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Bridging The Divide: Second Language Teachers, Pedagogy, Content Knowledge, And Technology

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BRIDGING THE DIVIDE: SECOND LANGUAGE TEACHERS, PEDAGOGY, CONTENT KNOWLEDGE, AND TECHNOLOGY

by

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DEDICATION

I would like to dedicate this paper to Clara who gave me the motivation, and inspiration to begin and Mary Frances and June who gave me the push to finish.

May I always be as patient with you as you have been with me.

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CHAPTER 1

PROBLEM STATEMENT

Technology and internet access has increased in classrooms throughout the United States (Kim, 2008). An increase in technology was thought to come with evidence of increased student achievement; however, results have been disappointing. Although K-12 students have more access to technology while at school, teachers continue to struggle with integration leading to student achievement.

Second language teachers agree that integrating technology is important, but their perceptions of what it can be used for and their expectations of it vary (Becker, 1991; Campoy, 1992; Ertmer, Addison, Lane, Ross, & Woods, 1999; Pedersen & Liu, 2003). In addition to these challenges, second language teachers are challenged to teach students to pass state mandated tests, while trying to integrate technology in ways that will produce constructive learning opportunities and outcomes. Technology provides unique opportunities for second language learners. Second language students can benefit from technology by practicing skills, increasing motivation, providing authentic materials, creating interaction between students, teachers and peers, creating individual learning, encouraging global understanding and increasing communication in safe ways (Lai & Kritsonsis, 2006). Although technology shows promise for increasing second language student achievement, students continue to have varied access at home, perpetuating the digital divide that was thought to disappear with large financial investments. By looking at how K-12 second language teachers use technology and the differences that exist

between title I and non-title I schools this study will serve to assess the current state of technology integration and offer suggestions to enhance future integration.

Due to the continued belief that increased amounts of technology are imminent for student preparation in a global market place, the amount of technology in schools and the access to the internet have become common place (ISTE, 2001, p. 1). National standards for students and teachers reflect the evidence of the importance being placed on students to become technology literate. The International Society for Technology in Education (2011) states that their standards are written for global learners in a digital age,

> Educational technology standards are the roadmap to teaching effectively and growing professionally in an increasingly digital world. Technology literacy is a crucial component of modern society. In fact, the globalizing economy and technological advances continue to place a premium on a highly skilled labor force. (p. 1)

The United States has and continues to generously invested in technology in schools. During the 1990s, The United States is said to have invested $90 billion dollars in computer technology (Oppenheimer, 1997, 2003). In addition, the E-Rate, funded by the Schools and Libraries Universal Service Support Mechanism, funds $2.25 billion each year to help schools and libraries maintain internet access (Oppenheimer, 1997, 2003). Research suggests two rationales for continued technology investment in schools. Technology in schools will help promote and develop literacy skills that are needed by students to work productively in a global economy and an evolving society. In addition, technology may hold the potential to improve the learning outcomes for low-income, second language learners, and minority students who may otherwise be more likely to underachieve (Cummins, Brown, & Sayers, 2007).

Although investment and professional development training helped narrow the digital divide that once existed for teachers, they are still challenged by using technology effectively. Computer in schools can be likened to the situation with television usage in the early 1980s. Lindenau (1984) refers to the use of television in education, "This instrument can teach, it can illuminate, yes, even inspire. But, it can do so only to the extent that humans are determined to use it to those ends. Otherwise, it is merely lights and wires in a box" (p. 121). When used in the classroom, technology must be applied with thought given to how it interacts within the pedagogy of instruction. How technology is used in each classroom is dependent in large part on the teacher. Technology can only truly influence the learning of students when applied and integrated into the classroom by the teacher (Franklin, 2007; Gorder, 2008; Judson, 2006; Liu, 2011; Rakes, Fields, & Cox, 2006).

An increase in the amount of technology in schools may have decreased the digital divide, but instead helped in the creation of a pedagogical divide (Cummins et al., 2007). The pedagogical divide is the difference in how technology is used in classrooms by teachers and with different groups of students (Cummins et al., 2007). The pedagogical divide presents itself as a problem when looking at technology and second language learners. It can create significant differences in how teachers use technology with certain groups of students and what assumptions are being made concerning what technology skills students are bringing with them to school (Cummins et al., 2007). The pedagogical divide is connected to the digital divide (Warschauer, Knobel, & Stone, 2004). Both the pedagogical divide and the digital divide highlight gaps in academic

achievement, which is evident in standardized test scores and high school graduation rates (Warschauer et al., 2004).

Cummins et al. (2007) discuss the importance of pedagogy when using technology in education, "The failure to realize the educational potential of technology has much more to do with pedagogy than with technology itself" (p. 91). Shulman (1986 b) created a framework for understanding how teachers' knowledge of educational technology interacts with pedagogical content knowledge (PCK). Technological Pedagogical Content Knowledge (TPACK) was developed by Mishra and Koehler, based on Shulman's work (Shulman, 1986a; Mishra & Koehler, 2006). Using the TPACK framework, three main components exist–teacher knowledge, content, and pedagogy–that interact with technology. Each of these three pieces interacts with each other to create combinations such as pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK). The TPACK framework can be especially useful when looking at how teachers use technology in the classroom. It can include the use of software programs that might not be designed for education, such as PowerPoint, Excel, Word, and web-based technologies (Mishra & Koelher, 2009).

This study investigates how second language teachers are using technology within the content and pedagogy of their classrooms. It will also look at differences in technology integration between Title 1 and non Title 1 schools. Title 1 is a section of the No Child Left Behind Act, that serves to assist students who are economically disadvantaged (U.S. Department of Education, 2004). By examining the patterns of use

and differences between teachers in Title 1 and non Title 1 schools, the researcher seeks to explore the concept of the pedagogical divide, investigating whether or not teachers are using technology differently with different populations of students. Using the TPACK framework, the researcher will look at how second language teachers connect technology, content, and pedagogy in the context of the classroom technologies (Mishra & Koelher, 2009).

Research Questions

1. Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***technology knowledge (TK)*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***content knowledge (CK)*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***pedagogical knowledge (PK)*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***pedagogical content knowledge (PCK)*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***technological content knowledge (TCK)*** with students in Title 1 and non Title 1 schools?

    What are the differences in how second language teachers use ***technological pedagogical knowledge (TPK)*** with students in Title 1 and non Title 1 schools?

What are the differences in how second language teachers use ***technology pedagogy and content knowledge (TPACK)*** with students in Title 1 and non Title 1 schools?

2. Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***technology knowledge (TK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***content knowledge (CK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***pedagogical knowledge (PK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***pedagogical content knowledge (PCK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***technological content knowledge (TCK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

   What are the differences in how second language teachers use ***technological***

pedagogical knowledge (TPK) with students in Title 1 and non Title 1 elementary, middle, and high schools?

