their classroom practices. This chapter described the immediate challenges teacher leaders face as content experts who support their colleagues as mentors and coaches to increase their effectiveness in their classrooms. The literature identified several barriers to teachers’ technology integrations and the need for a model of teacher support to address the varying needs of teachers. Bronson’s teacher leader framework provides the conceptual basis on teacher leadership identifying key roles teacher leaders assume when attempting to influence teacher practice, facilitate teacher support, and overcome obstacles that impede their efforts to support teachers.

The problem being addressed in this dissertation are the challenges presented to districts and schools to provide authentic professional development and support to teachers as they work to effectively integrate technology into their curriculum. The purpose was to examine the factors that foster or hinder technology teacher leaders’ efforts to build the capacity of teachers using technology in their classrooms to enhance instruction.
Organization of the Dissertation

Chapter 1 provided the background on teacher leadership and the evolution of their teacher leaders’ roles in schools and districts. Chapter 2 provides a review of the literature that is relevant to this study. Chapter 3 presents the study’s methodology. Chapter 4 describes the findings of the study. Chapter 5 summarizes the findings and discusses the conclusions, implications, and recommendations for further research.
Chapter 2: Review of the Literature

The central issues in using Technology Teacher Leaders (TTLs) to implement technology in classroom teaching are clarity of the goals or purposes for the technology; the types of training needed by teacher leaders and teachers; organization and support of teacher leaders’ work with teachers in classrooms; the need for authentic professional development tailored to teachers’ diverse needs; and different models of teacher leaders of technology.

Current Educational Context for Technology in Teaching and Learning

Efforts to shift the paradigm on K-12 education are escalating as teachers work to meet the demands of teaching students the skills required to be successful in the 21st century (Heineke & Blasi, 2001). Fullan (2012) noted, “Technology is evolving at an incredible rate so we should be careful about generalizing- it is different today than it was yesterday” (p. 10). Researchers recognized that while teachers have increased access to technology, they need training in order to integrate it into their curriculum (Gray, Thomas, & Lewis, 2010; Palak & Walls, 2009; Zhao, Pugh, Sheldon, & Byers, 2002).

While the need for professional development is still great, teachers are faced with additional barriers that stem from increased technology use in their schools (Brinkerhoff, 2006; Cuban, Kirkpatrick, & Peck, 2001; Hew & Brush, 2007; Hirsh & Killion, 2007; Mouza, 2001; Oldfield, 2010; Ottenbreit-Leftwich, 2010; Sheppard, Seifert, and Wakeham, 2014). Other escalating factors, such as consistent computer lab availability, reliable internet access, quick technical support, and a variety of software have now played a role in the effective integration of technology tools (Al-Bataineh, Anderson, Toledo, & Wellinski, 2006; Bauer & Kenton, 2005). Issues such as changes in administration, planning, and resource allocation have continued to emerge as obstacles
to making technology accessible and useable for teachers and students (Freeman, 2002; McIntire, 2006).

Teachers who use Web 2.0 tools that allow students to create, share, and collaborate with their peers online need increased bandwidth capacity to ensure students can access web tools and resources on a consistent basis. These challenges have negatively impacted teachers’ efforts and motivation to use online resources that support a constructivist approach to teaching with technology in their classrooms. At the same time, the lack of technology used in classrooms will impact a student’s level of engagement and participation in learning activities.

Studies revealed that students are more motivated and experience increased engagement in learning when teachers integrate and utilize technology in the classroom (Fullan, 2012; Prensky, 2010; Schlechty, 2011; Tan & Subramaniam, 2006). Various researchers claimed that schools and teachers are unable to relate to this generation of digital native students, and as a result, students frequently describe school as boring (Fullan, 2012; Prensky, 2010).

Schlechty (2011) noted, that the traditional student-learning environment is out-of-date and has not created a learning atmosphere for teachers and students to work as partners in the learning process. Students and teachers will have to assume new roles that foster a more collaborative approach to teaching (Cheng, 2006; Heineke & Blasi, 2001). Fullan (2012) suggested the following criteria be in place for students and teachers to be actively engaged in the learning process through the use of technology developments; i) irresistibly engaging (for students and teachers); ii) elegantly efficient and easy to use; iii) technologically ubiquitous 24/7; and iv) steeped in real-life problem solving (p. 4).
The Federal Department of Education commissioned a review of research (Ringstaff & Kelley, 2002) on the impact of technology on teaching and learning. The review and subsequent research by Carle, Jaffee, and Miller (2009) concluded that technology increases student motivation and engagement, prepares students for jobs, and enhances students’ ability to work collaboratively (Ringstaff & Kelley, 2002). In order to engage students in learning, school environments need to account for the home environments in which students live. Today’s students are more “tech savvy” than in past generations. Prior research concluded that today’s students use a variety technology devices daily (Zhu, 2003), while more recent research makes a connection between how students access and use technology at school and its influence on their computer using practices at home (Ba, Tally, & Tsikalas, 2002).

In order to compete in a global economy, students need to develop a variety of computer skills that enable them to acquire new knowledge that supports the development of 21st century skills (Berrett, 2006; Fullan, 2012; Schlechty, 2011) and digital literacies to process new information (Cadiero-Kaplan, 2006). Gilster (1997) coined the term ‘digital literacy’ and defined it as the “ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers” (p. 1). Some researchers use the term ‘digital literacy’ to explain how students will need to understand and use multiple forms of media to process information and learn (Cadiero-Kaplan, 2006; Gilster, 1997; Pailliotet & Mosenthal, 2000). This means the social structures of schools need to adapt to the changing roles of teachers and students within this new context of learning (Cadiero-Kaplan, 2006; Cheng, 2006; Dexter, Anderson, & Becker, 1999; Ferneding, 2003; Schlechty, 2011). According to the
Another important context is the growing disparity between students’ experiences in and out of school. Students use computers, mobile devices, and the Internet to create their own engaging learning experiences outside school and after school hours—experiences that too often are radically different from what they are exposed to in school. Leadership in the world depends on educating a generation of young people who know how to use technology to learn both formally and informally. (NETP, 2010, p. 4)

Due to the rapid emergence of social media and the multitude of technological devices, students already come to school as proficient users of the technology that some teachers are now learning how to use. Zhu (2003) identified today’s students as technologically literate and often exceed the abilities of their parents and teachers. Students have become accustomed to using technology devices throughout their day for various reasons and have steadily integrated the use of their devices for academic purposes, as well as, socially (Fullan, 2012; Prensky, 2010).

The New Context for Teaching in the Digital Age

Prensky (2001) maintained, “one of the biggest problems facing education today is our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language” (p. 2). According to Fullan (2012), boredom is prevalent under the current school system which he noted as “too costly, too ineffective, and as any kid will tell you, deadly boring” (p. 5). Researchers acknowledged that students are bored and unmotivated when they are
expected to act solely as consumers of knowledge under the current schools’ systems (Fullan, 2012; Prensky, 2010). Schlechty (2011) characterized the engaged student as “attentive, committed, persistent, and finds meaning and value in the tasks” (p. 14). Teachers must find engaging ways to teach students computer literacy skills. How teachers teach is just as important as what they teach (Feiman-Nemser, 2001). This type of change in mind-set is believed to have a striking impact on students’ achievement (Dweck, 2010; Schlechty, 2011).

Another issue to consider when discussing the relevance of integrating technology into the classroom is the impact on students from low-income communities and special needs students (Al-Bataineh, Anderson, Toledo, & Wellinski, 2006; Kuzmicic, 2006). Some researchers suggest that low-income students benefit from having access to technology in schools. Opponents of this view see computers as another digital divide between the have and have-nots. More research is on-going in the area of what Gates (2000) calls “cyber-segregation” (p. 1). Since poor families are not likely to have computers or internet access at home, it will be a challenge for these students to develop their digital literacies akin to their more affluent counterparts (Attewell, 2001). To integrate technology effectively, teachers need to ensure their curriculum and students’ needs determine what technology tools are employed to support learning outcomes (Bauer & Kenton, 2005; Cradler & Beuthel, 2000; Hew & Brush, 2007). Teachers have access to no fee sites such as Voki, Haiku, Edmodo, Remind 101, Knowmia, Kahn Academy and other social media types to keep their students engaged in learning, as well as, informed of their assignments, quizzes and pertinent class information (Gonzales & Vodicka, 2012).
Changing roles in the classroom. Loosening the reign on the traditional style of teaching will be another challenge for teachers. The traditional method of feeding students information and expecting them to ‘soak it up’ is outdated and ineffective. Today’s technology enhanced classroom depicts the teacher and student as partners in the learning process. This relationship requires teachers to enhance their overall approach to teaching and learning. Prensky (2010) used the term ‘partnering pedagogy’ to describe the role change of the teacher from lecturer to coach who guides the use of technology for effective learning. He explained that “teachers will need to become more expert at things that are already part of the job, including asking good questions, providing context, ensuring rigor, and evaluating the quality of students’ work” (p. 3).

Just as there has been a paradigm shift in the way schools have managed technology integration, teachers have experienced a shift in their classrooms. They have become facilitators of student learning as opposed to their traditional role as the teacher. McDonald (2012) argued that studies do not consider how transitioning between two different learning environments posed challenges for adult learners who already face multiple demands on their time and attention. This transition will particularly affect Digital Immigrants who must adapt to new technologies while simultaneously learning new concepts and skills. This paradigm encourages teachers to change their mindset and adopt the role of a facilitator who coaches and guides students towards meeting their technology learning goals (Cadier-Kaplan, 2006; Ng, 2006; MacDonald, 2011; Sclafani, 2006; Schlechty, 2011).

In this situation, the teacher is no longer the disseminator of knowledge and now becomes a collaborator or partner with students as they engage in the learning process.
Schlechty (2011) explained how teachers in the role as guide to instruction must be wise adults who provide guidelines, dialogue, and reflection about ethical implications of the digital environment our students live and learn in. Fernending (2003) has an opposing view of the teacher as a ‘guide to instruction’. He disproved of the role of the teacher as the ‘guide on the side’ and claimed it placed teachers in the role of technician. He claimed teachers acting as facilitators does not make any cognitive and literate connections that are inherent in student-centered and critical pedagogical approaches of teaching.

Researchers found many teachers reported feeling that they were less knowledgeable than their students about new technologies, leading other reports to suggest teachers work more in partnership with students (Banaji, Cranmer, & Perrotta, 2010). When teachers and students work together as collaborators, the potential for transformative teaching practices might manifest. Paulo Friere (1993) describes this as ‘transformative pedagogy’ where students contribute to knowledge meaning and making, with teachers open to learning from students. This paradigm proposes that school leaders build the will (belief) and skill (skill development) to support teachers in bridging the digital divide amongst themselves and students.

**Effective Integration of Technology**

According to different scholars, there is no universal definition of ‘technology integration’ (Bebell, Russell, & O’Dwyer, 2004; Cuban, Kirkpatrick, & Peck, 2001; Hennessy, Ruthven, & Brindley, 2005; Lim et al., 2003), although the prevailing elements included use of computing devices for instruction (Hew & Brush, 2007). To be effective in integrating technology for 21st century learning, teachers have to be experts in
their content knowledge, be well competent in their instructional practices, and be skilled in the use of technology (Prensky, 2010; Coppola & Elmore, 2004; Ng, 2006). Ertmer (1999) noted providing access does not ensure that technology will effectively enhance teaching and learning and result in improved achievement, and nor does providing access imply that all teachers and students will make optimal use of the technology (Dexter, Anderson, & Becker, 1999; Heineke & Blasi, 2001; Hixon & Buckenmeyer, 2009; Noeth & Volkov, 2004).

Hixon and Buckenmeyer (2009) stressed, “Technology needs to be married to the curriculum from the beginning, emphasizing its relationship to teachers’ views about teaching and learning” (p. 143). Technology may mean little without appropriate objectives and goals for its use, structures for its application, trained and skillful deliverers, and clearly envisioned plans for evaluating its effectiveness (Noeth & Volkov, 2004; Zhao, Pugh, Sheldon, & Byers, 2002). The process of integrating technology in the classroom is difficult for teachers for numerous reasons and is well-documented in the literature (Ertmer, 1999; Kuzmicic, 2006; Cadiero-Kaplan, 2006; Hew & Brush, 2007; Hixon & Buckenmeyer, 2009; Zhao, Pugh, Sheldon, & Byers, 2002). Spivy, Young and Cottle (2008) noted even with understanding the need to provide students with 21st century skills, actually succeeding in integrating the technology became overwhelming to most teachers. The process of integrating technology is not easy and is not completed quickly. According to Zhao, Pugh, Sheldon, & Byers, 2002, “There is a conspicuous lack of attention to the complexities and intricacies of how classroom teachers actually incorporate technology into their teaching” (p. 2). Researchers
suggested that time and effort is needed to build teachers’ confidence in using technology to facilitate student learning (Ertmer & Ottenbreit-Leftwich, 2010).

**Phases of integration.** The five phases teachers experienced as they moved toward integrating technology in order to create good learning environments for students was first noted in a seminal study conducted by Apple Computer Corporation. The five stages include: (1) Entry, (2) Adoption, (3) Adaptation, (4) Appropriation, and (5) Invention. The entry level indicated teachers did not integrate technology, while teachers at the invention stage had transformed their pedagogy. Apple Classrooms of Tomorrow (ACOT) conducted a project study with teachers who showed interest in using technology. They concluded that teachers’ use of computer hardware and software indicated they were taking a constructivist approach to teaching, which naturally showed an emergence of new teaching and learning practices (Dwyer, Ringstaff, Haymore, & Sandholtz, 1994).

**Barriers to Integrating Technology**

Many studies indicated teacher’s beliefs, skills, access to resources, and teacher support are key determinants of whether or not teachers integrate technology into their classrooms (Mouza, 2009; Boksz, 2012). The barriers related to professional development and technology have been noted by many researchers (Brinkerhoff, 2006; Cuban, Kirkpatrick, & Peck, 2001; Hew & Brush, 2007; Hirsh & Killion, 2007; Jenson & Lewis, 2001; Mouza, 2009; Oldfield, 2010; Ottenbreit-Leftwich, 2010; Sheppard, Seifert, and Wakeham, 2014). The barriers impacting technology integration have been grouped into distinct categories: resources, institutional and administrative support, training and
experience, and attitudinal or personality factor and assessments (Brinkerhoff, 2006; Hew & Brush, 2007).

**Lack of resources.** Some researchers suggested that lack of resources as the most pervasive barrier as teachers are becoming frustrated with current demands and mandates to use computers and devices that they are unaccustomed to use themselves. Lack of training and teacher support has been identified by many researchers as a reason why teachers are hesitant to integrate technology in their classroom practices (Cuban, Kirkpatrick, & Peck, 2001; Matthew, Stephens, Callaway, Letendre, & Kimbell-Lopez, 2002; Ottenbreit-Leftwich, 2010; Sheppard, Seifert, and Wakeham, 2014). Attitudinal and self-efficacy factors have been clearly shown to have an impact on teachers using technology (Bauer & Kenton, 2005; Royer, 2002; Piper & Perry, 2008; Wozney, Venkatesh, & Abrami, 2006). Under these circumstances, such barriers could perpetuate the digital divide between ‘digital immigrants’ and ‘digital natives’.

Variable access to resources, including hardware, broadband, updates and technical support have become barriers to technology integration in the classroom (Ertmer, 1999; Oldfield, 2010; Staples, Pugach, & Himes, 2005). Schools will need to update their computer mainframes to handle the increasing traffic on their information highways during the school day as students access the Internet throughout the day. A survey conducted by Schoolnet (2010) acknowledged teachers using the netbook identified technical problems (e.g., freezing, inability to access the Internet) as their top concern when using the device (Schoolnet, 2010). A teacher’s self-efficacy regarding his or her computer skills may play a part in the challenges or successes they have had with integrating technology. CDW Government Inc. conducted a nationwide “Teachers Talk
Tech’’ survey that asked classroom teachers for feedback on their perceived value of technology in education. The results of the survey indicated that teachers who were considered ‘experienced’ had few doubts about the benefits of computers to students, schools and themselves. Also, the survey revealed that the more teachers became familiar with computers, the greater their success would be in using them (Rother, 2003).

**Institutional and administrative support.** School leaders need to provide an environment that supports teachers’ acquisition of technology skills and integration into their classroom practices. In essence, they must become technology leaders who provide time and opportunities for themselves and their teachers to receive training on how to integrate technology into their curriculum. Dawson and Rakes’ (2003) exploratory study in K-12 principals found those who were involved in long-term technology-curriculum integration training significantly influenced the level of technology use in their schools. According to Vannatta and Fordham (2004), teacher’s time committed to teaching and amount of technology training are reliable factors of technology use in the classroom (p. 262). Cuban, Kirkpatrick, and Peck (2001) investigated two American high schools and found lack of time to engage in training, planning, and preparing to teach with technology was a barrier, and teachers who attempted to use technology complained of the long hours that were necessary to be successful. Researchers noted the importance of administrators allowing more time during the workday for teachers to learn, plan and practice using technology within the context of their own classrooms (Gorder, 2008; Vannatta & Fordham, 2004).

To achieve high levels of technology integration in schools, school leaders must provide a context that fosters instructional improvements for 21st century learning. A
study conducted by Zhao, Pugh, Sheldon, and Byers (2002) defined three aspects of school context which were considered central to understanding the success or failure of an innovation;

1) Human infrastructure should be flexible and provide responsive technical staff, institutionalized policies, and professional development support.

2) Technological infrastructure is an aspect that remains challenging for districts and schools. Teachers need access to computers, reliable network, and software that is not overly controlled by administrators.

3) Social support accounts for the degree to which peers support or discourage the innovators. Teachers need time to collaborate and support their peers to sustain their enthusiasm and motivation.

These three elements were found to have a strong mediating effect on the success of teacher’s technology integration into their classrooms.

**Teachers’ attitudes and beliefs about technology.** Any inquiry into teachers and their pedagogy should involve a concurrent investigation into their educational beliefs, as beliefs profoundly influence teacher perceptions and judgments, which in turn, influence their classroom behavior (Pajares, 1992). Computer self-efficacy is one’s own capabilities to use a computer. Efficacy is defined as the belief in one’s own abilities to perform. Studies on teacher attitudes and efficacy suggested those who lack confidence in their skills are less likely to change their pedagogy and integrate technology into their curriculum (Boksz, 2012; Johnson, Levine, Smith, & Smythe, 2009; Levin & Wadmany, 2008; Spivy, Young, & Cottle, 2008; Wang, Ertmer & Newby, 2010). Teacher’s beliefs about technology guide how they use it in the classroom (Ertmer, 2005; Hew & Brush,
Researchers found teachers know how to operate technology tools, but struggle with integrating into their classroom instruction (Cappola & Elmore, 2004; Ertmer & Ottenbreit-Leftwich, 2010; Gorder, 2008; Hew & Brush, 2007).

The U.S. Department of Education highlighted the ubiquitous nature of the use of technology in the 2010 National Education Technology Plan and states:

‘Technology can enable transforming education but only if we commit to the change that it will bring to our education system. For example, students come to school with mobile devices that let them carry the Internet in their pockets and search the Web for the answers to test questions. While such behavior traditionally has been viewed as cheating, with such ubiquitous access to information, is it time to change what and how we teach? Similarly, do we ignore the informal learning enabled by technology outside school, or do we create equally engaging and relevant experiences inside school and blend the two?’ (p. 4)

Today’s students are techno-literate and often exceed the abilities of their parents and teachers (Zhu, 2003). Students bring their own devices and more technology experience into the classroom, which elicits feelings of anxiety for teachers as they feel a loss of control. This can become one of many barriers that impede teacher’s technology integration. In essence, students have acquired the technology skills needed outside of classroom with their peers and utilize those skills to manage their lives. Prensky (2010) suggested, “It is in the afterschool world, rather than in schools, that many of our kids are
teaching themselves and each other all kinds of important and truly useful things about their real present and future” (p. 4).

Teachers who are under skilled in technology use may feel uncomfortable working with students who are more experienced with technology than themselves (Jones 2004; Banaji, Cranmer, & Perrotta, 2010). Jones (2004) administered the Becta survey to 170 teachers and practitioners on their perceived barriers to integrating information communication technologies into their teaching practice. The study found teachers who did not consider themselves to be well skilled in using informational communication technology felt anxious about using it in front of a class of children who perhaps know more than they do. Many teachers have steadily moved away from using technology to solely create documents, computer processing, communicating with colleagues and gradually using technology for instructional purposes and students are using technology to engage in researching on the internet and creating projects (Ottenbreit-Leftwich, 2010).

**School culture as a barrier.** A ‘culture of nice’ is one of many barriers that kept schools from engaging in practices that can sustain school change initiatives. McDonald (2012) described a ‘culture of nice’ as having an ‘underlying culture’ that inhibits the team from reaching a level of rigorous collaborative discourse where teachers are challenging each other and their own thinking, beliefs, assumptions, and practice. In order for change to occur in the context of teaching and learning, teachers will need to believe that change needs to happen. According to Zhao and Frank (2003), if a technology innovation is far removed from the existing norms (values, beliefs, and practices) of the existing school culture, technology innovations are less like to emerge
within the school setting. Hazzan’s (2002) study examined novice high school math teachers’ integration technology and found that negative undercurrents from veteran teachers influenced their decision to use technology.

Veteran teachers who do not believe technology is worthwhile in their classrooms will inevitable influence new teachers that enter the school environment. New in-service teachers entering today’s schools have technology skills (Heineke & Blasi, 2001), yet they will need to be supported by veteran teachers to develop confidence in their competencies to integrate technology into their pedagogy. Veteran teachers may even discourage new teachers from using technology in their classrooms (Abbott & Faris, 2001; Brinkerhoff, 2006; Hazzan, 2002). Brinkerhoff (2006) stated, “Experienced teachers who don’t see the value of integrating technology into their classrooms can negatively impact the design of instructional technologies by less experienced teachers” (p. 24).

Professional Development

Sclafani (2006) recommended that professional development for teachers be ongoing, include training, practice and feedback, and provide follow up support. Researchers have noted professional development that cause changes in pedagogy is a long process developing over several years (Levin & Wadmany, 2008; Boksz, 2012; Whitehouse, Reynolds, & Caperton, 2009). Feiman-Nemser (2001) stated, “what students learn depends on what and how teachers teach; and what and how teachers teach depends on the knowledge, skills, and commitments they bring to their teaching and the opportunities they have to continue learning in and from their practice” (p.1).
Teachers engage in professional development opportunities to increase their efficacy and improve or become more effective teachers. The teacher, as a learner, must be the focus of training and support with all the demands of curriculum, classroom management, and existing instructional skills that are prevalent (Dexter, Anderson, & Becker, 1999). Hirsh and Killion (2007) challenged the idea of "professional development programs and lectures as sufficient to change teachers' classroom practices" (p. 1). According to Darling-Hammond and Richardson (2009), “Professional development is more effective when schools approach it not in isolation (as in the traditional one-shot workshop) but rather as a coherent part of a school reform effort” (p. 2).

In regards to technology integration, researchers recognized professional development must focus on providing teachers with knowledge on how to use technology to change pedagogy, not just provide them with technical computer knowledge (Heineke & Blasi, 2001; Boksz, 2012; Slepkov, 2008; Schlechty, 2011). Hixon and Buckenmeyer (2009) emphasized the need for professional development that caters to teachers’ individual learning contexts regardless of their respective technology integration stage (p. 143) and suggested “training sessions are usually based on a ‘one size fits all’ model where individual differences and learning styles are not taken into consideration” (p. 141). Boksz (2012) emphasized professional development for teachers has fallen short of causing the paradigm shift needed for teachers to effectively use technology tools for instruction.

**Personalized learning opportunities.** Darling-Hammond and Richardson (2009) noted, “To avoid disparities between what teachers learn in professional
development work and what they can actually implement in their classrooms, schools should seamlessly link curriculum, assessment, standards, and professional learning opportunities” (p. 2). There is a great need for technology training, and researchers have identified teacher support as crucial and on-going coaching as necessary for teachers’ integration of technology into their pedagogy (Archambault, Wetzel, Foulger, & Williams, 2010b; Brinkerhoff, 2006). Researchers found that teachers who participate in professional learning opportunities around technology have successful experiences with technology integration in the classroom (Wells, 2007). A 2009 Status Report on Teacher Development in the United States and Abroad highlighted how schools in the United States failed to provide teachers with powerful professional learning opportunities. This report referenced data from teacher surveys and an inventory and noted the United States made some gains with providing support for new teachers, but were deficient in providing time and opportunities for sustained teacher learning with follow-up and job-embedded professional development in collegial environments (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009).

Levin and Wadmany (2008) emphasized the need for “long-term professional development programs to support technology integration, in lieu of just learning events” (p. 259). Training and support are essential as teachers align their subject area and learning objectives with technology tools and devices that promote higher levels of learning. Teachers who teach math, history/social science, science, and technical subjects are challenged with teaching literacy skills, as well as, expected to integrate technology into their instructional practices. Ertmer (2005) prescribed three strategies that seem to hold promise for promoting change in teacher beliefs about teaching and
learning, in general, and beliefs about technology, specifically: “(a) personal experiences, (b) vicarious experiences, and (c) social-cultural influences” (p. 32).

Hew and Brush (2007) identified three characteristics for implementing effective professional development in their review of the literature: “(1) focuses on content (e.g., technology knowledge and skills, technology-supported pedagogy knowledge and skills, and technology-related classroom management knowledge and skills), (2) gives teachers opportunities for ‘hands-on’ work, and (3) is highly consistent with teachers’ needs” (p. 238).

**Adult Learners.** Knowles (1980) coined the term andragogy to differentiate the assumptions made by teachers who teach children verses adults. His theory on adult learners was based on four main assumptions that explained adults’ learning experience. Knowles’ (1973) assumptions of andragogy have implications for organizing curriculum and learning experiences for adult learners: (a) changes in self-concept; (b) the role of experience; (c) readiness to learn; and (d) orientation to learning. Furthermore, Knowles (1998) affirmed six core adult learning principles for facilitators to keep in mind when engaged in professional learning opportunities. Knowles (1998) published the sixth edition of his book: *The Adult Learner: A Neglected Species* and included principles that support adults’ self-directed learning within his theory of andragogy:

1. Learner’s need to know
2. Self-concept of the learner
3. Prior experience of the learner
4. Readiness to learn
5. Orientation to learning

6. Motivation to learn. (p.?)

Adult education is not universally defined, and a variety of definitions of adult learning exist within research in this field of study (Merriam & Brockett, 2011). There is no universal theory on adult learning, although researchers agree certain conditions should be in place for adults to be successful as they engage in new learning opportunities (Brookfield, 1986; Irby, 2013; Merriam & Brockett, 2011). It will benefit district and school leaders to consider how adults learn by applying strategies geared specifically for the adult learner, especially when providing learning opportunities in trainings, workshops, and professional learning community meetings. Knowles (1980) asserted that setting a climate for learning is essential, yet it would be the most daunting and difficult task for facilitators working with adult learners. Brookfield (1986) noted six principals of effective practice when facilitating the learning of adults. According to Brookfield, facilitators should consider the following principals to support transactional teaching-learning encounters during professional learning opportunities for adults:

1. Participation in learning is voluntary.
2. Effective practice is characterized by a respect among participants for each other’s self-worth.
3. Facilitation is collaborative.
4. Praxis is placed at the heart of effective facilitation.
5. Facilitation aims to foster in adults a spirit of critical reflection.
6. The aim of facilitation is the nurturing of self-directed, empowered adults.

(pp. 9–11)
According to Darling-Hammond and Richardson (2009), the design of professional development experiences must also address how teachers learn (Fullan, 2012; Tan & Subramaniam, 2006; Schlechty, 2011) and just as students need to find learning opportunities engaging, so do teachers. Teachers continue to adapt to their new digital school and classroom environments and, as adult learners, the transition can prove to be a challenge (McDonald, 2012; Prensky, 2010). Gorder (2008) noted technology integration is not where teachers do the same thing for their students or where teachers possess the same specific skills to be competent technology users and emphasized teachers need to know how and why to use technology in meaningful ways. Adults need authentic learning environments (Brookfield, 1986; Slepkov, 2008). One-size fits all professional development models will not meet teachers various learning needs as they engage in 21st century teaching and learning environments.

Teacher Leadership for School Improvement

Teachers, from neophytes to experts, fulfill formal and informal leadership roles within all schools (Salazar, 2010). Researchers have shown the importance of leadership to school improvement (Marzano, Waters, & McNulty, 2005). Others agreed and added the importance of an established school environment with personnel to provide support and training with integrating technology as critical for teachers to be successful (Dexter & Anderson, 2002; Dexter, 2011; Ottenbreit-Leftwich, 2010). Many studies have found the principal’s role as key to school improvement and efforts to reform. This caused researchers to investigate how positional leaders might work with instructional coaches, technology coordinators, and teacher leaders to foster teacher’s learning in attempts to improve their teaching practices (Dexter, Louis, & Anderson, 2009; Gallucci, Lare,
Yoon, & Boatright, 2010; Salazar, 2010), yet there is little research on the influence of teacher leaders of technology on their colleague’s integration of technology into their classroom practices (McLeod & Richardson, 2011). There is even less research on how leaders design effective opportunities for teachers to learn how technology can support instructional innovations and improvements (Dexter, 2011).

York- Barr and Duke (2004) stated, “educational improvement at the level of instruction, for example, necessarily involves leadership by teachers in classrooms and with peers” (p. 255). Schlechty (2011) claimed change where it counts most- in the daily interactions of teachers and students- is the hardest to achieve and the most important. Dexter and Anderson (2002) stressed,

These notions signal why it’s imperative that all stakeholders partake in any dialogue regarding school change initiatives to ensure their involvement and support from all levels within the school community. Specifically, environments should be conducive to effective technology-supported instructional improvement efforts. (p. 12)

**School Culture.** Various studies indicated the importance of school culture and technology integration into the classroom (Lowther, Inan, Strahl, & Ross, 2008). Culture is built up over time, and it will take more than professional development opportunities to build or shape school culture (Bolman & Deal, 2008). Researchers have examined of the role of teacher leadership and its impact on school improvement, school culture and student achievement (Smylie & Denny, 1990; York-Barr & Duke, 2004). Smylie and Denny (1990) noted although teacher leadership is not a new concept, “what is new are increased recognition of teacher leadership, visions of expanded teacher leadership roles,
and new hope for the contributions these expanded roles might make in improving schools” (p. 25).

Teacher Leader Models

Researchers have acknowledged teacher leaders as experts in their field who have served as valuable resources and have positively influenced schools’ implementation of instructional goals (Harris, 2005; Salazar, 2010; Sheppard, Seifert, & Wakeham, 2014; Teacher Leadership Exploratory Consortium, 2011; York-Barr & Duke, 2004). Educational institutions have created teacher leadership positions and employed teacher leaders in an effort to support teachers with effective use of technology to enhance student learning. Katzenmeyer and Moller (2009) noted a primary reason that teacher leader positions are emerging is that school systems recognize that the professional development offered to teachers does not result in changed teacher behavior in the classroom unless follow-up coaching and support are offered.