What are the differences in how second language teachers use ***technology pedagogy and content knowledge (TPACK)*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

3. Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools after controlling for years of experience?

   What are the differences in how second language teachers use ***technology knowledge (TK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

   What are the differences in how second language teachers use ***content knowledge (CK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

   What are the differences in how second language teachers use ***pedagogical knowledge (PK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

   What are the differences in how second language teachers use ***pedagogical content knowledge (PCK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

   What are the differences in how second language teachers use ***technological content knowledge (TCK)*** with students in Title 1 and non Title 1 schools

controlling for years of experience?

What are the differences in how second language teachers use ***technological pedagogical knowledge (TPK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

What are the differences in how second language teachers use ***technology pedagogy and content knowledge (TPACK)*** with students in Title 1 and non Title 1 schools controlling for years of experience?

See Appendix A for definitions.

Need for the Study

This study examined the use of technology by second language teachers in the K-12 environment. Wang and Reeves (2004) write that pervious research on second language teachers and technology looked at teacher's view of using technology. Lam (2000) found that teachers were using technology with second language learners to increase motivation, but lack of knowledge about technology hindered their use with students.

Past research has left out the needs of teachers. Rakes et al. (2006) investigated teacher's use of technology and found a need to research the link between teachers' technology use and classroom instructional practices. Cuban (2001) reports that many teachers use computers to support traditional teaching practices and not to promote constructivist practices in more innovative ways. Therefore, Rakes et al. report that the training programs and technology-related funds may not be having a positive effect on student learning.

Given this lack of focus on teachers' concerns, it is easy to understand why educational technology and the Internet have had minimal impact on instructional practice and educational outcomes thus far (Cuban, 2001; Reiser, 2001; Wang & Reeves, 2004). Research in the area of teacher's use of technology for instruction has primarily been conducted in higher education settings, and with adult language learners. Zhao (2005) reviewed research on computer use in language learning and found that (a) the settings of instruction where studies were conducted where limited to higher education and adult learners, (b) languages studied were limited to common foreign languages and English as a foreign or second language, and (c) experiments were often short-term and about one or two aspects of language learning (e.g., grammar or vocabulary). This study was designed to collect data in the K-12 setting and to connect prior research on second language learners and technology in higher education settings to second language learners and technology in the K-12 setting.

Teachers' use of technology in the classroom has been and will continue to be significant. It will help the researcher and others determine how to best increase not only its use, but also its integration into the teachers' pedagogy. Knowing that teachers believe technology to be motivating for students, this study looked at how teachers are integrating technology into their content, knowledge, and pedagogy of their classroom. This study reviewed the concept of the pedagogical divide to see if teachers are using different types of technologies with different populations of students. The significance of this study may extend the understanding of how to use technology effectively in the teaching of second language learners. Teachers' integration of technology within their

teaching is essential for gaining an understanding of how to improve their technological pedagogical content knowledge and create learner-centered classrooms. This study serves to identify challenges involving technology integration that can be overcome by teachers and administrators.

Summary

The purpose of this study was to examine how second language teachers use technology within their classroom instruction. Classroom instruction included how teachers use technology in combination with their pedagogy and content knowledge within the TPACK domains, how much time they spend using technology while teaching, if it is used differently between grade levels, and if it is used differently by teachers in Title 1 and non Title 1 schools. Assumptions, limitations, and significance of the study have been addressed. The researcher may expect to find differences in technology use between teachers in different grade levels and in technology use between teacher in Title 1 and non Title 1 schools. With the purpose of investigating technology use with second language students in K-12 schools, the researcher is looking for potential solutions to barriers that presently exist for teachers.

CHAPTER 2

LITERATURE REVIEW

A review of literature related to teacher's use of technology and second language learning displayed the following themes: technology and second language learning, No Child Left Behind and second language learners, the digital divide, the pedagogical divide, teacher and technology, and the TPACK framework.

Technology and Second Language Learning

The history of second language instructional approaches reflects the evolution of technology in education. During the 1960s and 1970s, behaviorist learning theory was seen in computer assisted language instruction with drill and practice software for students. Computer assisted language learning (CALL) was introduced during the 1960s and reflected behaviorist learning theory of the time. Complementing Skinner's work, technology included repetition and used practice to teach. Computer language learning programs at this time were commonly known as drill and practice programs. They were created based on a computer assisted language learning model called, "computer as tutor" (Taylor, 1980). Following this model, the computer delivered a program to students for learning. The idea is still found in language software today. The three main ideas of this model are repeated exposure to learning materials, the computer providing repetitious drills and feedback, and information presented to students at an individualized pace. Using this model, computers held the potential for reaching large numbers of students in

a cost effective way, while matching specific skills to individual learners. This also allowed the teacher time to do other things.

During the late 1970s and early 1980s, the microcomputer was introduced in education. Microcomputers moved CALL from the behavioristic phase to the communicative phase. Critics of drill and practice found that it did not provide students with opportunities to communicate authentically. Communicative software provided language skills practice, but not drill format. Activities included paced reading, text reconstruction, and games using language (Healey & Jonson, 1995).

The communicative phase allowed students to generate their own speech, and it did not provide feedback that was perceived by some students as judgmental. Students were also allowed to practice language in the context of a natural setting. Practice in a natural setting was believed to build intrinsic motivation for students and creative interactivity between the learner and computer (Stevens, 1989). During this time, programs were used that were not specifically designed for language learning. Software such as *Sim City* and *Where in the World is Carmen San Diego* followed the computer as a stimulus model and through their design encouraged language development. Software such as word processing, spell checks, and desktop publishing programs were also used following the computer as a tool model. These tools could empower learners, while at the same time helping them understand language. During the 1980s and 1990s second language instruction saw a shift towards cognitive and constructivist learning theory. Second language teachers attempted to move from teacher centered to student-centered instruction.

The next approach in computers and language learning was integrative multimedia. This approach combined multimedia computers and the internet. Hypermedia allowed components of multimedia to be linked together for the user to navigate through. Multimedia created authentic learning environments for students, with seeing and listening with real world simulations. Integration into the classroom was easy for teachers and language learners to practice reading, writing, speaking, and listening. It also allowed learners to practice what they already knew, while learning something new. Few quality multimedia programs existed for students, and although it was possible for teachers to create their own, it was difficult to do. Programs available were not truly interactive. Software had limited ability to understand student speech and evaluate it.