Although there is no uniform definition of teacher leader, there is agreement that their role in school reform efforts is multifaceted (Ash & Persall, 2000; Harris & Muijs, 2003; Katzenmayer & Moller, 2001; Lieberman, 1988; Salazar, 2010; Sheppard, Seifert, & Wakeham, 2014). Salazar (2010) acknowledged how teacher leadership has become a reform strategy to address the pressures on schools to improve student outcomes. According to Galland (2008), “Teacher leadership is not a new concept and many researcher studies have been conducted to investigate various elements of teacher leadership” (p. 2). Harris and Muijs (2003) acknowledged that teacher leadership has taken on various forms due to the limitations of site administration to manage both the operations and instructional goals singlehandedly.
Models of teacher leaders of technology have emerged to help teachers learn how to effectively use technology as a tool for learning (Dexter, Seashore, & Anderson, 2003; Gorder, 2008; Schopp & Rothernel, 2001). South Dakota’s governor implemented a technology integration model, The Technology for Teaching and Learning Academies (TTL), as part of a plan to create a world class technology infrastructure for technology integration in schools. The Basic TTL Academy provided an extensive four-week professional development training to build teachers’ capacity to integrate technology into their curriculum and classroom practices. A two-week Advanced TTL Academy was established for teachers to build on their knowledge and skills they gained in Basic TTL Academy. Gorder (2008) conducted a study on the academies to determine the participants’ perceptions on technology integration, and explored how they integrated technology in their classrooms for teaching and learning. Demographic characteristics such as gender, age, teaching experience, content area and educational level were compared in relation to effective technology integration. The study found that teachers needed opportunities to learn how to use technology within the context of their classrooms to support consistent use and integration of technology. Gorder’s (2008) major findings revealed that a teacher’s regular use of technology was more indicative of their success in integrating technology for teaching and learning.

A study conducted by Dexter, Seashore, and Anderson (2003) on staffing models at eleven schools examined the impact of technology support staff on teacher’s integration of technology in their classrooms. The study revealed that technology support staff were able to exert considerable influence on how technology was incorporated into teaching and learning at school sites due to their expertise. These findings highlighted
the need for a team-based leadership approach for successful implementation of
improvement efforts (Dexter, Seashore, & Anderson, 2003).

Summary

To ensure students’ access to 21st century learning opportunities, teachers must be
well equipped in using technology to facilitate students learning activities to meet their
learning goals. Teachers will need personalized, on-going support as they acquire new
technology skills and adopt new teaching practices using technology. Nurturing school
cultures are necessary to support teachers and students as learning partners, who forge
new pathways of learning together in the future (Cadiero-Kaplan, 2006). Technology
teacher leaders are proficient technology users who view technology as a tool for
transforming teaching and learning. As technology leaders, they will need support from
school leadership as they work to influence their colleagues’ adoption of technology into
their teaching practices.

Chapter 3 will discuss the design of the study, data collection methods and the
district’s TTL program data for this study.
Chapter 3: Methodology

The literature on teacher leadership in Chapter 2 described a variety of definitions and models and evidence about supports and barriers to effective technology integration. A local teacher leadership initiative to implement technology in classrooms provided the opportunity to study important questions about teacher leadership. The purpose of this study was to explore the factors that helped or hindered TTLs efforts to build capacity of their colleagues to integrate technology in their classrooms practices. The problem being addressed by this research is the growing demand on school district leaders to provide support to teacher leaders of technology as they help to facilitate effective technology integration in schools.

Two research questions guided this study.

1. What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites?
2. To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?

The Technology Teacher Leaders Program

The Sewter Unified School District (pseudonym) initiated a Technology Teacher Leaders (TTL) initiative in 2013 as part of the District’s strategic Master Technology Plan to build the capacity of teacher leaders to support their colleagues with learning how to integrate technology into their curriculum. In 2014-2015 school year, the district gathered three types of data to monitor and evaluate the progress of the program that were available for this research.
1. Professional Development Logs. The TTL district staff members developed a TTL professional development log to gather data on the amount of opportunities the TTLs had to facilitate workshops and support meetings for teachers at their school sites.

2. Surveys. A team of teacher specialists and the program administrator in the Instructional Technology department developed survey instruments for TTLs, principals, and teachers in their schools. Surveys were administered at the end of each school year for the past two years the program has been in existence.

3. Archived documents. The Master Technology Use Plan and program description/overview detail the program objectives and the TTL role expectations in their schools.

The district and program are described more completely in Chapter 4.

Case Study Design

The methodology appropriate for investigating the research questions using the district data was a case study. According to Yin (2013), “Case studies are effective designs to use to contribute to the knowledge of individual, group, organizational, social, political, and related phenomena. In brief, the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events…” (p. 4).

A case study was an appropriate design for this study because it aims to obtain an in-depth, contextualized understanding of a case by providing descriptions, analyses, and interpretations of data (Stake, 1995). According to Creswell (2012), a case study “explores a real-life, contemporary bounded system (a case) or multiple bounded systems

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(cases) over time, through detailed, in-depth data collection involving multiple sources of information . . . and reports a case description and case themes” (p. 97).

According to Merriam (2009), “a case study may be used by administrators or policymakers to improve the ways things are done” (p. 4). Merriam (2009), noted case studies may be characterized as particularistic (focusing on a particular program or phenomenon), descriptive (providing an end product of rich description of the phenomenon being studied, and heuristic (enhancing the reader’s understanding of the phenomenon under study). This case study can be characterized as descriptive because it illuminated the intricacies of a particular program within a school district. Analysis of the responses of technology teacher leaders, administrators, and classroom teachers helped to identify the factors that contributed to teachers’ integration of technology into their teaching practices.

**Mixed-Method Design**

The researcher gathered the district’s data to use a convergent parallel design, which involved collecting qualitative and quantitative data simultaneously. According to Creswell (2012), this design allows for one form of data’s strengths to offset the weaknesses of another form, and that a more complete understanding of the research problem results from collecting both quantitative and qualitative data. This type of triangulation of multiple data sources collected on an on-going basis will establish “converging lines of inquiry” (Yin, 2013, p. 98). According to Yin (2008), “a major strength of case study data collection is the opportunity to use many different sources of evidence. Furthermore, the need to use multiple sources of evidence far exceeds that in other research methods” (p. 114). The data used in the study are listed in Table 2.
Table 2  

*Definitions of Data Sources*  

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Technology Use Plan</td>
<td>A three-year plan that outlines the District’s and Instructional Services’ commitment to provide teachers and students with access to technology-integrated classrooms and support, to acquire 21st century teaching and learning environments that support the transition to the Common Core State Standards and College and Career Readiness.</td>
</tr>
<tr>
<td>TTL Program Overview 2014-2015: Scope of the Program</td>
<td>Description of the program and purposes to support the integration of technology into classrooms, build technology proficiencies among teachers at all school sites, and build site leadership to foster the usage of educational technologies with technology devices.</td>
</tr>
<tr>
<td>TTL Program Overview 2014-2015: Site, Instructional Technology and District Expectations</td>
<td>Description of expectations: Integrate and model teaching with technology, provide a site professional development plan and log monthly technology sessions for teachers, and support District technology initiatives as outlined in the Master Tech Use Plan.</td>
</tr>
<tr>
<td>TTL Teacher Surveys</td>
<td>A team of teacher specialists and the program administrator in the Instructional Technology department developed survey instruments for TTLs, principals, and teachers in their schools. The surveys included reflections of their participation in the TTL program and impact on school sites.</td>
</tr>
<tr>
<td>Principal Surveys</td>
<td>The principal survey included their reflections of their school TTL’s work and the benefits to their site of participation in the TTL program.</td>
</tr>
<tr>
<td>Classroom Teacher Surveys</td>
<td>Surveys asked teachers to reflect on their site support in the use and integration of technology into their classrooms.</td>
</tr>
<tr>
<td>Professional Development Logs</td>
<td>TTLs recorded their professional development meetings on the district’s Site Professional Development Aligned to Technology Integration Plan.</td>
</tr>
</tbody>
</table>

**Research Setting**  

The district’s setting and participants in this teacher leader initiative are described to emphasize the uniqueness of this case of a large, local district. The Sewter Unified School District’s TTL Program is responsible for preparing over 26,000 students in grades Kindergarten through twelfth in building 21st century competencies. The TTL
Program initiative provides on-site support to teachers and aids the district in supporting teachers learning how to teach with technology. This study’s focus is on the multiple sources of data collected by the district from its TTL program.

Since the program’s inception, the district has administered on-line surveys and collected data from TTLs and principals in an effort to provide the support needed to make the program successful. In Spring, the district’s Instructional Technology department teacher specialists crafted distinct, year-end survey instruments to get feedback and reflections from TTL program participants. The district used a web-based Google application called Google Forms to create their online surveys, which allowed the district to get immediate feedback from its study participants. The results were used to guide the district’s planning on how to provide effective support to future TTL program participants and school sites.

Survey respondents. In 2014-2015, 63 TTLs, 40 principals, and 177 teachers provided feedback about their participation in the TTL program on the district’s year-end survey. This was the first year the district teacher added a survey for classroom teachers to solicit their feedback about the program. For the purpose of this study, classroom teachers who responded to the survey were regarded as study respondents. TTLs, principals, and classroom teachers shared their thoughts and opinions on the operations of the TTL program, which helped to frame the context in which TTLs had to operate in schools and at the district level. The survey for classroom teachers was anonymous, and their questions focused on the impact the program had on their experiences with integrating technology into their classrooms. The survey responses provoked awareness of the necessary conditions to develop a model of support for teachers learning to
integrate technology and to improve the effectiveness of site-based teacher leaders of technology. The collection of surveys from TTL, principals, and classroom teachers allowed for triangulation of the data as shown in Table 3.

Table 3

*Data Sources Aligned with Research Questions*

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Data Source: TTLs</th>
<th>Data Source: Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites?</td>
<td>TTL Year End Survey</td>
<td>TTL Principal Year End survey</td>
</tr>
<tr>
<td></td>
<td>Professional Development Logs</td>
<td>Professional Development Logs</td>
</tr>
<tr>
<td>2) To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?</td>
<td>TTL Year End Survey</td>
<td>TTL Principal Year End survey</td>
</tr>
<tr>
<td></td>
<td>Professional Development Logs</td>
<td>Teacher survey Professional Development Logs</td>
</tr>
</tbody>
</table>

**Documents**

Documents are valuable in helping researchers understand the central phenomena in qualitative studies (Creswell, 2012). The review of the archived documents enabled the researcher to gain an understanding of the conditions under which the TTL program was initiated. Also, the review allowed the researcher to determine the program’s overall goals and objectives, and gather the reflections and comments of the participants regarding their involvement in the program. The following internal archived documents from the district’s Instructional Technology department were reviewed:

- The Master Technology Use Plan (See Appendix B)
- TTL Program Overview and Expectations (See Appendix C)
- Professional Development Logs (See Appendix G)
- Surveys year-end surveys were reviewed. (See Appendices D-F)
The district technology plan. The Sewter Unified’s Master Technology Use Plan 2013-2016 was collected from the Instructional Technology department archives. The document is available and downloadable from the Instructional Technology’s district webpage. The researcher downloaded the plan to review for this case study.

TTL program overview and expectations. In Spring 2014, the district developed the 2014-2015 TTL Program Overview and Expectations for the upcoming school year (see appendix C). The document outlined the expectations for TTLs, principals and the Instructional Technology teacher specialists. This document was available to all program participants and was collected from the district’s Instructional Technology program office.

Professional development logs. At the end of the 2014-2015 school year, the district collected data on the number of professional learning opportunities TTLs offered to teachers. TTLs recorded the number of technology trainings and meetings with teachers at their sites on professional development logs distributed by the district (see appendix G). According to Creswell (2012), “there are useful guidelines for collecting documents in qualitative research” (p. 223). Documents that are incomplete, inauthentic, and inaccurate represent the negative aspects of collecting documents (Creswell, 2012). The Educational Technology department required TTLs to have their site administrator sign their logs as a means of verifying its completeness and accuracy of their recorded professional development activities.

Surveys. Every year, the District gives TTLs and principals an opportunity to give their feedback on the program. In 2014-2015, the district extended the opportunity for classroom teachers to volunteer to complete an anonymous survey. The surveys for
principals were distributed in April 2015 (see appendix E). Principals were administered
their survey earlier than TTLs and teachers. This was done strategically to assist the
instructional technology program administrator in helping principals select the next
year’s TTLs and gain board approval for their selections. Surveys for the TTLs and
classroom teachers were distributed in May 2015 (see appendices D and F). The TTL
survey was used to gather quantitative and qualitative data on their experiences as TTLs
in the program. Questions regarding their ability to build teachers capacity to integrate
technology into their classroom practices was included. According to Fink (2013), online
surveys should be no different than other self-administered questionnaires. They have
many useful features and enable one to build on the answers of previous questions. The
online surveys for this case study were created using the Google form application, which
allowed the option to create the following nine question types from a drop down menu:
text, paragraph, multiple choice, checkboxes, choose from a list, scale, grid, date and
time. For the purpose of this study, the paragraph response type was considered an open-
ended response. The District administered the survey by sending a link via district mail
to year-end survey. Confidentiality was maintained through the use of pseudonyms and
identifiers to de-identify all participants’ names.

Both written and online self-administered questionnaires should be written in a
language that is clear so people can accurately response to the questions. According to
Fink (2013), the survey must be designed to get the information you need from the people
who are most likely to give the most accurate answers. Specifically, the surveys focused
on feedback and reflections of the value of the TTL role, support and obstacles to
supporting teachers, their opportunities to offer professional development trainings, and the level of technology integration at their school sites.

All survey questions were categorized into themes of professional development, TTL support, and level of technology integration at their sites. The TTL and principal surveys included additional questions that solicited their thoughts about new computer devices that would be forthcoming in the upcoming school year. The number of survey questions differed for each group as shown in Table 4.

Table 4

Total Number of Survey Questions

<table>
<thead>
<tr>
<th>Participant Group</th>
<th>Survey Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTLs</td>
<td>20</td>
</tr>
<tr>
<td>Principals</td>
<td>19</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>18</td>
</tr>
</tbody>
</table>

Data Analysis

Data analysis is the process of finding meaning or making sense from the data, and includes consolidating, reducing, and interpreting interview responses, field notes from observations, and notes from documents that the researcher has examined (Merriam, 2009, Yin, 2008). Merriam (2009) points out data analysis and collection should occur at the same time. For this case, study analysis began with the review of qualitative and quantitative data such as interview transcripts, survey responses, other relevant documents. The researcher utilized the SPSS statistical software tool for descriptive statistics to report the frequency of responses and summarize the survey data. The TTL, principal, and teacher surveys were reviewed and manually coded using the basic word
processing software Microsoft Excel. The Microsoft Excel spreadsheet allowed the researcher to organize and manage mixed methods data and codes to analyze data and identify emerging themes. The researcher used a holistic coding approach called “lumper” coding, which captures the essence the participants’ responses by identifying key words and phrases in their responses (Saldana, 2012).

The survey required TTLs and principals to select their site level to indicate if they belonged to the K-8 or secondary TTL group. This information allowed the researcher to categorize their responses into either the K-8 or secondary group for comparison analysis. Classroom teachers were administered an anonymous survey, although they had to type in the name of their school site. This allowed the researcher to determine if they taught at the K-8 or secondary level.