Electronic communication and the Internet brought computer mediated communication to second language instruction. Computer mediated communication has shown the most impact on language learning because it has allowed learners to communicate directly with each other, is inexpensive, and convenient because it can be done 24 hours a day from home or school. Technology and the Internet can be very beneficial for students,

> When computer technology combines with Internet, it creates a channel for students to obtain a huge amount of human experience and guide students to enter the "Global Community". In this way, students not only can extend their personal view, thought, and experience, but also can learn to live in the real world. They become creators not just the receivers of knowledge. And, as the way information is presented is not linear, second language learners can still develop thinking skills and choose what to explore. (Lai & Kritsonis, 2006, p. 3)

Aspects of the mentioned approaches to technology integration have been limited by many things, one being state testing requirements. Wang and Reeves (2004)

commented on how testing impacts technology integration, "Unfortunately, most teachers find the shift to constructivist pedagogy to be out of sync with other expectations placed upon them, such as the emphasis on improving achievement test scores and maintaining classroom discipline" (p. 35). The No Child Left Behind Act has put tremendous pressure on teachers to get students to pass state mandated tests.

No Child Left Behind and Second Language Learners

Technology has brought about opportunities for teachers to create authentic learning experiences for second language learners, but state testing requirements create challenges. The Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students found that the enrollment of limited English proficient students increased 406% from 1997–1998 to 2007–2008 in Georgia. In the 1997–1998 school year, 1,375,980 students were enrolled in school, with 14, 339 enrolled as English language learners. In the 2007–2008 school year, 1,649,589 students were enrolled in school in Georgia, with 72,613 enrolled as English language learners (U.S. Department of Education, 2010).

Second language teachers are continually searching for ways to increase student achievement for second language students, to meet state testing requirements. The goal of meeting state testing requirements can present limitations in how teachers use technology within their instruction. The No Child Left Behind Act (NCLB), which put state testing requirements into place, was created to improve public schools in the United States. Under this act, all teachers are required to meet the standard of being highly

qualified, as determined by NCLB provisions by teaching in areas in which they are certified or working towards certification.

The act requires that all students, including second language learners, take and pass state mandated tests yearly. Provisions in the accountability section of NCLB recommend that state testing results ultimately determine whether a school passes or fails on a yearly basis. Students who attend a school labeled as failing have the option of going to a nearby school that has received a score of passing. Schools that have met testing requirements are said to have made adequate yearly progress.

The No Child Left Behind Act includes a section called Title III, which organizes funds for English language instruction and sets up a plan for how they are distributed by combining monies from bilingual and immigrant education programs into one category. Each state determines how their Title III funds will be spent. Title III also gives guidance to educational requirements for English language learners. The purpose of the Title III section under No Child Left Behind is to ensure that limited English proficient children master English and meet the same rigorous standards for academic achievement as is the standard for all children, while meeting the challenges of state academic content and student academic achievement.

Under Title III, Georgia developed a program called English for speakers of other languages (ESOL) that provides services to those who qualify for English language instruction. The ESOL curriculum is standards based and designed around the World Class Instructional Design and Assessment's standards. The state curriculum does not define how students are taught, and many different models for teaching English language

learners exist. The following five methods for delivering instruction in ESOL programs in the state of Georgia have been approved. The first is push in (inclusion) where students remain in their general education class, where students receive content instruction from their content area teacher and language assistance from the ESOL teacher. The second is the scheduled class period for middle and high school students who receive language assistance instruction in a class of English language learners. The third is a lab or resources room where students receive language instruction in a group taught by supplemental multimedia materials. The fourth is pull-out, where students are taken out of their homeroom class to receive small-group instruction. The fifth is an ESOL cluster where students are grouped from possibly more than one school to receive intensive language instruction (Georgia Department of Education, 2010).

The No Child Left Behind Act has been under criticism for perpetuating the digital and pedagogical divide. Standardized tests have been known to continue existing power structures by excluding low-income and minority students (Cummins et al., 2007). Although schools must meet AYP scores to be regarded as pass, Cummins et al. noted the following challenges for using standardized tests, particularly with second language learners:

1. There is no scientific evidence that increased standardized testing results in higher achievement.
2. Standardized tests typically assess only a limited range of content standards, specifically those that can be assessed easily and relatively inexpensively.
3. High-stakes testing narrows the curriculum such that teachers will teach only the content that will be tested.
4. Test scores reflect both instructional and non-instructional factors (e.g., poverty, proportion of ELL students, etc.). When the contribution of non-instructional factors to test score variance is ignored, the test scores no longer provide any scientific basis for policy decisions.

5. Teaching to the test disproportionately affects students in low-income schools with the results that the pedagogical divide between low-and middle-income schools is exacerbated.
6. Educational programs, such as dual language programs for ELL and native-English-speaking students, are compromised because of pressure to meet test-defined AYP criteria in the early grades. (p. 69)

Standardized tests, both standards based and criterion referenced are limiting for teachers and create a challenge that may be unobtainable. Popham (2005) addresses the list of skills and knowledge that teachers must teach students,

> Educators must guess about which of the multitude of content standards will actually be assess on a give year's test….After working with standards-based tests aimed at so many targets, teacher's understandably may devote less and less attention to those tests. As a consequence, students' performance on this type of instructionally insensitive test often become dependent upon the very same SES [socioeconomic status] factors that compromise the utility of nationally standardized achievement tests when used for school evaluation. (p. 40)

Standardized tests do not guarantee higher quality instruction. Others have observed that standardized tests generate information that could be gained more quickly and less expensively by ranking students and schools by incomes found in their zip codes. Kohn (2000) comments on how standardized tests are not a predictor of quality instruction, but rather income levels,

> Research has repeatedly found that the amount of poverty in the communities where schools are located, along with other variables having nothing to do with what happens in classrooms, accounts for the great majority of the difference in scores from one area to the next. To that extent, tests are simply not a valid measure of school effectiveness. (p. 7)

Test scores are not single indicators of instructional or non-instructional influences. Non-instructional sources such as poverty, socioeconomic status, reflect opportunities that ELL students have in school. Some have less time or opportunity to learn the content, which represents a relationship between poverty and test scores. These

non-instructional variables are thought to be reversible by teachers and schools through instruction. This reversal is asked to take place in areas with fewer funds and communities with fewer resources for supporting education.

The high stakes of testing brought by NCLB may have forced the direction of technology integration for teachers. Cummins et al. (2007) reference the demands of AYP for teachers,

> The accountability mandates of adequate yearly progress (AYP) and high-stakes testing have resulted in a pedagogical focus on teaching to the test in many schools serving low-income and minority students. Because drill-and-practice transmission pedagogy predominates in these schools, computer use tends to conform to the same orientation. In this context, imaginative inquiry-focused teaching, with or without teaching, is frequently considered 'off task.' Consequently, the potential power of technology is only rarely and minimally harness in these school contexts. (p. 91)

Wang and Reeves (2004) also acknowledge how testing has hindered technology integration, "Unfortunately, most teachers find the shift to constructionist pedagogy to be out of sync with other expectations placed upon them, such as the emphasis on improving achievement test scores and maintaining classroom discipline" (p. 55).