Triangulation of the data from TTLs, principals and classroom teachers occurred as a measure of validity. According to Creswell (2012), triangulation ensures the study is accurate because the information draws on multiple sources of information, individuals, or processes. The researcher extracted questions from the surveys that revealed the experiences of TTLs, principals, and classroom teachers which pertained to the TTL program and research questions that guided the study as shown in Tables 5 and Table 6.
<table>
<thead>
<tr>
<th>Table 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research Question 1 Matrix (see Appendices C and D)</strong></td>
</tr>
</tbody>
</table>

| RQ 1. What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites? |  |
|---|---|---|
| TTLs | Principals | Classroom Teachers |
| 4. How many TTLs did your school site have this year? | 3. Do you plan to keep your district-funded TTL for next year? | 2. Did you receive training and/ or support from your site’s TTL? |
| 5. If applicable, how valuable was having two or more TTLs at your school this year? | 4. If not planning to keep your current District Funded TTL, who do you have in mind as a replacement and have you met with all involved to confirm | 3. To what extent has your site TTL/s training and support influenced your classroom practice? |
| 6. Please share your reasoning. | 5. If you currently have a SITE funded TTL or TTLs, do you plan on continuing to fund for next year? |  |
| 7. Do you desire to continue as a TTL next year at your school site? | 7. How valuable was having one or more TTLs at your school this year? | 10. How has the integration of technology enhanced your teaching? |
| 8. What was the deciding factor? | 8. Please share what you found valuable. |  |
| 10. How often did you have opportunities to provide professional development for teachers per month? | 9. How often did TTLs have opportunities to provide professional development for teachers per month? |  |
| 11. As a result of the TTL program, to what extent is technology integrated into classrooms at your school? | 10. As a result of the TTL program, to what extent is technology integrated into classrooms at your school? |  |
| 12. What obstacles did you face with supporting your colleagues' integration of technology in their classroom practice? | 11. What obstacles did TTLs face with supporting their colleagues' integration of technology in their classroom practice? |  |
| 13. What obstacles did you face with integration of technology into your classroom practice? | 12. What obstacles did TTLs face with integration of technology in their classroom practice? |  |
| 14. What types of support did you receive to assist you with your TTL work? | 16. Comments: Please share any insights you have about the TTL Program, including thoughts on how we can improve the program. |  |
| 18. Comments: Please share any insights you have about the TTL Program, including thoughts on how we can improve the program. | | |
Table 6

Research Question 2 Matrix (see Appendices C, D and E)

<table>
<thead>
<tr>
<th>RQ 2. To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TTLs</strong></td>
</tr>
<tr>
<td>11. As a result of the TTL program, to what extent is technology integrated into classrooms at your school?</td>
</tr>
<tr>
<td>10. As a result of the TTL program, to what extent is technology integrated into classrooms at your school?</td>
</tr>
<tr>
<td>2. Did you receive training and/or support from your site’s TTL?</td>
</tr>
<tr>
<td>3. To what extent has your site TTL/s training and/or support influenced your classroom practice?</td>
</tr>
</tbody>
</table>

Summary

Chapter 3 described the methodology used for this study. A mixed methods approach was utilized to explore the factors that helped or hindered teacher leaders of technology influence on their to use and integrate technology effectively in classrooms.

To begin an in-depth exploration of the experience of TTLs, the researcher discussed the TTL program and the district’s context during year 2 of the program. This chapter discussed the process for data collection and analysis. Qualitative data were collected and manually coded using Microsoft Excel. Quantitative data was collected using the SPSS statistical software to gather descriptive data on the frequency of responses from survey responders. The district’s archived documents were reviewed and provided background information on the program, which established the context in which TTLs operated at site and at the district level. Chapter 4 presents a description of the case study and outlines the foundation set by the district that enabled it to further develop and support the TTL Program. The program initiative and participants are discussed along with the findings for the research questions.
Chapter 4: Research Findings

The purpose of this case study was to examine teacher leadership in the Sewter Unified School Districts’ Technology Teacher Leaders Program and the factors that supported or inhibited the technology teacher leader’s ability to build capacity of their teachers to use and integrate technology in their classrooms. Quantitative and qualitative archive data from the school district were used to gain background and current information on the TTL program during the 2013-2014 and 2014-2015 school years. Documents reviewed in this study included the district’s Master Technology Use Plan, TTL program overview, interest letter and application, professional development logs, and year-end surveys. The study’s quantitative and qualitative data provided insight into the valuable assistance in the development of a model of support to improve the effectiveness of technology teacher leaders at their school sites.

The findings from the quantitative and qualitative survey instruments informed the study’s two research questions:

1. What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites?
2. To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?

District Foundation

Sewter Unified School District encompasses the City of Sewter and part of the adjacent community of Geramound. The District is comprised of 41 schools; 21 elementary schools, 5 K-8 schools, 4 middle schools, 8 high schools, and an adult school. The district served approximately 25, 250 students in grades K-12 and had approximately
2,900 employees. The ethnic makeup of students was 85% Hispanic, 5% African-American, 4% Anglo, 5% Asian, 1% Multiple ethnicities, 1.5% Native Hawaiians and other Pacific Islanders, and 0.2% American Indian/Alaskan (2014-15 statistics).

**District’s Master Technology Use Plan**

The district’s Technology Teacher Leader program initiative was a strategic effort to answer the call to action to address the Partnerships for 21st Century (P21) skills and implementation of Common Core State Standards. In 2013, District stakeholders convened to create a three-year Master Technology Use Plan (MTUP), that encompassed the following three main goals: (1) provide teachers and students with appropriate technology tools that are aligned to K-12 grade level technology competencies, (2) provide teachers and students with adequate and appropriate technology tools in the classroom to create technology rich environments with ubiquitous access to online learning platforms, and (3) provide on-going professional development to teachers to support technology integration in classrooms. The TTL Program was written into the district’s 2013-2016 Master Technology Use Plan, which served to guide the implementation of the program at the district level and at school sites.

**The Technology Teacher Leader Program Initiative**

Sewter Unified School District’s Technology Teacher Leaders Program is an initiative that aims to address the demand of providing high quality professional development and technology support to teachers to support their integration of technology into their classrooms. In 2013-2014, the district saw a need to increase support for teachers learning to use and integrate technology in their classrooms. During that time, the district’s Instructional Technology Department program administrator and
A teacher specialist created a plan to employ tech savvy teachers to provide site based technology support for teachers learning to use and integrate technology in their classrooms. District funding was used to pay for one TTL at each school site, yet school administrators had the option to fund more TTLs for their schools. The participants were selected through an application process upon admittance into the program. Teachers were not expected to be experts in technology, though they had to have experienced using technology with students to participate in the program. More so, they had to be willing to build their own capacity to integrate technology and provide their colleagues with trainings on effective integration of the district’s technology resources.

A major focus of the program during year one was to support TTLs in building their own capacity for technology integration in their own classrooms, as well as, their peers. Also, TTLs worked to facilitate and support district and site technology initiatives as specified in the program’s goals overview (see Appendix G or H). Their work included the following:

1. Modeled the integration of district supported technology resources,
2. Facilitated Internet safety protocols,
3. Gathered technology inventories on the devices in their school,
4. Vetted the district’s K-12 Technology Scope and Sequence which rolled out in Fall 2014-2015.
5. Surveyed teachers about the types of technology support they needed and tailored their professional development to meet teachers’ needs.
The TTL Program Year 2

The TTL Program was in its second year of implementation at the time of the study. The district funded one on-site TTL at the beginning of the school year to support teachers at each school with implementing district and site initiatives around technology integration. By the end of year two, there was at least one teacher designated as the district TTL at each school site, and some principals funded additional site TTLs in order to provide more support for teachers. In 2014-2015, 62% of all schools in the Sewter Unified School District had 2 or more TTLs. The school district’s Educational Technology Department funded 60% of the TTLs, while 40% were site-funded shown in Table 7.

Table 7
Technology Teacher Leader Program Funding Sources for 2014-2015

<table>
<thead>
<tr>
<th>TTLs - All</th>
<th>District Funded</th>
<th>Site Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

The TTLs had clearly defined roles as assigned by the district’s TTL Program, yet their on site responsibilities varied due to their additional duties as assigned by their principal. For example, two were teaching teacher specialists, three taught secondary technology proficiency courses, and three were resource teachers who worked in and out of the classroom. The sites funded the resource teachers for additional support for teachers. One principal was the site administrator for two small schools who shared one school facility so the District funded one TTL for that site. All other principals were responsible for one site. Teachers were representatives from both K-8 and secondary schools.
**TTL Program Participants.** TTLs were designated as either K-8 or secondary based on their grade level they taught and the configuration of their school site. The TTL K-8 group consisted of 41 teachers, while the secondary group was comprised of 22 teachers. TTLs at comprehensive and alternative high schools were designated as secondary TTLs. The K-8 group represented teachers who taught kindergarten through eighth grade at elementary schools with different configurations such as K-5, K-6, and K-8. The secondary group was teachers who taught grades six through twelve and included comprehensive middle schools with grades 6-8 and the high schools configured as 7-12 and 9-12. During this time, 65% of the TTLs were K-8 teachers, and 35% made up the Secondary group as shown in Table 8.

Table 8

*Technology Teacher Leader Program Participants 2014-2015*

<table>
<thead>
<tr>
<th>TTL Groups</th>
<th>Grade Span</th>
<th>Total Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-8 TTLs</td>
<td>K-8</td>
<td>41</td>
<td>65%</td>
</tr>
<tr>
<td>Secondary TTLs</td>
<td>9-12</td>
<td>22</td>
<td>35%</td>
</tr>
</tbody>
</table>

**Survey data.** The District administered the online survey to all groups by sending a hyperlink to their designated year-end survey through district mail. As a requirement of the program, TTLs and principals took this survey annually at the end of the school year. Any identifying information on the TTL and principal surveys were redacted to ensure a reasonable amount of confidentiality. The District sent classroom teachers a link to an anonymous TTL teacher survey through district email. Their survey was voluntary and served to give teachers an opportunity to share their reflections about the TTL program and their experiences integrating technology into their classroom.
practices. One hundred percent of TTLs and principals completed the surveys. Eleven percent of classroom teachers completed the survey. The total number of the questions varied for each survey, which was based on the kinds of information the district needed from each group.

All surveys asked questions about the TTL program, professional development and experiences with integrating technology for teaching and learning. TTLs were asked an additional question about participating in a pilot designed to support teachers as they learned to use a new 2 in 1 Lenovo tablet for teaching. The surveys for the principals included questions that would help the Instructional Technology department develop a plan and budget for buying new computer devices for their school. The response rates from the respondents and survey information for each group are listed in Table 9.

Table 9

<table>
<thead>
<tr>
<th>Surveys</th>
<th>Number Distributed</th>
<th>Number Responded</th>
<th>Percentage Responded</th>
<th>Number of Survey Question</th>
<th>Distribution Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTLs</td>
<td>63</td>
<td>63</td>
<td>100%</td>
<td>20</td>
<td>Required</td>
</tr>
<tr>
<td>Principals</td>
<td>40</td>
<td>40</td>
<td>100%</td>
<td>19</td>
<td>Required</td>
</tr>
<tr>
<td>Classroom Teachers</td>
<td>1900</td>
<td>177</td>
<td>11%</td>
<td>18</td>
<td>Voluntary</td>
</tr>
</tbody>
</table>

Survey Findings

The findings suggest that time, access to computer and updated technology, and teachers’ varying skills were the major factors TTLs confronted as they worked to build the capacity of teachers to use and integrate technology. Research question one addressed the factors that arose while TTLs attempted to support teachers with
integrating technology into their classrooms while maintaining their own duties and responsibilities as assigned by the district and site leaders. Research question one addressed the factors TTLs confronted throughout the school year. The survey responses from open-ended questions were coded into categories to reveal the most prominent factors that emerged in this case study. Research question two addressed the influence TTLs had on their colleagues’ teaching practices. Table 10 shows the means and ranges for the survey questions used to derive the factors in this case study. Open-ended questions are also listed.

Table 10

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Response options</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. How many TTLs did your school site have this year?</td>
<td>(1-4)</td>
<td>2.05</td>
<td>1.04</td>
</tr>
<tr>
<td>5. If applicable, how valuable was having two or more TTLs at your school this year?</td>
<td>(1-5)</td>
<td>3.25</td>
<td>1.68</td>
</tr>
<tr>
<td>6. Please share your reasoning.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Do you desire to continue as a TTL next year at your school site?</td>
<td>(1-3)</td>
<td>1.46</td>
<td>.758</td>
</tr>
<tr>
<td>8. What was the deciding factor?</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. How often did you have opportunities to provide professional development for teachers per month?</td>
<td>(1-4)</td>
<td>2.02</td>
<td>1.04</td>
</tr>
<tr>
<td>11. As a result of the TTL program, to what extent is technology integrated into classrooms at your school?</td>
<td>(1-4)</td>
<td>3.00</td>
<td>.821</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Response</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. What obstacles did you face with supporting your colleagues' integration of technology in their classroom practice?</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. What obstacles did you face with integration of technology into your classroom practice?</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14. What types of support did you receive to assist you with your TTL work?</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18. Comments: Please share any insights you have about the TTL Program, including thoughts on how we can improve the program.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Principals**

3. Do you plan to keep your district-funded TTL for next year? (1-3) 1.35 .736
4. If not planning to keep your current District Funded TTL, who do you have in mind as a replacement and have you met with all involved to confirm? (1-2) 1.45 .932
5. If you currently have a SITE funded TTL or TTLs, do you plan on continuing to fund for next year? (1-2) 2.68 1.67
7. How valuable was having one or more TTLs at your school this year? (1-4) 3.35 .892
8. Please share what you found valuable. - - -
9. How often did TTLs have opportunities to provide professional development for teachers per month? (1-4) 2.18 .984
10. As a result of the TTL program, to what extent is technology integrated into classrooms at your school? (1-4) 2.55 .846

(continued)
Research Question

Response options (low-high)

11. What obstacles did TTLs face with supporting their colleagues’ integration of technology in their classroom practice
   - - -

12. What obstacles did TTLs face with integration of technology in their classroom practice?
   - - -

16. Comments: Please share any insights you have about the TTL Program, including thoughts on how we can improve the program.
   - - -

Classroom Teachers

2. Did you receive training and/or support from your site’s TTL? (1-2)
   2.51 1.06

3. To what extent has your site TTL/s training and support influenced your classroom practice? (1-4)
   2.51 1.06

10. How has the integration of technology enhanced your teaching? (1-5)
   2.61 1.03

---

Research Question One

What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites?

Based on the survey data, TTLs, principals and teachers indicated factors of time, access to computers, updated technology devices, and restricted Internet access were important to their efforts to build teachers’ capacity to use and integrate technology at their sites. Survey questions 7-12 on the TTL survey and questions 10, 12-14 on the principal survey addressed factors that influenced TTLs efforts to build teachers’
capacity. The participants’ comments in response to open-ended questions are included
and coded as follows:

- CT- Classroom Teacher
- TTL- Technology Teacher Leader
- P- Principal

Time

According to all study participants, time was a major factor in integrating
technology in the classroom. During the day, the times available for TTLs to assist their
colleagues were during late start Friday meetings and afterschool. Secondary TTLs had
the option of helping teachers during their preparation time, but this posed a challenge
because they needed to use the time to prepare for their own classes. TTLs reported they
didn’t have a lot of time to assist their colleagues during the day, and it was difficult to
get teachers to stay afterschool for assistance and training. TTLs had their own class to
teach which left few opportunities to connect with teachers during the workday besides
those times. Based on low or no attendance at afterschool trainings, TTLs struggled to
provide high levels of support to teachers. TTLs relied heavily on the days they were
given substitute teachers to relieve them to visit and support to their colleagues for the
entire day. On sub-release days, TTLs could schedule times that were convenient for
teachers to meet, address teachers’ questions and concerns, model how to use and
integrate technology in classrooms with students. According to the TTL program
overview, principals were to provide four sub-release days throughout the year for TTLs.

Teachers’ unwillingness to commit their time to developing their computer
literacy skills was related to the need to devote time to other school priorities. During
this time, the district’s initiatives were focused on academic vocabulary, informational reading, and writing across the curriculum. The implementation of Common Core standards remains a priority for all schools, yet schools are expected to build the capacity of teachers to use and integrate technology effectively. The district’s professional development strands were highly focused on the areas that supported the continued implementation of the Common Core State standards, integration of the new English Language Development standards, and effective integration of technology in schools.