Teachers under pressure to have students pass state tests are less likely to use integrate technology constructively. Schools labeled and having lower socio-economic status are more likely to have a regimented, uniform approach to instruction that does not allow for technology integration or learning in the context of social constructivist learning. Teachers teaching second language learners are forced to teach students the content to a test in which they are not familiar with the vocabulary or the English language. These teachers have perceptions of what types of technology second language learners have at home, and how much their parent's value education. Teachers assign

projects that do not include the use of technology for learning, and students with access to technology at home are more likely to use it for entertainment purposes. Teachers are then perpetuating the digital divide by not helping students connect learning to technology. Standardized tests, such as those brought about by NCLB, are ultimately hindering education by creating a type of time warp, and challenge that is unobtainable.

Digital Divide

State mandated testing interferes with teachers integrating technology and the digital divide continues to interfere with students using technology. Large financial investments in K-12 technology were thought to cure the digital divide. Cuban (2001) notes,

> The billions of dollars already spend on wiring, hardware, and software have established the material conditions for frequent and imaginative uses of technology to occur. Many students and teachers have acquired skills and have engaged in serious use of these technologies. Nonetheless, overall, the quantities of money and time have yet to yield even modest returns or to approach what has been promised in academic achievement, creative integration of technologies, and transformations in teaching and learning. (p. 189)

Low return on investment is partially because the digital divide still exists for many students. Although the digital divide in schools is smaller, it does still exist in relationship to student's technology access at home. Low-income students benefit less from having technology at home than higher income students because of teacher's perceptions. Warschauer et al. (2004) connect this to teacher's assumptions that low-income students do not have access at home, and therefore do not include homework or projects that require technology. Social constructivist and transformative pedagogy show that low-income students, even those who have little experiences are very able to use

technology for collaboration and inquiry when given the opportunity to do so (Cummins et al., 2007). This illustrates how technology is connected to the context of use in schools and what the teacher believes the student can do with it.

Researchers have looked at how technology is used with low-income, minority, and second language students only to find differences when comparing it with use with higher income students. Warschauer et al. (2004) found that more remedial and vocational uses of technology were used with low-income or Black and Hispanic students, while more academic uses of technology were used with higher-income students. Wenglinsky (1998) analyzed NAEP mathematics performances of fourth and eighth graders and found that low-income students were more likely to be taught low-level skills on the computer than students who were more affluent. Warschauer et al. surveyed eight low- and high-income California high schools to compare the availability and use of technology. He found that although rations of students to computers were similar, differences existed when looking at the effectiveness of how computers were used. Those students from low-income schools had poor human support networks and irregular home access.

Warschauer (2003) also identified patterns of computer use in schools that he titled *performativity*. He described performativity as a pattern that, "Refers to situations in which teachers are going through the motions or ticking off checklists of skills without paying due attention to larger issues of knowledge construction and purposeful learning" (p. 574). Although teachers who exhibit performativity use of technology with students and teach them to use it, they are not integrating it in social constructivist way.

Technologies, such as basic computer skills or word processing are taught. Performativity has been seen in low- and high-income schools. It can have more of a negative impact students in low income schools because the teacher focused on teaching students computer skills more than content because they assume that students do not have access to computers at home. The digital divide is defined as division in access to technology between low-income and high-income schools. The increased equity that exists is now highlighting existing inequalities within schools and society (Cummins et al., 2007).

Pedagogical Divide

After years of investment and unseen results, researchers have found that teacher's pedagogy maybe influencing what learning theories and approaches are applied to technology integration, "The failure to realize the educational potential of technology has much more to do with pedagogy than with technology itself" (Cummins et al., 2007, p. 91). Cummins et al. acknowledge another divide,

> The initial quantitative disparity between schools in high-income and low-income areas with respect to technology access has been largely replaced by a pedagogical divide in the way new technologies are used to support instruction and a corresponding cognitive divide in the way students use the new technologies to support different forms of learning. (p. 98)

When technology integration encourages social constructivist and transformative pedagogy, learning possibilities for students are much higher. Students working on constructivist based technology projects are more likely to put in extra time, energy, and thought to what is being taught. These actions encourage learner engagement, increase learning, and are constructivist in nature,

> Substantial effort and money has been paid to promoting the integration of the personal computer and internet access into schools around the globe. Learning

> how to use a computer has been seen as an effective way to bridge the digital divide, producing computer-savvy students and future workers prepared to enter the highly computerized workforce. Technology has also been promoted as a key to the shift towards constructivist pedagogy in the classroom. (Amiel, 2006, p. 237)

Cummins et al. (2007) discuss the pedagogical divide,

> The reforms in literacy instruction that the NRP (National Reading Panel) report has spawned are reinforcing the pedagogical divide that characterizes instruction for low-income as compared to more affluent students. Low-income students increasingly receive an instructional diet of drill-and-practice while upper and middle-income students are apprenticed to knowledge construction and critical inquiry, all in the name of scientifically based reading instruction. (p. 21)

Although it can help lessen the digital divide, the presence of computers alone cannot change pedagogy and rid the digital gap. Amiel (2006) brings the focus of the digital divide to technology literacy, "The solution to this problem does not lie in devices such as the computer, but increase technology literacy" (p. 238).

The International Technology Education Association's definition of technology literacy is "a person that understands- with increasing sophistication- what technology is, how it is created, how it shapes society and in turn is shaped by society" (International Technology Education, Association, 2000). The digital divide, once described as the division in the amounts of technology available to students, has continued as new technologies that have been introduced, creating new gaps. By working to create technology literacy for students, new digital gaps that continue to arise will be manageable. Technology literacy is compared with random technology integration by Amiel (2006),

> A technology literacy agenda, as opposed to the frantic integration of computers into the classroom, can provide effective, long-term solutions to the digital divide. This entails making use of all available technological tools to promote a

> sustainable and valid tactic in achieving educational reforms and closing the digital gap. It is argued that students should not need to wait for a computer in order to gain entry into the world of the digitally literate. (p. 237)

Teachers and Technology

With widespread use of computers and internet access, more attention and expectations being placed on integrating technology in second language classes. As the amount of computers and internet access has grown, using technology in the classroom has become a required part of teaching, regardless of one's pedagogical beliefs or technology knowledge. Teachers' use of technology in the classroom varies greatly depending on their perceptions and expectations of it, as well as their personal skills and knowledge. Researchers believe that teacher's perceptions or beliefs about the role of technology in school are the most important factor in determining how they use it within their classrooms (Becker, 1991; Campy, 1992; Ertmer et al., 1999; Pedersen & Liu, 2003). Teachers, not the amount of technology, are the most important component in technology integration. Researchers noted that teacher's perceptions and beliefs are the most important factor in not only technology use, but also in their teaching practices. It can be assumed that their perceptions and beliefs about technology influence how they use it. Kim (2008) studied teachers' perceptions of technology to help provide an understanding of how and why teachers integrate technology into their teaching, and to help teacher preparation programs development curriculum that would best teaching educational technology.

Technology has the potential to improving second language learning. Undirected potential does not lead to desired goals. Teachers often use technologies that are not

intended for language learning without specific instructions or directions on how they should be used. Second language teachers need to interpret how to use technology to best enhance learning. Zhao (2005) called this interpretation *figuring out*, a process of reinvention where the teachers have to translate the capacity of a technology to a solution or a problem in language learning. The ability to interpret or translate how technology can be used is a process that depends on the understanding of the teacher, their understanding of technology, their educational goals, and the context in which learning occurs. When used as a tool for the teacher, technology can be used to address problems such as communication with peers, students, parents, record keeping, or classroom preparations. When used as a tool for students, technology can enable them to solve problems, access-learning materials, or receive feedback.

TPACK

Teachers' perceptions have been identified as the most important thing involving their ability and desire to integrate technology. The TPACK framework was used to develop a survey to assess how second language teachers are currently integrating technology. Schmidt et al. (2009) note that existing surveys have looked at teachers' self -assessment of their technology use. After the development of the TPACK framework, researchers began to look for ways to assess components of technology use for both pre-service and in-service teachers. Like other surveys, survey's developed based on the TPACK framework also use teacher's self-assessment, but look at their self-assessment level in each of the combinations of TPACK. Koelher and Mishra (2005) attempted to measure TPACK in a survey that tracked changes in teacher's perceptions of content,

pedagogy, and technology over the timeframe of an instructional design course. Angelia and Valanides (2009) looked at the use of design-based performance assessments built into course sequences to produce an "ICT-TPCK" score (p. 127). This score looked at how teachers do the following during their instructional design:

> Identify suitable topics to be taught with technology, (b) identify appropriate representations to transform content, (c) identify teaching strategies that are difficult to implement by traditional means, (d) select appropriate tools and pedagogical uses, and (e) identify appropriate integration strategies. (Baran, Thompson, Mishra, Koehler, and Shin, 2009, p. 127)

The survey consists of 36 Likert-scaled items that will allow teachers to identify their technology knowledge (TK), their content knowledge (CK), their pedagogical knowledge (PK), their pedagogical content knowledge (PCK), their technological content knowledge (TCK), their technological pedagogical knowledge (TPK) and their technological pedagogical content knowledge (TPACK). In addition, several demographic questions asked teachers to identify their gender, highest degree obtain, grade level taught, and if their school has Title 1 status. In addition, teachers were asked to provide the number total years of teaching experience, number of years in their current school, and their years of experience teaching ESOL.

Survey recipients were asked to rate their use of technology within the domains of TPACK using self-assessed scores ranging from 1 (*strongly disagree*), 2 (*disagree*), 3 (*neither agree or disagree*), 4 (*agree*), or 5 (*strongly agree*). The researcher believes this survey, as designed, may be successful for measuring how second language teachers are integrating technology with different domains and combinations of domains within their teaching. Mishra and Koelher (2009) state that the

> TPACK framework seeks to assist the development of better techniques for discovering and describing how technology-related professional knowledge is implemented and instantiated in practice. By better describing the types of knowledge teachers need (in the form of content, pedagogy, technology, contexts and their interactions), educators are in a better position to understand the variance in levels of technology integration occurring. (p. 67)

The purpose of this study was to identify differences in how technology is combined with pedagogy. This purpose led the researcher to the TPACK framework, and survey. The researcher began by reviewing different surveys that were created with the intent of measuring technology's use in schools in some form. The Stages of Technology Adoption was reviewed for this study, with the purpose of identifying teachers perceptive of technology. After careful review, the researcher determined that although these identification levels were important to the study, the Stages of Technology Adoption Survey was very limited in description of identification level and lent itself to indicate teacher's perception of technology for use, not necessarily use in combination with instruction. The Levels of Technology Implementation (LoTi) was also considered for this study. This survey looks at different categories of implementation, which would have been beneficial for the researcher. LoTi is a commercial survey, and because of this, proved to be more difficult to preview and modify. This survey has also been primarily to identify professional development needs. Careful consideration was given to other surveys and the TPACK framework combined with a modified TPACK survey evolved as the best choice.

The TPACK framework's history is interesting and has been influence by different researchers over the course of its ongoing development and revision. Technological Pedagogical Content Knowledge (TPACK) was first introduced to the

field of educational research as “a theoretical framework that would allow researchers to understand the teacher knowledge required for effective technology integration (Mishra & Koehler, 2006, Schmidt, Baran Thompson, Mishra, Koehler, & Shin, 2009). The framework was originally given the acronym TPACK and was later renamed to TPACK so it would be easier to remember and to help the three parts of the model form a more integrated whole (Thompson & Mishra, 2007-2008, Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009). The idea of TPACK is not new. This framework was built on Shulman’s construct of pedagogical content knowledge. (Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009). The TPACK framework built on Shulman’s work by adding the component of technology. There are other frameworks that include similar elements, but the TPACK seeks to measure the three knowledge types; content, pedagogy, and technology, with teaching, and appropriate methods and technologies (Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009, p. 124 & 125).

CHAPTER 3

METHODOLOGY

This study aimed to identify possible relationships between variables of interest. This study used correlational methodology to "describe the degree to which two or more quantitative variables are related" (Fraenkel & Warren, 2003, p. 338). Fraenkel & Warren write, "Correlational research is carried out for one of two basic purposes- either to help explain important human behaviors or to predict likely outcomes" (2003, p. 338). Borg and Gall write about the benefits of using a correlational method when analyzing research data, "The correlational method of analyzing research data is very useful in studying problems in education and in other behavioral sciences. Its principal advantage is that it permits one to analyze the relationships among a large number of variables in a single study" (1989, p. 576). The researcher proposed that variables may show patterns that would be useful to better understand the research questions. For the purpose of this study, correlational research is being carried out to explain the behaviors of ESOL teachers in regards to how they are using technology.

Survey type research was done to collect quantitative data for this study. Two-open ended survey questions served to generate qualitative data. Inferential statistics were used to examine the data (Creswell, 2003, p. 172). This data was then analyzed using multivariate analysis of variance to determine if the groups differed (Fraenkel & Warren, 2003, p. 24). The TPACK survey was used to collect standardized information on second language teacher's technology integration. The researcher modified the TPACK survey specifically for second language teachers. The survey was administered

to second language teachers who attended pre-planning training sessions, and included elementary, middle, and high school teachers.