- I feel we are at a disadvantage at this school because we do not have the technology support we need. Our TTL is helpful, but is also a full time classroom teacher, so there are limitations. (CT)
- The biggest obstacle my TTL faces is time. Developing a deeper understanding of the new CCSS and integrating technology to support those standards have been challenging. In addition, current site technology that is becoming or has become obsolete has also posed an unnecessary obstacle. (P)
- Time to plan for and deliver training for existing technology, and to gain in confidence levels all took time. I think the fact that all 3 TTLs were faced with having to prioritize their own learning, not just in Technology, but to dedicate time in learning other initiatives became a challenge. (P)
- TTL overload with other obligations. (P)
- The major obstacle was time. Many teachers did not want to have after school trainings. (TTL)
• We do not have enough time to really coach a teacher on technology implementation. That requires intensive planning before a lesson is to be presented. (TTL)

• There is so much professional development going on in other areas that I feel like we don't have a much time to spend on technology. (TTL)

Access to Technology

The amount of computers in teachers’ classrooms varied from site to site. Most teachers did have enough computers for each of their students and relied heavily on computer labs for students to access technology and online resources. Teachers who taught technology education classes were an exception because their courses required computers to be allocated to students on a daily basis. As stated in the district’s TTL program overview, TTLs were to be provided ubiquitous access to technology, whether in the classroom or in the school’s computer labs. Some principals purchased additional computers to ensure their TTLs had consistent access to technology for instruction.

Teachers normally reserved their school’s computer labs so students can access a variety of online learning tools and resources for class assignments and projects. TTLs and teachers mentioned it was difficult to get access to the computer labs on a consistent basis. Prescheduled lab times for intervention programs and computer lab policies with ‘first come, first serve’ policy did not allow for optimal utilization by TTLs to support teachers. Additionally, labs were being used for online reading and mathematics intervention programs to address students’ varying learning needs. Online standardized testing is becoming the standard for all schools, which places more limits on lab availability for teachers. For example, during spring, computer labs are unavailable for
students to use due to the administration of the Smarter Balanced Assessment Consortium (SBAC) currently known as the California Assessment of Student Performance and Progress (CAASPP). Depending on the number of labs at the school, testing windows lasted 3 to 6 weeks and were not available to teachers for instructional use. Schedule conflicts between TTLs and teachers’ schedules posed another barrier that impeded their efforts to support their colleagues even when they had access to computers.

- I feel ready to integrate technology, but laptops are very limited. I need a class set of laptops to implement. (CT)
- Technology is extremely important, and we really need to have computers in the classroom on a daily basis to use whenever we need them. Right now, it's hard to complete any kind of project because we don't know if we will be able to get the computer or not. (CT)
- My challenge was integrating regularly. I used it on average…once a week. (some weeks none) The other challenge I faced with the inconsistency of the Wi-Fi at my site. Difficult to have students do work on Google drive when Wi-Fi wasn't always up. Then I had to scramble for a quick alternative. (TTL)
- Having the time to demonstrate and help. There are a minimum amount of computers in most classrooms, so I believe that the teachers don't teach as many lessons. Most of the practice done by the students must be done in the computer labs, and it was difficult at times to get a lab time that worked into teacher's schedules. (TTL)
- Time to collaborate with them (teachers). Access to computers. (TTL)
• The hardware was the biggest obstacle, but we have addressed it by buying new computers and updating the Wi-Fi. Overall, we overcame many obstacles this year in teachers integrating technology. (P)

Updated Technology

Lack of access to updated technology prevailed as another obstacle mentioned by all groups. Teachers indicated their computers had become outdated, and as a result, they and their students could not access online educational resources due to the lack of required computer specifications needed. After 5-10 years of using the same computers, students and teachers began to receive messages that restricted their access to web-based online resources. TTLs noted that outdated computers hindered their ability to support teachers with acquiring innovative classroom practices and ultimately caused teachers to become frustrated and unmotivated to attend their trainings. Furthermore, they felt unsatisfied having attended trainings on how to integrate technology when they did not have access to the modern computer devices needed to practice what they had learned.

• If we are going to push the technology in the classroom, we should have updated equipment. Computers are about 10+ years old, and my students can't do much on them regarding educational learning because they are outdated. (CT)

• If we are going to continue to use technology in the classroom, we need more up-to-date technology, more access to different types of devices, technology that works well and on a regular basis, ability to use the brand new Smart board in our computer lab, mounted projectors in our classrooms that would
make use of the Smart board more practical, and a full time computer tech.

(CT)

- Having access to technology that was current and not outdated. (P)
- Outdated technology. My laptop is old; don't have a laptop cart (need to share); access to lab is limited. (TTL)

Access on Computers

The district aims to provide and install Wi-Fi access points at all of its schools to enable teachers and students to access educational resources on the Internet. Teachers noted they were not able to connect on a consistent basis and sometimes received a message indicating they could not access web resources because of computer restrictions. This was frustrating for teachers who wanted to use online resources to supplement their lessons. TTLs were limited in the type of technical support they could offer to teachers under these circumstances and did not have access to the credentials to resolve certain types of technical issues. Often times, TTLs had to call upon the district and site tech to help teachers because they were the only ones with the credentials to address computer restrictions problems. This was problematic because of the large amount of time that lapsed between when the teacher needed help to when they received help with their computer issues.

- District needs to make Wi-Fi in every classroom, everyday, every time you try to connect a priority. It is very frustrating to plan to use technology and then my 4-year-old laptop and the spotty Wi-Fi won't ‘talk’ to each other. (CT)
- No obstacles except the tech is here one day a week....if a student needs the lab password,(which we did), we had to wait a week for his return. Can't that
be given to the principal and when we need it, we send her the request to enter the password. If you are working on a project, the child can't do anything for a week, and we use them on a daily basis. The wireless infrastructure is not in place, yet, to support real 21st century learning. It has improved in last 2 years, but there is still more work to be done to elevate dropped signals and internet interruptions and delays, especially if we continue to only have 50-55 minutes of class time. (TTL)

- Most of our teachers do not have access to adequate computers that allow them to access the many online resources. There is also reluctance by many to try new methods of technology integration. (TTL)
- We all have iPads, but the blocks on updating and on apps have made them difficult to use. Because of these restrictions, many teachers have chosen not to use this technology out of frustration. (TTL)
- Overcoming firewall issues, getting new apps approved for use, and time. (P)
- The lack of Wi-Fi connectivity and inadequate/out dated school technology. (P)
- Out dated computers in the classrooms; not enough computers in the rooms. (P)
- Access to technology that was not outdated. The only obstacle I can imagine is old technology. (P)
- Wireless support. (P)
Teachers’ Varying Skills

A TTL who was the sole source of support for teachers at their site, or was one of a few TTLs at a large school site were presented with the additional challenge of differentiating their support for teachers. A majority of the schools had at least two TTLs to support teachers as they learned to use and integrate technology in their classrooms. TTLs who had another TTL at their school appreciated the opportunities to collaborate with one another and to assist each other with their assigned workloads from administrators and the district Instructional Technology department. The biggest challenge was organizing and facilitating professional development opportunities that addressed teachers’ diverse technological needs that ranged from the entry-level stage to the invention stage of technology adoption.

TTLs who were content area teachers sometimes struggled to provide help for teachers who taught subjects that were outside of their content knowledge and expertise. Principals observed that varying skills amongst TTLs impacted their level of influence on their peers. TTLs’ professional leanings sometimes coincided with that of their colleagues. Some TTLs felt overwhelmed at the responsibility of leading teachers in learning to integrate technology, while acquiring and developing their own skills at the same time.

- The obstacles are just the time to learn how to apply the knowledge and the equipment to use as well. (TTL)
- It's very difficult to plan and organize professional developments as only one person. Plus, there were times that I had more than one meeting to be at, where it would have been nice to have a back up person to go. Also, with the
upcoming new technology, it's nice to have an extra person to throw ideas off of. It's very difficult to be at such a large school, and be the only TTL. (TTL)

- I know this is more work, but if possible I would like to ask, is it possible to provide my TTL more support? He's great and eager to help, and there is no one else willing to step up and support. I would help him more, but I myself find I am needing help at times. (P)

**Site Professional Development Plans**

The District’s Action Plan for Technology Integration action plan served to guide the support efforts of TTLs and site leaders with nurturing teachers’ adoption and integration of technology into their curriculum (see appendix F). The action plan was divided into two parts; the Site Professional Development Aligned to Technology Integration and the Action Plan for Integrating Technology into the Classroom. The top section detailed the actions TTLs, principals, and teachers would take to support students’ use and integration of technology. TTLs were instructed to use the bottom section to document their professional development meetings and trainings offered to teachers.

The district collected one site plan from each site. The researcher reviewed the professional development section for each school site to check for accuracy. TTLs representing thirty-two schools included only the times they offered their support to teachers, while the others representing nine schools included both the trainings they offered and received on their logs. Many plans were missing information such as the target audiences, name of the trainings and the dates on which the training was provided. The number of professional development workshops and teacher meeting sessions were tallied for each site. There was an increase in the number of professional development
opportunities for teachers during the first four months of the school year. The numbers began to taper off and declined as the school year progressed. As shown in Figure 1, there was a rapid decline in the number of trainings offered during the last four months of school.

![Total Number of Professional Development Opportunities for Teachers All Schools 2014-2015](chart)

*Figure 1. Total number of professional development opportunities for teachers for all school.*

Teachers’ workloads tended to increase as the school year progressed, which meant priorities would shift depending on the areas of need for schools throughout the year. Teachers become inundated with professional learning community meetings, and other related teaching tasks while trying to keep pace with district and school site initiatives. Furthermore, it was common for schools to focus on preparing students for benchmark assessments throughout the year, and summative assessments in the spring.

**Research Question Two**

To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?

Based on the data, TTLs influence on their colleagues’ classroom practices was contingent upon the support they received from the district and their site, as well as teachers’ interest and willingness to learn about integrating technology. In an effort to
meet the needs of all teachers, TTLs offered trainings during late start Friday meetings, during work hours when TTLs were released from their classes, and after school. Approximately half of the classroom teachers surveyed indicated their practices were somewhat or greatly influenced by the trainings offered at their site, while half were not affected. Trainings that were facilitated by TTLs were not mandatory, but offered as a means of support for teachers with integrating technology.

**Principals’ Support**

TTLs and principals indicated having one or more teachers as a technology leader was valuable to their sites making progress with building teachers’ capacity for integrating technology. TTLs reported their principal’s support as an important element in their influence on teachers’ classroom practices at their site. Principals who funded additional TTLs nurtured opportunities for co-TTL support and collaboration that could support a wider range of teachers with varying needs. TTLs who had another person to work with appreciated the principal providing an extra TTL to reduce the workload that could become overwhelming as they worked to address teachers’ varying needs and differentiate their support.

- I am the only TTL at my school, but I was able to recruit other ‘tech savvy’ teachers to help with staff training modules. (TTL)
- Time for planning with my other TTLs as well as for any professional development we were going to do with the teachers. (TTL)
- One person isn't bogged down by all the work (staff needing help). Also, we are experts at different things, so we can focus on our expertise for trainings. With more of us, we have more varied ideas and feed off each other. (TTL)
• It was easier for us to split duties on giving trainings each month, and we split upper and lower grades. It was extremely helpful to have two TTLs because it allowed us to help more teachers and students. We are spread thin with our general duties as it is, so having the support of another person to be able to meet the needs of our fellow teachers and our students is important. (TTL)

• It really helped having two TTLs on campus. Having the extra support makes a world of a difference and makes my life as a teacher easier. We were able to share the responsibilities and while I was training upper grade on some of the new programs (Google apps), she was able to train or retrain some of the primary grades on Smart board lessons. (TTL)

• We were able to create rotating workshops that allowed teachers to select what they wanted help with. This made it so teachers could learn at their own pace and interest. (TTL)

• We collaborated throughout the year. It was nice for teachers to know they had more than one staff member to ask for support. (TTL)

• Collaboration. Knowledge and interest in technology [is] growing at a faster rate. (P)

Principals indicated teacher’s unwillingness to stay afterschool for trainings hindered TTLs efforts, so they utilized their Friday meetings as an avenue to support their work. All school sites have Late Start Friday (LSF) meetings to disperse pertinent information and provide professional development training to teachers and staff. Many principals allowed time for their TTLs to facilitate professional learning opportunities during this meeting at least once per month. TTLs deemed this type of support as
instrumental to their work of building teachers’ capacity for technology integration. This allowed their colleagues who became proficient in using technology to support their peers. Along with the professional development support, principals understood the importance of acquiring more computer devices for teachers to use to practice and improve their computer skills. Also, principals acknowledged how difficult it was to support the work of TTLs because they did not have the funding to buy new computer devices for teachers and students to use and implement what they learned from TTLs.

- Administrators accommodated our schedule to meet the needs of our staff. In addition, our principal called for instructional services support on specific areas of need. (TTL)
- Trainings, time during late start Fridays, collaboration with fellow TTL. (TTL)
- Our site has been very generous in allowing us to use late start Fridays and PD days to do instructional technology PD, and also has permitted us many work days as teachers to work within the normal work day to develop ourselves with the integration of common programs in our classes. Having administrator support to fit these things into our regularly scheduled day and/or getting coverage or relief from other responsibilities has helped other teachers to be able to be enticed to participate. (TTL)
- We had two late start Friday meetings during which the TTL modeled and led the learning of two district technology resources. She was also available to staff to assist with tech needs and answer tech questions. (P)
• More time to help teachers develop stronger technology skills. Late Start Fridays is not enough. (P)

District Support

TTLs and principals indicated more district support was needed to help facilitate the work of TTLs to be more effective in schools. Principals advocated for more funding to buy more technology and sub-release days for schools to support the TTL as leaders and teachers as learners. The district made efforts to support schools with funding technology resources as funding sources became available throughout the year.

TTLs valued the trainings they received from the Instructional Technology teacher specialists. They often advocated for more release time to support teachers with learning new ways to use technology for teaching and learning in the classroom. Teachers noted they needed more updated computers to be available to them to make technology accessible to students to support their learning. It was frustrating for teachers to receive training on using and integrating technology when they did not have access to the technology on a regular basis.

• Although we have Title 1 students, we have no Title 1 funds, and therefore, we cannot make strides forward. (CT)

• The answers to question #17 would only apply if we are to have updated computers in our classrooms. If we do not, the trainings and the PDD days for using technology in the classrooms would be a waste of time. (CT)

• I received the absolute best support from everyone... from the District, to my administration team, to our IT departments, both at the district and on site, to my fellow teachers and parents, and let’s not forget the patience of my
students. I would not have been able to get this far without each and every person. (TTL)

- District funded extra support time as needed so the TTL could work in more depth with teachers to gain vital integration skills and develop project based learning. Being able to use PD days would help so teachers have the depth of time to learn without worrying about subs or limited time restrictions. (P)
- Since funds are so different for each site yet the technology needs are the same, I feel the district needs to take the lead in providing equitable support and funding for all sites so all students and teachers are not only equipped with current technology but all get consistent support at each site. (P)

**Professional Development**

The program’s administrator and two teacher specialists worked closely with TTLs to offer professional development on technology integration and to ensure they received timely technical and instructional support as needed. TTLs reported the trainings and support they received was valuable and allowed them to grow professionally and build their capacity with integrating technology to enhance their pedagogy. For many TTLs, the benefits of their involvement in the program influenced their desire to continue as a TTL for the upcoming school year. A major benefit was having time at district meetings to collaborate on technology integration lessons with other TTLs to enhance their own classroom practices. Also, they enjoyed sharing their experiences with integrating technology into their classroom to increase student engagement and learning outcomes. As TTLs became more proficient at using and integrating technology, they became more confident with utilizing technology to enhance
their students’ learning experiences. At district trainings, TTLs learned about many resources and research based strategies for integrating technology, which they introduced to teachers at their site at their trainings and staff meetings.