Population and Sample

Second language teachers in the Cobb County public school system were the population used for this study. Cobb County is the second largest school system in Georgia. It is located in north Georgia, and is the 26th largest school system in the United States. The school district is 20 miles north of the city of Atlanta.

Cobb County school district has seen the impact of second language learners in their school system. For in example, in 1989 there were 100 ESOL students from 20 countries, who spoke 10 major languages. During this time, most ESOL students are Asian or Eastern European and had strong native language literacy skills upon entering school in Cobb County. The district in the late 1980s had few K-12 resources to service second language learners, and what they did have was primarily for adult learners. In 2009, Cobb County Schools had over 8,000 ESOL students from 130 different countries, and speaking 83 different languages.

Second language learners entering the county now are primarily of Hispanic descent and are entering school in the United States with more limited native language literacy skills. To assist with the development of students' second language and to encourage their success while being educated in Cobb County, the district now has various K-12 resources at a variety of proficiency levels, as well as an International Welcome Center and Refugee and Immigrant Parent Outreach and Migrant Education Services (Cobb County Public Schools, 2009). Helping teachers overcome obstacles to

technology integration with second language learners may be of particular interest for this district because of their large second language population.

This research design used participants who are K-12 ESOL teachers in Cobb County. This sample was a purposeful convenience sample, based on teachers' willingness to participate. The participants were given the opportunity to participate based on their attendance at pre-planning staff development sessions for second language teachers. Teachers attending the pre-planning session were all K-12 ESOL teachers in the county, a few of which had not yet been given a specific teaching assignment for the 2012/2013 school year. Some were assigned to teach at more than one school, or they may-be first-year teachers who have not yet begun teaching and are attending the sessions for informational purposes only.

The survey was distributed to approximately 300 teachers. Teachers attending the training session where broken into two groups. Middle and high school second language teachers attended the training the first day and elementary teachers attended the training the second day. The teachers differed in their school type, grade level taught, and what technology they may choose to work with. An informational piece on this study was included, introducing the researcher and explaining the role of participation. Teachers where compensated for their time and participation by receiving a $5.00 gift card.

Instrumentation

The study included data from the modified TPACK survey instrument, which consists of 36 Likert-scaled items, 7 demographic questions (i.e., gender, grade level taught, degrees earned, and years of total teaching and ESOL teaching experience), and

two open-ended questions. The goal of the survey was to look at how teachers use technology in combination with their content and pedagogy. The survey participants were asked to identify themselves as working in Title 1 or non Title 1 schools.

The TPACK framework was developed to measure three distinct areas–technology, pedagogy, and content knowledge–and how they are interrelated (Archambault & Oh-Young, 2009). To measure correlations of the TPACK framework, the original TPACK survey was modified and includes the seven domains. When developing the survey, Sahin (2011) looked at validity and reliability, discriminate validity and test-retest reliability. Validity and reliability was studied by surveying 348 pre-service teachers. To test the construct validity, Sahin examined factor validity of the seven domains using exploratory factor analysis to determine if each survey item of each domain successfully measured each variable. The exploratory factor analysis indicated that the items were qualified to be included. It was found that statistically significant correlations existed among the domains of the TPACK survey (Table 1), showing that "knowledge in technology, pedagogy, content and their intersections are related" (Sahin, 2011, p. 101).

Table 1
Pearson Correlation Coefficients Among Subscales

Subscale	1	2	3	4	5	6
1. TK	-					
2. PK	.28**	-				
3. CK	.36**	.61**	-			
4. TPK	.46**	.67**	.53**	-		
5. TCK	.53**	.60**	.59**	.79**	-	
6. PCK	.29**	.80**	.63**	.73**	.69**	-
7. TPACK	.41**	.66**	.56**	.72**	.79**	.72**

Sahlin (2011), p. 101. Cited with permission from publisher
* $p < .05$; ** $p < .01$

Cronbach's alpha coefficient was used to test the reliability of the scale (Fraenkel & Wallace, 2003, p. 215). Survey question correlations ranged from .62 to .90, correlations showed positive and strong relationships between TPACK domains. Archambault and Oh-Young (2009) tested the reliability and validity of the TPACK framework and survey by looking at K-12 online educators and concluded that the TPACK was a good way to examine areas in which individuals may benefit from specific professional development opportunities, especially when using technology with specific topics. Table 2 contains the items in the TPACK survey categorized by domain.

Table 2

Survey Statements Representative of TPACK Domains

Domains of TPACK	Survey questions
Technology knowledge (TK)	I know how to solve my own technical problems. I can learn technology easily. I keep up with important new technologies. I frequently play around with technology at my school. I know about many different technologies. I have the technical skills I need to use technology.
Content knowledge (CK)	I have sufficient knowledge of second language instruction. I am knowledgeable in different types of language instruction. I have various strategies to develop my understanding of ESOL instruction.
Pedagogical knowledge (PK)	I know how to assess student performance in a classroom. I can adapt my teaching based-upon what students currently understand or do not understand. I can adapt my teaching style to different learners. I can assess student learning in multiple ways. I can use a wide range of teaching approaches in a classroom setting. I am familiar with common student understandings and misconceptions. I know how to organize and maintain classroom management.
Pedagogical content knowledge (PCK)	I can select effective teaching approaches to guide ESOL student thinking and learning in mathematics. I can select effective teaching approaches to guide ESOL student thinking/and learning in literacy. I can select effective teaching approaches to guide ESOL student thinking and learning in science I can select effective teaching approaches to guide ESOL student thinking and learning in social studies.
Technological content knowledge (TCK)	I know about technologies that I can use for understanding and teaching mathematics to ESOL students. I know about technologies that I can use for understanding and teaching literacy to ESOL students. I know about technologies that I can use for understanding and teaching science to ESOL students. I know about technologies that I can use for understanding and teaching social studies to ESOL students.
Technological pedagogical knowledge (TPK)	I can choose technologies that enhance the teaching approaches for a lesson. I can choose technologies that enhance students' learning for a lesson. I am thinking critically about how to use technology in my classroom. I can adapt the use of the technologies to different teaching activities. I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn. I can use strategies in my classroom that combine content, technologies, and teaching approaches that I learned in professional development courses. I can provide leadership in helping others coordinate the use of content, technologies, and teaching approaches at my school and within my district. I can choose technologies that enhance the content for a lesson.
Technology pedagogy and content knowledge (TPACK)	I can teach lessons that appropriately combine mathematics, technologies, and teaching approaches. I can teach lessons that appropriately combine literacy, technologies, and teaching approaches. I can teach lessons that appropriately combine science, technologies, and teaching approaches. I can teach lessons that appropriately combine social studies, technologies, and teaching approaches.

Procedures

The Wayne State University's Human Investigation Committee gave approval for the research study.

A pilot study was conducted in the summer of 2012. The pilot study survey was administered to teachers who were looking to receive certification in second language instruction or were taking classes for professional development offered by the Cobb County Public School System. The pilot study included ESOL course participants from Grades K–12 who were from Title 1 and non Title 1 elementary, middle, and high schools, as well as others. The pilot study served to test research questions and TPACK survey questions. The pilot study gathered information that allowed the researcher to make changes to potential questions in the final survey. Upon completion of the pilot study minor changes were made to survey questions to increase the clarity for participants.

The pilot study was given to two classes of teachers seeking ESOL certification. Of those two classes, 29 students chose to participant. Of those 29 students, 24 completed the demographic information. Fourteen of the participants were from Title 1 schools and 10 were from non Title 1 schools. Fifteen of the participants were from elementary school, 5 were from middle school and 4 were from high school. I also went into the pilot study letting the participants know that they were participating in a pilot study, they signed a consent form and I asked them to please let me know if they had any questions. After giving the pilot study to two groups of teachers or students

who were taking classes to gain ESOL certification some reflection was done as to the survey itself.

The researcher reviewed the survey to check to see if what was being asked was going to provide information that would answer the research questions. After the completion of the pilot study I added the following demographic items to the survey; gender, highest degree obtained, years of total teaching experience, years of teaching experience as a ESOL teacher , and years of teaching in current school. A few participants had asked questions and some questions were reworded to help with participant clarity.

Questions modified included the removal of the word foreign language teacher and an emphasis on all students being ESOL.

For example:

I can select effective teaching approaches to guide second language students thinking and learning in mathematics.

was changed to

I can select effective teaching approaches to guide ESOL student thinking and learning in mathematics.

By changing the wording from second language students to ESOL, clarity was added that the instructional focus was on ESOL students and not students learning another language. No changes were made to the open-ended questions.

Participants from the pilot study were not included in the actual study that took place in the fall of 2012.

To create an organizing system the researcher reviewed the TPACK definitions and then the answers to the open-ended questions from the pilot study. The pilot study served as a starting point for organizing the open-ended questions, such as grouping responses from Title 1 and non- Title 1 teachers and looking for themes from definitions that could be connected to the 7 areas of the TPACK framework. Further reading on TPACK definitions was done at this time to help the researcher clarify between answers that could fit into more than one category.

This survey looked for examples of different TPACK combinations as described by second language teachers, in elementary, middle and high schools settings and compared responses between Title 1 and non Title 1 schools. Patterns found could be used to look at how teachers can move towards social constructivist and transformative pedagogy within their second language instruction by reviewing open-ended survey questions. Reviewing this data can assist with understanding how teachers are currently integrating technology into their teaching, content and pedagogy and what they need to know to further integrate in ways most beneficial for students. These open-ended questions highlighted technology integration, strategies, and assessment. Goodrich (2008) stated,

> By asking an open-ended question to elicit this information, the surveyor eliminates the possibility of the respondent not being able to properly answer the

> question because the list of options does not include the issue(s) that are most important to the respondent. The very features that make open-ended questions desirable also make the responses challenging. (p. 5)

Data Collection Procedures

Data was collected from the TPACK survey generating both quantitative and qualitative data. The actual survey was distributed to second language teachers who attended a pre-planning training session in the fall of 2012. Consent for participation was distributed first and those who turned in the content to participate where the given the survey. Teachers included were given an informational letter, a consent form, and the survey. Information on compensation for their time in the form of a gift card was also included in the informational letter. No identifying information was used, and participants were given their compensation immediately upon completion of their survey, the same day. Participant information in the form of the consent form will be destroyed within one week of the completion of the study.

Data Analysis

Likert-scaled survey question data were analyzed using multivariate analysis of covariance (MANCOVA) to determine significant relationships between the teachers' grade level of teaching and the status of their school (Title 1 or non Title 1). Data collected from open-ended survey questions were reviewed for patterns of use and common factors. Data received from the open-ended questions were used to supplement and support the data from the quantitative survey questions. Results of the data analysis were organized according to research questions (Table 3).

Table 3
Research Design, Data Collection, and Data Analysis

Research questions	Data collection	Data analysis
What are the differences in how second language teachers use technology knowledge (TK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use content knowledge (CK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use pedagogical knowledge (PK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use pedagogical content knowledge (PCK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use technological content knowledge (TCK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use technological pedagogical knowledge (TPK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
What are the differences in how second language teachers use technology pedagogy and content knowledge (TPACK) in the classroom?	Survey	Statistical analysis MANOVA and MANCOVA
Open-ended survey questions serve to support all research questions and allow the participant to synthesis different components of TPACK.	Open-ended questions	Descriptive analysis coding scheme

Researcher Identity

The researcher has worked in the field of education for 14 years in public education, and is currently working as an elementary school media specialist. The researcher has had experience working with diverse populations and gained certification in ESOL instruction in the state of Georgia during the 2009–2010 school year. She also has had experience working with adult migrant workers in English language programs. Her variety of experiences and her studies at Wayne State University have prepared her to conduct this research.

Ethical Considerations

The purpose of this research was to encourage the use of technology with second language teachers; thereby, encouraging further educational experiences for second language students. This study was not conducted with the intent to discredit or show dissatisfaction with any school district or teacher working in it. Participant researcher forms were filed with the school district for appropriate parties to review with the intent of improving second language student achievement and the advancement of technology in education. The researcher, although a teacher within the state of Georgia and the school district, did not work directly with any of the potential schools or survey recipients. All participants were informed of the objective for the research. All surveys were collected anonymously.

CHAPTER 4

RESULTS

This study used a survey to collect quantitative and qualitative data for this quantitative survey research project. Thirty-six likert-scaled items collected quantitative data and two open-ended survey questions served to generate qualitative data. Data was collected from 75 teachers; however, incomplete responses reduced the number of usable questionnaires to 69, which were used to analyze three research questions.

Description of the Sample

Table 4 contains information to describe the 69 teachers who responded completely to the survey. The return rate was 23%. More than 80% of the respondents were female, more than half (64%) held a master's degree, and more than half (57%) taught at the elementary level. Two thirds of the teachers worked in Title 1 schools. The teachers reported an average of 12.6 years of teaching experience and an average of 6.4 years of experience working as an ESOL teacher.

Reliability of the Scales

The TPACK instrument used to collect the quantitative data contained seven domains. The items in each domain were analyzed to determine the internal consistency of each domain. Table 5 contains Cronbach's coefficient alphas obtained. With the exception of the PCK domain ($\alpha = .55$), the alpha values were adequate, ranging from .70 to .92.