TTLs admitted the knowledge and skills they gained from district trainings helped to push technology initiatives at their sites. Their inclusion and participation on their site’s leadership team helped to build a common understanding of the district’s and site’s goals regarding technology integration.

- District support was readily available anytime I requested it. (TTL)
- As a TTL for two years now, I find that I enjoy guiding other colleagues through our transition into CCSS with the implementation of technology. As I continue to grow as a professional through district wide collaboration at TTL meetings, CUE conferences, as well as attending numerous trainings on a variety of technology resources and their in-class implementation, I look forward to passing the information on and helping others get on board. (TTL)
- Leading innovation in technology, sharing strategies, attending conferences, and leading professional development for teachers were important. (P)
- I am very pleased with this program. The three T's are always needed: Time, Technology and Training! (P)

Sub-release Days

Principals acknowledged the need for the district to allocate funding to sites to support their TTL’s efforts to provide professional development for teachers. Teachers’ reluctance to stay afterschool for their technology trainings posed another major challenge for TTLs. Also, TTLs had to allocate time to work on district initiatives as
directed by the TTL program. TTLs and principals noted other priorities took precedence over planning and facilitating workshops for teachers. More than half of all TTLs provided professional development for teachers only once per month or not on a monthly basis. TTLs expressed a need for more days out of their classrooms to meet the demands placed on them from their schools and the district. Although TTLs enjoyed helping interested teachers learn to use and integrate technology throughout the day, it became costly for sites to pay for substitute teachers to release them for an entire day, for 3-4 days per year. TTLs indicated they were able to support more teachers, more often when they were released from their classroom duties. A valuable component of TTLs work was face-to-face time to teach with and model lessons for teachers. They reported this time as crucial for teachers because it gave them opportunities for hands on practice using technology to build their capacity.

- Would be nice for TTL's to have individual time with teachers or provide a calendar of on-site workshops. (CT)

- It would be better if we could work with the teachers/students hands-on with release days. When we give the teachers information, it often gets lost before implementation. (TTL)

- There is usually another program or school-wide issue that takes priority over training teachers to integrate more technology in the classroom. (TTL)

- Being able to meet the wide-range of individual needs on a consistent basis. Also, follow-up in the classroom with modeled lessons and further hands-on assistance as some teachers requested. (TTL)
• They gave us many opportunities to use most of the resources from our school library. I also felt giving us a day to train students, teachers, and the data team was very rewarding. (TTL)

• I have felt very valuable in my role as a TTL this year in assisting teachers in implementing the use of new (at least to us) technology, such as Chrome books, especially for Project Based Learning. (TTL)

• I have thoroughly enjoyed working with teachers at Bridge (pseudonym) and encouraging them to use technology more in the classroom. I have also enjoyed presenting workshops for teachers with follow-up to help them to incorporate the computer applications in their daily classroom activities. (TTL)

• I found the most value in the professional learning through hands on classroom demonstrations! (P)

• TTLs helped to support their respective grade level teams to build tech capacity. TTLs provided PD to teachers. TTLs worked to develop model classrooms. (P)

• Having an on-site expert who can support other staff members as they emerge in their implementation of technology in their CCSS instruction has been invaluable. (P)

• My site and I have enjoyed having our TTLs, especially since we do not have a computer tech on site. They have been supportive of the teachers (being available for one to one support) and in providing trainings. (P)
• A great deal of valuable TTL PD is done informally, resulting from a passing conversation and a follow up visit to a classroom. Formal meetings occur less than once a month. Assistance and learning occurs daily through organic conversations between TTLs and teachers. (P)

• I really like it. I wish they had more support. I wish they had more time. I wish they had more sub release days so that they could support their colleagues and show their students what to do. (P)

• The TTL role should include at least once a week out of the classroom supporting the technology plan in the classroom with other teachers. This needs to be a co-teaching model. (P)

Summary of Findings

The participants in the Sewter Unified School District’s TTL program highlight the complexities inherent when building the capacity of teachers to meet the evolving needs of students. In this case, technology integration is a focus for classrooms across the district and supporting teachers in learning to use and integrate technology is the key to successful reform efforts. The survey results indicate that TTLs and teachers had varying skills and abilities, which impacted their efforts to support technology reform at their schools. As TTLs and teachers work to build their capacity to integrate emerging technologies in their classrooms, they require more time, more updated computer devices, and more non-traditional means of attaining and providing support to teacher during the workday. Furthermore, principals have begun to advocate for funding to be dispersed to schools to support TTLs work with technology initiatives at the district and site level.
This study’s aim was to add to the body of literature on barriers to teachers’ technology integration in K-12 classrooms. This study specifically addressed the factors that affected teacher leaders who lead the efforts to build teachers’ knowledge and skills on how to effectively integrate technology into teaching and learning. The research questions were developed as a result of the insight gained from the TTL program participants after its first year of completion. The factors that helped or impeded teacher leaders of technology with supporting their colleagues with integrating technology provided the impetus for exploring the experiences of participants in the TTL program during the second year of the program. This study utilized existing data from the Sewter Unified School District’s Instructional Technology department. Chapter 5 interpreted the findings, discussed the implications for educational institutions, and the recommendations that provide a basis for further research.
CHAPTER 5: Conclusion

As the development of students’ technology literacy becomes more vital in today’s working environment, so does a teacher’s ability to effectively integrate technology in the classrooms (Demesa, 2009). Studies found that teachers become more reluctant to integrate technology into their pedagogy when on-going access to technology, training, and support are lacking (Royer, 2002). Teachers need access to ongoing, authentic and sustained professional learning environments to adopt innovative teaching practices that engage students and enhance their learning (Boksz, 2012; Schlechty, 2011; Slepkov, 2008).

Models of teacher leadership are prevalent throughout research and were examined to identify the best practices of teachers who help lead reform efforts (Ash & Persall, 2000; Harris & Muijs, 2003; Katzenmayer & Moller, 2001; Lieberman, 1988; Salazar, 2010; Sheppard, Seifert, & Wakeham, 2014). According to research, models of teacher leaders of technology have emerged to provide support to teachers learning to use and integrate technology (Dexter, Seashore, & Anderson, 2003; Gorder, 2008; Schopp & Rothernel, 2001), yet they are scarce (Gorder, 2008). This study will add to the generalizable body of knowledge on what is needed to provide the necessary conditions for teacher leaders of technology to be effective in their roles as they lead technology reform in schools.

Overview of the Study

The purpose of the study was to explore the factors that helped or hindered teacher leaders efforts to build the capacity of teachers using and integrating technology into their teaching practice in a large urban school district. This case study used a
convergent parallel design to allow for the simultaneous collection of the Sewter Unified School District’s archival data from its Technology Teacher Leaders Program. The participants in the study consisted of the teachers and principals who participated in the Technology Teacher Leaders Program during its second year of implementation. This year, the District sent classroom teachers a survey that inquired about their thoughts of the program. The District administered surveys to TTLs, principals, and classroom teachers to collected quantitative and qualitative data on the program. The district’s archived surveys and documents were analyzed for this study. Descriptive statistics were used to analyze the responses from the survey respondents. The data collection methods yielded the findings that addressed the research questions and gave insight into how to support teachers as they assume key roles to influence teacher practice, facilitate teacher support, and overcome obstacles that impede their efforts.

The findings of this study adds to the body of research that addresses the problem regarding the lack of sustained models of support for teacher leaders who provide technology support to teachers. These findings will be discussed in more detail and in relation to the existing research on technology teacher leadership.

The following research questions inform the organization of the findings:

- What are the factors that influence technology teacher leader’s efforts to build capacity for technology integration at their school sites?
- To what extent did technology teacher leaders impact how teachers use and integrate technology in their classrooms?
Discussion of the Findings

Research Question One

The first research question sought to identify the factors that impeded or helped TTLs support teachers with integrating technology. Lack of time, access to technology, updated technology, access on computers, and teachers’ varying skills prevailed as the major factors in building the capacity of teachers to integrate technology. Researchers have noted these as major challenges to effective technology integration in schools (Al-Bataineh, Anderson, Toledo, & Wellinski, 2006; Bauer & Kenton, 2005). These factors will be discussed in more detail and in relation to the existing research on technology teacher leadership. The factor of time is discussed first.

Time

The participants indicated time as the most pressing challenge they confronted when attempting to integrate technology. TTLs had a limited amount of time to provide technology trainings for teachers or meet individually with them for one on one support. TTLs indicated they were not able to provide timely support because they were either teaching their own class or could not find a convenient time to meet with teachers due to conflicts in their class schedule. Sheppard, Seifert, and Wakeham (2014) reported similar findings amongst teachers who were considered technology leaders at their school sites. The teachers voiced frustration for the fact they did not received time out of their classrooms to help their colleagues. The fact that teachers were reluctant to stay after school for their technology trainings added an additional obstacle to their efforts.

Teachers acknowledged that TTLs were helpful in supporting their site’s technology initiatives, but voiced they needed more hands on practice. The demands of...
leading their site’s technology initiatives and inspiring reluctant teachers to use and integrate technology proved to be difficult.

**Access to Technology**

The participants continually commented on the increasing number of outdated computers and other technology devices that were available for their use. Sites that were fortunate to have a sufficient number of computers at their site were able to support the TTLs’ work more effectively than sites that had a limited supply of computers or large amounts of outdated computers. The participants described that limited access to computer in class or in the school’s computer lab were indicative of teachers’ use and integration of technology. The lack of technology and Wi-Fi access was common amongst the biggest impediments to supporting teachers’ development of computer literacy skills and inhibited them from practicing what they had learned with students. Researchers have noted these barriers have a profound impact on the level of technology integration in classrooms (Ertmer, 1999; Oldfield, 2010; Staples, Pugach, & Himes, 2005).

**Updated Technology**

The participants often commented that the technology devices at their schools were outdated which caused them to be reluctant to use them with students. It was a concern that teachers were provided professional development on using technology and expected to use outdated technology for practice at their schools. Participants shared that devices such as, desktop computers, laptops, iPads, and tablets had difficulty connecting to the schools’ established Wi-Fi, or they could not consistently access the Internet. This posed frustration for participants as they planned for integrating technology, yet they
could not rely on its usefulness for their lessons or projects. The participants described how difficult it was to use technology consistently when they often confronted issues that arose while working on outdated laptops and desktop computers that could not connect to educational websites and learning resources on the Internet. Schoolnet (2010) identified technical difficulties, such as freezing screens and the inability to connect to the Internet, as a major concern of teachers when they used netbooks (tablets) in the classrooms.

**Teachers’ Varying Skills**

The participants had varying knowledge and skills regarding the use and integration of technology for instruction. Teachers were reluctant to use technology because of the amount of time that was required for the training and planning involved in integration technology. Cuban (2001) noted teachers complained of the same issues with regards to the time it takes to train and plan to teach effectively with technology.

The participants mentioned that it was difficult for TTLs to support their colleagues if they were not familiar with their content area or grade level curriculum. TTLs had different technology backgrounds ranging from beginning to expert users and often were building their own capacity to integrate technology throughout the school year. Their dual role as teacher and leader created a challenge for them as they worked to provide ample and differentiated support to their colleagues. Sheppard, Seifert, and Wakeham’s (2014) study on teacher leadership and emerging technology found the English teachers assigned to support their colleagues had varied levels of technology skills. The study highlighted that a majority of the teachers were self-taught while the others were formally educated in teaching and learning with technology. The proficiency
of the TTLs was important to the levels of support they were able to provide to their colleagues.

Participants who had two or more TTLs at their sites were provided with more assistance for teachers, could differentiate their support, and benefited from their TTLs ability to collaborate with another TTL to divide their workload as assigned by the TTL program. This allowed TTLs to service more teachers during the day since teachers were reluctant to attend trainings held after school.

**Research Question Two**

The second research question addressed the influence TTLs had on their colleagues teaching practices. Half of the teachers who responded indicated TTLs had somewhat or greatly influenced their use of technology in their classrooms. The participants noted the amount of influence on their teaching practices was related to the amount of support given by the district and the principal. The discussion of the findings is organized by the themes that emerged from the district’s data. The theme of principal support is discussed first.

**Principals’ Support**

The participants acknowledged the principal’s support efforts were crucial to the TTLs ability to facilitate their school’s technology initiatives and effectively support their colleagues. The participants described the main types of support provided to them were funding for an additional TTL, allowing time to train teachers on technology during Friday staff meetings, and funding for TTLs to use substitute teachers to be released from their classroom for an entire day to provide support to teachers. Zhao, Pugh, Sheldon, and Byers (2002) found that setting the conditions that foster instructional improvement
was crucial and had positive effects on teachers integrating technology into their classrooms. He noted teachers’ need timely training and support, access to reliable technology and the school’s network, and peer support to sustain their efforts at integrating technology.

The participants expressed ways the support from the principal could increase teachers’ commitment to building their capacity for technology integration. They noted that principals were accommodating of their needs and provided as much time and support as they could within their capacity to do so. Vannatta and Fordhan (2004) had similar findings and noted teachers’ commitment to teaching with technology was a reliable factor to their use and integration in their classrooms. The participants acknowledged TTLs commitment to supporting teachers as often as possible, but realized TTLs tended to be overextended due to maintaining their own classroom responsibilities and assigned tasks needed to support the TTL Program.

The participants acknowledged that principals often advocated for funding for technology and substitute teachers so they could help teacher during the workday, and they called on district teacher specialists to support their TTLs with integrating educational technology initiatives at their schools. Dawson and Rakes (2003) found that K-12 principals who were involved in the technology curriculum integration trainings significantly influenced their teachers’ technology use in their classrooms. These conclusions are validated in previous research findings of ways principals and teacher leaders attain a positive impact on school cultures when they lead together (Katzenmeyer & Moller, 2001; Salazar, 2010).
District Support

Participants remarked that the district’s support of their site’s technology initiatives was in the form of funding, teacher specialists’ support, and professional development for TTLs, principals, and teachers. Principals benefited from professional learning opportunities given by the Instructional Technology program administrator and teacher specialists. They shared what they had learned with TTLs and teachers at staff meetings or professional development trainings. Participants shared that district teacher specialists made a difference in their level of technology integration. Teacher specialists scheduled trainings for TTLs a few times throughout the year to build their capacity to use researched based teaching strategies to integrate technology into their curriculum. In turn, TTLs shared those best practices with teachers in hopes of building their capacity to integrate technology into their classroom practices.

Participants stated that more support was needed to help principals facilitate the work at school sites. The participants noted the district should allocate more funding for substitute teachers that would allow teachers and TTLs to collaborate on teaching strategies, plan technology-integrated lessons, and practice teaching with technology. This perception supports previous research on the importance of giving teachers the time to learn and practice using technology in authentic learning environments, which include coaching and feedback (Wei, Darling-Hammond, Andree, Richardson & Orphanos, 2009).

Professional Development

The TTL program’s overview indicated that TTLs were expected to provide professional development at least one per month, yet participants stressed time as a major
barrier to providing on-going training on a consistent basis. According to the participants, TTLs constantly worked to overcome challenges that came with managing their own classroom obligations, supporting their colleagues during the school day, and after school. TTLs’ workloads included regularly meeting with their grade level or content area peers to discussing their curriculum and lesson plans, monitor students’ progress, as well as, facilitating the implementation of school and district initiatives. Participants expressed how difficult it was for TTLs to provide differentiated support if there was only one TTL at the school site. Schools with two or more TTLs were able to alleviate some of the stresses that came with teacher leadership by dividing their duties, which allowed them to support more teachers with varying skill levels.

Participants shared how TTLs struggled with providing trainings that was differentiated to address teachers varying learning needs and technology skill levels within one workshop setting. They were able to accomplish this task by requesting more sub-release days to offer differentiated support. They strategically utilized their sub-release days by setting up meetings with teachers throughout the day to model teaching with technology, assist with them with lesson planning, and provide one on one or small group trainings. Teachers’ professional development opportunities were mostly facilitated by TTLs during the school year and at the district’s summer institute for teachers. Principals received technology trainings from TTLs and Instructional Technology teacher specialists. Most often, TTLs were provided professional learning opportunities by the Instructional Technology teacher specialists. Participants spoke of the need for their site or the district to provide funding for them to attend technology conferences and workshops to learn more about integrating technology. This conclusion
is supported in previous studies on how critical it is for teachers to engage in professional learning opportunities that are relevant, on-going, hands on, and tailored to teacher’s individual needs (Hew & Brush, 2007; Sheppard, Seifert, & Wakeham, 2014).

Participants indicated an overall increase in the use of technology at their sites, and teachers had learned to integrate technology into some aspects of their teaching. According to participants, there was a notable difference in classes whose teachers attended TTL trainings. Classroom teachers mentioned better learning environments, more opportunities for students to participate in creative assignments, and increased student participation were established as a result of integrating technology into their teaching practices. These results are noted in previous research studies on ways teachers can have successful experiences and enhance learning opportunities for students as a result of integrating technology into their classroom practices (Fullan, 2012; Prensky, 2010; Schlechty, 2011; Tan & Subramaniam, 2006; Wells, 2007).

All participants recognized a need for more professional development that included modeling and hands on practice with technology and highlighted the need for reliable Internet access to web resources for teachers and students.

**Sub-Release Days**

The participants stressed that time out of their classrooms helped them to navigate certain barriers to helping their colleagues. The participants indicated how important it was for TTLs to be available throughout the workday for teachers to encourage and support their use of technology. According to the participants, TTLs could provide more time and plan for more access to technology if they were released for the entire day. This type of support would allow TTLs to be flexible in scheduling
teachers at convenient times for trainings and one on one support to expand their knowledge and skills for effective technology integration. The biggest benefit would be that they could model for teachers how to use technology effectively in the classroom with students. Reeves (2009) emphasized the importance of using the strategy of direct modeling by teacher leaders as the most powerful and effective way to influence teachers’ classroom practices.

According to the participants, the time spent with TTLs was most beneficial when they were provided time to meet and plan with TTLs on a consistent basis. The importance of establishing a school environment with personnel to train and support teachers as vital to teachers’ success with technology integration is validated in previous research findings (Dexter & Anderson, 2002; Dexter, 2011; Ottenbreit-Leftwich, 2010).

**Implications for Districts and Educational Technology Leaders**

Districts and schools need to determine ways to revamp the current school structures to support teacher leaders of technology and teachers as they adopt new and innovative ways of teaching. Researchers noted classroom teachers need training and support from teacher leaders who are experienced and successful with integrating technology into their teaching practice (Dexter, Louis, & Anderson, 2009; Dexter, Seashore, & Anderson, 2003; Gorder, 2008). Team-based initiatives to build teacher capacity to use and integrate technology have been explored (Dexter, Seashore, & Anderson, 2003) and are the most effective way to lead and support technology initiatives.

In this case study, TTLs were teacher leaders who led from within and outside of their classrooms and supported the implementation of district educational technology
initiatives. As key components to technology reform efforts in schools, they need to be recognized as an essential component of school leadership and their role should be embedded in shared leadership practices. Their primary role is to model technology integration and support teachers as they adopt technology into their classroom practices. Unfortunately, current school structures do not allow for ample opportunities to work with teachers in their classroom during the workday. Galland’s (2008) study on the relationship between school structures and effective teacher leaders revealed that in order for teachers to lead from within their classrooms, they needed to have frequent, scheduled contact with their colleagues.

According to Salazar (2010), district-level supervisors who oversee teacher leadership initiatives could influence principals’ knowledge and interactions with teacher leaders. Studies recognized when school leaders support the use and integration of technology, teachers are more likely to overcome barriers for effective integration in their classrooms (Chang, Chin and Hsu, 2008; Demesa, 2009; Sheppard, Seifert, & Wakeham, 2014). The principal’s new leadership roles are becoming increasingly important and crucial in efforts to acquire and implement new educational technologies within [public] school settings (Chang, Chin and Hsu, 2008). Principals and school leaders should include the importance of computer and information technology in their schools’ missions and visions to ensure students are college and career ready for the information age.

According to Chang, Chin and Hsu (2008), “Information age school leaders should model technology leadership behaviors that promote teaching and learning to foster a learning environment in their organization. Principals should play a critical
technology leadership role to create a learning culture” (p. 230). Principals need access to on-going and sustained professional development around teaching with technology in order to provide the appropriate types of support for teacher leaders in and out of the classrooms.

**Recommendations for Educational Technology Leadership Consideration**

Models of support for teacher leaders of technology should include consistent ubiquitous access to updated technology, in-time technical support, site-based support which allows for ample time to collaborate with other teacher leaders, and district support that allows for time outside of the classroom to model using technology in their colleagues’ classrooms. The following recommendations are necessary to create the conditions for technology teacher leaders to effectively support teachers with using and integrating technology:

- Provide TTLs with up to date computers and reliable access to Wi-Fi and Internet web resources.
- Recognize the TTLs position as school leaders who are included in the decision-making aspects of the school’s technology initiatives.
- Increase the number of release days so TTLs can meet with teachers throughout the workday and provide timely, in-class support to teachers and model the effective use and integration of technology with students.
- Provide opportunities for TTLs to visit their peers during the workday to observe best practices in effective technology integration. This will allow for needed collaboration and peer support to build their capacity with integrating technology.
- Provide ongoing opportunities for TTLs, school leaders, and teachers to attend
technology related conferences and professional development workshops.

- Provide technology-related workshop strands in the summer conference that allow teachers to practice what they’ve previously learned about integrating technology. This would support the efforts of TTLs in building capacity for technology integration at their sites, and allow teachers to sustain and build upon the areas of educational technologies they were instructed in during the year.

- Provide school leaders the opportunity for formal dialogue on research regarding the role of school leadership in creating a learning culture in the information age.

- Provide task management systems for TTLs to collect data on the types of support teachers receive. This would ensure an alignment between the professional learning opportunities they offer for teachers and the goals of their school’s technology integration plans.

**Recommendations for Policy Makers**

The following are recommendations based on areas that support effective technology integration in schools:

- School districts need funding for a full-time instructional technology person who can model best practices and provide ongoing support during the workday. A full-time site technician is necessary to deal with computer issues that arise during the workday. Classroom teachers need more opportunities to collaborate and plan with TTLs. This model of support is crucial if teachers are to build their capacity to use and integrate technology into their teaching practices.

- School districts need flexibility in how their funding is allocated to support teachers’ long-term professional growth in learning about the best ways to
integrate educational technology. Districts need to allocate funding for schools to send teachers to technology workshops and conferences as part of their professional growth.

**Recommendations for Future Study**

Findings from this study and previous studies reveal a need for further research to identify the necessary conditions that help teacher leaders of technology facilitate their work within their own and their colleagues’ classrooms. Galland (2008) shared “Schools are not currently structured to support teachers leading from within their classrooms” (p. 98). Further investigation is needed into models of support for this unique group of teacher leaders to gain insight into how school structures impact their effectiveness at building the capacity of their colleagues for effective technology integration in their classrooms.

**Reflections**

The TTL Program was an initiative set forth to address the need for supporting teachers and students with integrating technology into the classroom. The TTLs were charged with providing support to colleagues at school sites and provided insight into the demands of the role at the district and site level. This unique group of teachers has been recognized as an essential component in the district’s efforts to support every teacher as they learn new ways to interact with technology in the classroom. It is my hope that their voices become the impetus for educational reform regarding teachers who lead their district’s and school’s technology reform efforts from within the classroom.
References


http://doi.org/10.1080/08886504.2000.10782306


Gallucci, C., Van Lare, M. D., Yoon, I. H., & Boatright, B. (2010). Instructional coaching building theory about the role and organizational support for professional learning.


Leadership, 42(2), 8–10.


Marzano, R. J., Waters, T., & McNulty, B. A. (2005). *School leadership that works: From research to results*. ASCD. Retrieved from https://books.google.com/books?hl=en&lr=&id=njFoCQAAQBAJ&oi=fnd&pg=PR5&q=school+leadership+that+works+form+research+to+results&ots=_EvkOxYIR&sig=ZRSwJqpiQ41CaPNYedBtGmQhE


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Piper, D., & Perry, B. (2008). The differences in instructional computer use, attitudes, experience and self-efficacy of teachers who are digital immigrants or digital natives. In


Slackman, J. (2005). School districts meeting adequate yearly progress (AYP) requirements spend significantly more per student on technology and plan to spend more in 2005-2006. *Scholastic, 1.*


APPENDIX A

IRB Approval Memo

State of California
California State Polytechnic University, Pomona
Office of Research Compliance

Memorandum

Date: 23-Apr-2015
To: Tamatha Williams, MS
CEIS, Education
From: DR. Jeffery S. Mio
Chair, IRB (Human Subjects Protection Committee)
cc: IRB file
Nancy Sanders, PhD
Subject: Protocol number 15-0198

Your new protocol entitled "Factors in Technology Teacher Leaders Building Capacity for Technology Integration in Schools" has been reviewed by the Cal Poly Pomona Institutional Review Board (IRB) by the Exempt - general process. It was found to be in compliance with applicable federal and state regulations and Cal Poly Pomona policies regarding the protection of human subjects used in research. Thus, the Cal Poly Pomona IRB grants you approval to conduct the research. On its behalf, I thank you for your adherence to established policies meant to ensure the safety and privacy of your study participants. You may wish to keep a copy of this memo with you while conducting your research project.

Applicable notes:

Approval is conditional upon your willingness to carry out your responsibilities as the principal investigator under University policy. Your research project must be conducted according to the methods described in the final approved protocol. Should there be any changes to your research plan as described, please advise the IRB, because you may be required to submit an amendment. Additionally, should you as the investigator or any of your subjects experience any "problems which involve an undescribed element of risk" (adverse events in regulatory terms), please immediately inform the IRB of the circumstances.

If you need further assistance, you are encouraged to contact the IRB administrator, Bruce W. Kennedy MS R/AATG CMAR CPRIA at 909-869-4215.

The committee wishes you success in your research endeavors.

Jeffery S. Mio PhD
Professor, Psychology
College of Letters, Arts, and Social Sciences
APPENDIX B

District Master Technology Use Plan 2013-2016

Executive Summary

Under the leadership of the Board of Education, [Redacted], Unified School District is committed to providing a student-centered, technology-integrated classroom where technology-supported curriculum and assessment will make learning-relevant while focused on both technology and content. In order to support 21st Century Learning and the transition to the California Common Core State Standards, including College and Career Readiness, Instructional Services/Technology is committed to facilitating teacher learning and site-support in the use of educational technologies for student learning and achievement. Empowered students will be equipped with skills for successful school life, personal-life, and work experiences. Over the next three years, [Redacted] Unified School District will be deepening its instructional focus areas to improve student outcomes with an emphasis on California Common Core State Standards, English Language Learners (ELLs), and Literacy.

[Redacted] is among the 25-largest K-12 districts in California and serves a highly diverse population of 28,424 students. That diversity is represented by a student demographic that includes 82 percent Hispanic/Latino; 6 percent African American; 6 percent white and 5% Asian.

Over 3,000 learners attend Adult Education classes. [Redacted] has one of the lowest median incomes in Los Angeles County. The city of [Redacted] low socio-economic reality threatens the success of our students. High numbers of families receive state aid and three-quarters of the student population receive free and reduced lunch. Access to technology continues to be limited in [Redacted] households.

As a District with twenty-three schools that are currently in Program Improvement under the No-Child Left Behind Act of 2001 (NCLB) and as a designated Year 3 Program Improvement District, it is crucial that we utilize every resource available to support instructional and administrative staff at all sites in accelerating student learning.

Vision Statement

The [Redacted] Unified School District is a world-class education system committed to: Respect, where all students, parents, staff, and community members are valued partners; Relationships, where genuine and caring connections are built; Responsibility, where everyone is accountable for what they say and do; and Results, which reflect a high level of student achievement.

Mission Statement

The [Redacted] Unified School District provides a well-rounded and challenging educational program of the highest quality, empowering students to lead productive, fulfilling lives as lifelong learners. Supported on a foundation of integrity and respect, students will gain academic excellence and take personal and community pride as responsible citizens and productive participants in a diverse society and global economy.
Technology Mission Statement

The [redacted] Unified School District is committed to providing opportunities for all students to develop their abilities and talents to the fullest extent possible. Participation in the global community demands that all educators and students be prepared to use technology well. The District will support instruction and enhance learning by helping teachers and students integrate technology into the core curriculum in order to provide quality education and challenge students to reach their highest potential.

Current Practice

Annually, our school-site personnel are required to complete a variety of technology surveys. These surveys plus information from Instructional Technology Teacher Specialists gathered at our regular meetings and information from SpeakUp 2012 surveys provided us with the basis for a general needs assessment for the use of technology in the [redacted] Unified School District.

[redacted] administrators, teachers and students use technology to access current and relevant information. Administrators use technology for school management (including record keeping), for communications with the community, for the analysis of student data, and to provide professional learning opportunities to site staff to assure that there is student progress towards meeting state and district standards. Teachers use technology in enhancing the delivery of curriculum, assessing student progress made toward meeting standards, record keeping, for communications with the community and for meeting the needs of diverse learners. Teachers and administrators also use technology as tools for furthering their knowledge and abilities. Students use the appropriate technological tools to help them build their skills for the classroom and beyond. The students use technology to engage in 21st Century learning and employ the four C's: communication, collaboration, creativity and critical thinking that will assist them in meeting state and district curriculum standards (Common Core).

Moving Forward

In order to support 21st Century Learning and the transition to the California Common Core State Standards, including College and Career Readiness, [redacted] Unified School District is committed to facilitating teacher learning and site support in the use of educational technologies for student learning and achievement. The stakeholders involved in developing the Master Technology Use Plan strongly recommend the creation of a Technology Teacher Leader (a teacher who will provide site support in the integration of technology for teaching and learning) and the formation of a Technology Leadership Team at each school site. Teams may include teachers, the administrator, library personnel, and parents. The purpose of this team is to plan and monitor the use of technology to support curriculum and instruction at the school site. Both the TTL and the Technology Leadership Team will assist in the site implementation of the District Master Technology Use Plan.

The overarching goals included in this plan are:
Career Readiness. The following [redacted] Unified School District [redacted] initiatives will be included: English Language Development (ELD) and Common Core State Standards implementation. By June 2016, all [redacted] students will be utilizing grade appropriate technology tools to learn and build their skills for the classroom and workplace.

• In order to prepare students for 21st Century Learning, technology tools will be embedded into the curriculum with a focus on digital literacy, including research skills, critical thinking, communication, creativity, student inquiry, problem solving and collaborative skills. Teachers will create and integrate online learning opportunities (i.e., blended, flipped, virtual) so that by June 2016 students will be utilizing grade appropriate technology to help prepare them for College and Career Readiness as outlined in the CCSS.

• Create and support learning environments that leverage the ubiquitous (anytime, anywhere, any-device) nature of online learning to exploit the capabilities of emerging information, communication and collaboration technologies.

• All site administrators, teachers and students will be provided with training around Digital Literacy, such as Cyber-bullying and Internet Safety, including how to protect online privacy and avoid online predators, using a variety of resources. This training will include any updates to the District's Acceptable Use Agreement (AUA).

• Provide professional development in technology integration to improve teaching and learning with a focus on California Common Core State Standards, English Language Learners (ELLs), and Literacy.

• Teachers will demonstrate understanding of the student technology grade level competencies required in the CCSSs and College and Career Readiness requirements in order to provide rigorous instruction to meet 21st century learner goals.

Comparison of 2010-2013 Master Technology Use Plan and 2013-2016 Master Technology Use Plan:

In the 2010—2013 Master Technology Use Plan our goal was to focus on ELLs, Literacy, and Rti². Our goals for the 2013-2016 Master Technology Use Plan are to focus on the California Common Core State Standards, English Language Learners (ELLs), and Literacy. While we mentioned in the 2010-2013 plan that the creation of a Technology Leadership Team be created at each site this was not accomplished. In the new plan we will create Technology Teacher Leaders at each school site with the objective of creating a Technology Leadership Team to help with site technology planning and professional development. The new plan will also focus on creating a Scope and Sequence that will coincide with ISTE-NETS and the California Common Core State Standards to ensure that students will be able to have success when taking the Smarter Balance assessments.
Implementation of Common Core/Advanced Digital Technology Scope and Sequence:

- Support the implementation of the main goals in the District's 3 Year Master Technology Use Plan, including leadership and teacher development.
- Maintain a 1:1 ratio of students using the instructional and professional development in Google, aligned with the curriculum needs, and be provided during designated meeting times, such as the school-wide, grade level, or after-school.
- Provide monthly technology sessions for the teachers, which can offer small-group or grade-level based on the needs.
- Supporting school participation in surveys, including the District's Tech Tip, Teacher Technology Needs Assessment (by November 2014).
- Continuing the learning safety training for students to be provided by October 2014 and implemented by the end of the 2014-15 school year.

Monthly meetings with principal and teacher leaders to provide guidance in technology integration:
- Provide leadership in educational technology by:
  - Leading school-wide meeting to learn, collaborate, and share with other schools and districts.
  - Lead in the professional development plan for 2014-15, and
  - Lead the school-level planning and implementation of the Common Core/Advanced Digital Technology Scope and Sequence.

- Technology Teacher Leads - TTL Overview 2014-2015

Scope of the Program - General Expectations: Year 2

Sevier Unified School District
<table>
<thead>
<tr>
<th>Leadership Expectations</th>
<th>Instructional Technology Support (as needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support levels for TLLS (as needed)</td>
<td>Immediate instructional support beyond current standards</td>
</tr>
<tr>
<td>Spring 2015 dates — To be determined</td>
<td>All days, all schools, 2:30-5:00 pm</td>
</tr>
<tr>
<td>January 22, 2015</td>
<td>All day, all schools, 3:30-5:00 pm</td>
</tr>
<tr>
<td>December 23, 2014</td>
<td>All day, secondary TLLS</td>
</tr>
<tr>
<td>October 28, 2014</td>
<td>All day, elementary TLLS</td>
</tr>
<tr>
<td>February 25, 2014</td>
<td>All day, elementary TLLS</td>
</tr>
<tr>
<td>August 25, 2014</td>
<td>All day, secondary TLLS</td>
</tr>
</tbody>
</table>

**Note:**
- Pay for $500 support per TLL per day
- Pay for 3 or more days per week
- Pay for 5 or more days per month

**If you have a single TLL (s):**
- Provide the same level of technology support in their classrooms
- Support teachers in the integration of technology in classroom instruction
- Provide support for PLCs and Professional Learning Communities
- Provide support for professional development days
- Provide support for classroom instruction
- Support teachers in the integration of technology in their classrooms
- Support teachers in the integration of technology in their classrooms

**Exceptions:**
- Up to 4 additional hours per week
- Up to 6 additional hours per week
- Up to 8 additional hours per week
APPENDIX D

TTL Year End Survey

TTL 2014-15 Year End Survey

Your username (tamatha.williams@pwsd.org) will be recorded when you submit this form. Not required.

* Required

1. School Site

____________________________________________

2. TTL Group *
Which TTL Group did you participate in this year?
Mark only one oval.

☐ K-8 TTL
☐ Secondary TTL

3. Please indicate if you were the district funded or site funded TTL.*
Mark only one oval.

☐ District-funded
☐ Site-funded

4. How many TTLs did your school site have this year? *
Mark only one oval.

☐ 1
☐ 2
☐ 3
☐ 4

5. If applicable, how valuable was having two or more TTLs at your school this year?
Mark only one oval.

☐ extremely
☐ very
☐ somewhat
☐ not at all
6. Please share your reasoning

________________________________________
________________________________________
________________________________________
________________________________________

7. Do you desire to continue as a TTL next year at your school site? *
   Mark only one oval.
   ■ Yes
   ■ No
   ■ Not sure

8. Based on your answer what was the deciding factor? *

________________________________________
________________________________________
________________________________________
________________________________________

9. Have you been asked by your principal to continue as a TTL for the next school year? *
   Mark only one oval.
   ■ Yes
   ■ No

10. How often did you have opportunities to provide professional development for teachers per month? *
    Mark only one oval.
    ■ 4 or more
    ■ 2-3
    ■ 1
    ■ not on a monthly basis
11. As a result of the TTL program, to what extent is technology integrated into classrooms at your school? *

Mark only one oval.

☐ All teachers
☐ Most teachers
☐ Some teachers
☐ Few teachers

12. What obstacles did you face with supporting your colleagues' integration of technology in their classroom practice?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

13. What obstacles did you face with integration of technology into your classroom practice? *

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

14. What types of support did you receive to assist you with your TTL work?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

15. In general which level is your site currently at with SAMR for technology integration? *

For a quick overview, please go to: http://tinyurl.com/ysdSAMR

Mark only one oval.

☐ Redefinition
☐ Modification
☐ Augmentation
☐ Substitution
16. What is needed at your site to move your teachers’ practices to the next level of SAMR? *
   S=Substitution, A=Augmentation, M=Modification and R=Redefinition
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

17. To what extent are students using Google Drive/Apps? *
   Mark only one oval.
   ○ All students
   ○ Some students
   ○ Most students
   ○ Few students

10. Comments *
    Please share any insights you have about the TTL program, including thoughts on how we can improve the program.
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________

TTL ’2-in-1 Lenovo Thinkpad 12’ Cohort

* We are planning on piloting a new device with our TTLs next school year. The video below will give you a quick look at the device - it will be a touch screen, Windows 8.1 or 10 OS, with a stylus. Let us know of your interest to be a part of the 2-in-1 Lenovo Cohort. If you participate, the expectation is that with the proper support and PD, this will be a tool that you use to develop your 21st Century lessons/content and teach with in the classroom. The plan is for the first session of PD to take place on August 8, 2015 (half day).
19. In moving our TTLs forward with more contemporary technology and in building capacity at the sites, are you interested in piloting the Lenovo ThinkPad 2-in-1? *
Note: your answer to this question does not guarantee the device, as we are in the planning phases at this time.
Mark only one oval.
☐ Yes, I want to be a part of the Lenovo TTL cohort.
☐ No thank you, I am content with what I have.

TTL 2015-16 Kick-off -- August 6, 2015

SAVE THE DATE! (May be subject to change)

20. If you desire to be a TTL next year, will you be able to attend the full day TTL kick-off on August 6, 2015? *
All TTLs in attendance will be paid in-service rate for the full 8 hours.
Mark only one oval.
☐ Yes, I will be there!
☐ No, I cannot make it but I will attend a make-up session. This session may be on a Saturday or after-school for multiple days.

☐ Send me a copy of my responses.

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APPENDIX E

TTL Principal Year End Survey

TTL Principal Year End 14-15 and Teacher Laptop Survey

Thank you for your valuable input on the TTL program, including your plans for the 2015-16 school year. Your input will help us to ensure that the TTL program meets the needs of all schools in integrating educational technology into teaching and learning.

Your username (tamatha.williams@one.sbd.org) will be recorded when you submit this form. Not required.
* Required

1. Please list your school:

________________________________________________________

2. TTL Group
   Which TTL Group applies to your site?
   Mark only one oval.
   ○ K-8 TTL
   ○ Secondary TTL

3. Do you plan on keeping your current DISTRICT funded TTL the same for next year? *
   Mark only one oval.
   ○ Yes
   ○ No
   ○ Not sure - we need to talk

4. If you are not planning to keep your current District Funded TTL, who do you have in mind as a replacement and have you met with all involved to confirm?

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

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5. If you currently have a SITE funded TTL or TTLs, do you plan on continuing to fund for next year?  
Check all that apply.
Check all that apply:
☐ Yes
☐ Not sure - we need to talk
☐ I do not have a site funded TTL
☐ I want to add one or more site funded TTLs next year - let’s talk
☐ Other:________________________________________

8. Please list your site funded TTLs for 2015-16 that you will submit Unit Leader TTL Pink(s) for:

________________________________________
________________________________________
________________________________________
________________________________________

7. How valuable was having one or more TTLs at your school this year?  
Mark only one oval.
☐ extremely
☐ very
☐ somewhat
☐ not at all

8. Please share what you found valuable:

________________________________________
________________________________________
________________________________________
________________________________________

9. How often did TTLs have opportunities to provide professional development for teachers per month?*  
Mark only one oval.
☐ 4 or more
☐ 2-3
☐ 1
☐ not on a monthly basis
10. As a result of the TTL program, to what extent is technology integrated into classrooms at your school? *

*Mark only one oval.*

- All teachers
- Most teachers
- Some teachers
- Few teachers

11. What obstacles did TTLs face with supporting their colleagues’ integration of technology in their classroom practice?

________________________
________________________
________________________
________________________

12. What obstacles did TTLs face with integration of technology into their classroom practice? *

________________________
________________________
________________________
________________________

13. To what extent are students using Google Drive/Apps? *

*Mark only one oval.*

- All students
- Some students
- Most students
- Few students

14. In general which level is your site currently at with SAMR for technology integration? *

*For a quick overview, please go to: http://tinyurl.com/visSAMR*

*Mark only one oval.*

- Redefinition
- Modification
- Augmentation
- Substitution
15. What is needed at your site to move your teachers’ practices to the site’s next level of SAMR? 
* 
S=Substitution, A=Augmentation, M=Modification and R=Redefinition 

________________________________________
________________________________________
________________________________________
________________________________________

10. Comments * 
Please share any insights you have about the TTL program, including thoughts on how we can improve the program.

________________________________________
________________________________________
________________________________________
________________________________________

Teacher Laptops

* At this time, this is preliminary data - no devices for teachers is guaranteed. 
* Please be as accurate as possible. When answering the following two questions, please make sure that the total of both answers equal the number of current teachers at your site. 
* We are collecting information that will help us in future decisions regarding technology needs across the district. Also note: choice #2 may mean less devices for sites, as they are more costly.

17. Based on your current situation, how many teacher laptops are more than 3 years old? * 
Laptop was purchased more than 3 years ago, or teachers who do not have a laptop (purchased before 2012).

________________________________________

18. Based on your current situation, how many teacher laptops are less than 3 years old? * 
Laptop was purchased 0-3 years ago (after 2012).

________________________________________
19. In thinking about the technology proficiency of your teachers, which type of PC laptop/device would you prefer for your site?*

Note: your answer to this question does not guarantee the preferred device, or any devices for that matter.

Mark only one oval.

☐ Windows 7 PC laptop
☐ Windows 8.1/10 PC Notebook 2-in-1 device
☐ I have no preference for my school
☐ Other: ____________________________

☐ Send me a copy of my responses.

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Google Forms
APPENDIX F

TTL Teacher Year End Survey

TTL Teacher Survey 2014-15 (Anonymous)

I know that this is a very busy time of year, however Instructional Technology (IT) would like you to take a few minutes to complete an end of year technology survey, which will help us reflect and prepare for next year’s TTL program and EdTech professional learning opportunities. Your input is very valuable to us!

* Required

1. 1. Please indicate your school site. *

________________________________________________________________________

2. 2. Did you receive training and/ or support from your site’s TTL? *

Mark only one oval.

☐ Yes

☐ No

3. 3. To what extent has your site TTL’s training and/ or support influenced your classroom practice? *

Do you use more technology as a result of having a TTL at your site?

Mark only one oval.

☐ Greatly

☐ Somewhat

☐ A little

☐ Not at all

4. 4. Reflect on the professional development sessions you were offered at your site. To what extent did the training/s impact your teaching practices. *

Mark only one oval.

☐ Greatly

☐ Somewhat

☐ Little

☐ Not at all

5. 5. Name the two professional development sessions that you consider the most effective. *

Describe what made them effective

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
6. Did you introduce Google Apps to your students this year? *

Mark only one oval.

☐ Yes, greatly
☐ Yes, somewhat
☐ Yes, a little
☐ No, not at all

7. If you selected "No, not at all", briefly explain why.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

8. How many of your students are using Google Apps to complete your class assignments? *

Mark only one oval.

☐ All students
☐ Most students
☐ Some students
☐ Few students
☐ None

9. What technology have you used and integrated into your teaching this year? *

Check all that apply.

☐ Desktop
☐ Laptops
☐ Chromebooks
☐ iPads
☐ Smart board
☐ Smartphone
☐ Other: __________________________________________

10. How has the integration of technology enhanced your teaching? *

Check all that apply.

☐ More creative with assignments
☐ Better learning environment
☐ More class student participation
☐ Other: __________________________________________
11. On average, how often did you use technology in your classroom? *
   How many times per week?
   Mark only one oval.
   - 0-1
   - 2-3
   - 4-5

12. On average, how often did students use technology in your classroom? *
    How many times per week?
    Mark only one oval.
    - 0-1
    - 2-3
    - 4-5

13. Which district resources did you use to integrate technology? *
   Check all that apply.
   - Google apps
   - Haiku
   - Edmodo
   - OARS
   - World Book
   - Turrible Books
   - Accelerated Reader
   - Teaching Books
   - Proquest
   - Read 180
   - Riverdeep
   - Think Central
   - Treasures-McGraw Hill
   - MediaSnap
   - Other: ________________________________
14. For what purposes did "you" use technology in the classroom? *

*Check all that apply.*

- [ ] notetaking
- [ ] study aid
- [ ] emailing teachers and students
- [ ] reading textbooks
- [ ] reading articles and other materials
- [ ] researching
- [ ] educational applications
- [ ] art and music application
- [ ] accessing class-related media
- [ ] completing quizzes and exam
- [ ] simulations
- [ ] creating and producing media
- [ ] Other: ____________________________

15. For what purposes did your "students" use technology in the classroom? *

*Check all that apply.*

- [ ] notetaking
- [ ] study aid
- [ ] emailing teachers and students
- [ ] reading textbooks
- [ ] reading articles and other materials
- [ ] researching
- [ ] educational applications
- [ ] art and music application
- [ ] accessing class-related media
- [ ] completing quizzes and exam
- [ ] simulations
- [ ] creating and producing media

16. What are your next steps in integrating technology in your classroom practices? *

*Check all that apply.*

- [ ] Practice what I've learned
- [ ] Integrate what I've learned next year
- [ ] Request one on one support from the site TTL
- [ ] Attend more TTL workshops and trainings
- [ ] Attend district trainings and workshops
17. What types of professional learning experiences would you prefer when learning about new technologies for teaching and learning? *

Please check all that apply:

- In-person
- Online
- Blended
- Hands-on
- Video tutorials
- After-school
- During the school day (pull-out)
- Late-start Fridays
- Saturdays in-person
- Workshop format
- Professional conference
- District-wide Professional Development Days
- Professional Readings - books/articles
- Site visits of model schools/classrooms
- Badges for completion of online or blended learning modules
- One-on-one
- Small group
- Whole group/staff
- Other: ________________________________

10. 18. Comments

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