Table 4
Description of the Sample

Characteristic	*n*	%
Gender		
Male	12	17.4
Female	57	82.6
Highest degree obtained		
BA/BS	8	11.6
MA/MS	44	63.8
Specialist	15	21.7
PhD	2	2.9
Grade level		
Elementary	39	56.5
Middle	15	21.7
High	15	21.7
Title 1 status		
Title 1	46	66.7
Non title 1	23	33.3
	M	*SD*
Years of teaching experience	12.55	7.74
Years of experience in current school	5.49	4.86
Years of experience in ESOL	6.41	4.80

Table 5
Reliability of the TPACK Scales

Scale	# of items	Cronbach's coefficient alpha
Technology knowledge (TK)	6	.88
Content knowledge (CK)	3	.71
Pedagogical knowledge (PK)	7	.84
Pedagogical content knowledge (PCK)	4	.55
Technological content knowledge (TCK)	4	.79
Technological pedagogical knowledge (TPK)	8	.92
Technology pedagogy and content knowledge (TPACK)	4	.70

Analysis of Data

Three research questions were developed for the study. Each research question, the statistical procedure used to analyze it, and the results of the analysis are presented below. Each research question was evaluated to determine if the null hypothesis was rejected and the alternative hypothesis was accepted. Table 6 contains the means and standard deviations of the domains of the TPACK by grade level and Title 1 status. These values were used in the analysis of Research Questions 1 and 3.

Research Question 1

Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools?

A multivariate analysis of variance (MANOVA) was used to determine the differences among second language teachers at Title 1 and non Title 1 schools (Table 7). A significant difference was found between the two groups ($F = 2.59$, $p = .02$). The univariate results found significant differences between the two groups on the TPACK domains pedagogical knowledge ($F = 13.71$, $p < .01$) and technological pedagogical knowledge ($F = 6.21$, $p = .02$). In each case, teachers at Title 1 schools reported less agreement with the items describing these two domains (Table 6). Therefore, the null hypothesis was rejected and the alternative hypothesis was accepted. There are statistically significant differences in how second language teachers use technological pedagogical content knowledge with students in Title 1 and non Title 1 schools.

Table 6
Means and Standard Deviations of TPACK Scales by Title 1 Status

	Total (n = 69)		Title 1 status: Title 1 (n = 46)		Title 1 status: Non Title 1 (n = 23)	
Scale	*M*	*SD*	*M*	*SD*	*M*	*SD*
Technology knowledge (TK)	3.73	0.74	3.62	0.76	3.96	0.67
Content knowledge (CK)	4.28	0.61	4.24	0.59	4.36	0.66
Pedagogical knowledge (PK)	4.44	0.43	4.32	0.40	4.69	0.37
Pedagogical content knowledge (PCK)	3.87	0.61	3.88	0.59	3.86	0.67
Technological content knowledge (TCK)	3.55	0.82	3.51	0.86	3.64	0.72
Technological pedagogical knowledge (TPK)	3.91	0.72	3.76	0.77	4.20	0.51
Technology pedagogy and content knowledge (TPACK)	3.65	0.74	3.60	0.77	3.75	0.67

Table 7
Results of the MANOVA Analysis of Research Question 1

Statistic	*F*	*p*
Multivariate–Wilks' Lambda	2.59	.02
Univariate		
Technology knowledge (TK)	3.43	.07
Content knowledge (CK)	0.61	.44
Pedagogical knowledge (PK)	13.71	< .01
Pedagogical content knowledge (PCK)	0.02	.89
Technological content knowledge (TCK)	0.42	.52
Technological pedagogical knowledge (TPK)	6.21	.02
Technology pedagogy and content knowledge (TPACK)	0.60	.44

Research Question 2

Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

Six teachers in Title 1 high schools and three teachers in non Title 1 middle schools responded to the survey. A MANOVA (or ANOVA) cannot be conducted if the number of responses in cells is fewer than the number of dependent variables in the analysis (Tabachnick & Fidell, 1996). In this case, the number of dependent variables is 7 and two of the six cells in the analysis have a sample size of less than 7 (6 and 3). Therefore, the three grade level categories (elementary, middle, and high) were collapsed into two categories (elementary and middle/high). Table 8 contains the means and standard deviations of each TPACK domain broken out by Title 1 status and the new grade level categories. The interaction of Title 1 status and grade level is the only result of interest (Table 9). The interaction was not significant ($F = 1.92$. $p = .08$).

Table 8

Means and Standard Deviations of TPACK Domains by School by Grade Level

Domain	School	Grade	*M*	*SD*	*n*
Technology knowledge (TK)	Title 1	elementary	3.65	0.72	28
		middle/high	3.57	0.83	18
	non Title 1	elementary	3.99	0.66	11
		middle/high	3.94	0.70	12
Content knowledge (CK)	Title 1	elementary	4.19	0.50	28
		middle/high	4.32	0.73	18
	non Title 1	elementary	4.46	0.54	11
		middle/high	4.28	0.76	12
Pedagogical knowledge (PK)	Title 1	elementary	4.35	0.37	28
		middle/high	4.27	.045	18
	non Title 1	elementary	4.66	0.41	11
		middle/high	4.71	0.35	12
Pedagogical content knowledge (PCK)	Title 1	elementary	3.98	0.53	28
		middle/high	3.72	0.65	18
	non Title 1	elementary	4.32	0.34	11
		middle/high	3.44	0.62	12
Technological content knowledge (TCK)	Title 1	elementary	3.63	0.90	28
		middle/high	3.31	0.78	18
	non Title 1	elementary	3.86	0.69	11
		middle/high	3.44	0.72	12
Technological pedagogical knowledge (TPK)	Title 1	elementary	3.74	0.83	28
		middle/high	3.79	0.70	18
	non Title 1	elementary	4.26	0.46	11
		middle/high	4.15	.057	12
Technology pedagogy and content knowledge (TPACK)	Title 1	elementary	3.70	0.78	28
		middle/high	3.46	0.75	18
	non Title 1	elementary	4.18	0.60	11
		middle/high	3.35	0.47	12

Table 9
Results of MANOVA of Title 1 Status by Grade Level

Statistic	*F*	*p*
Multivariate–Wilks' Lambda	1.92	.08
Univariate		
Technology knowledge (TK)	0.01	.92
Content knowledge (CK)	.88	.35
Pedagogical knowledge (PK)	.43	.51
Pedagogical content knowledge (PCK)	4.69	.03
Technological content knowledge (TCK)	.06	.82
Technological pedagogical knowledge (TPK)	.22	.65
Technology pedagogy and content knowledge (TPACK)	2.63	.11

Research Question 3

Is there a relationship between how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools and years of experience?

Two correlation matrixes were created to determine the relationships between the seven TPACK domains and years of teaching experience (Table 10). A number of significant correlations were found between experience and several TPACK domains in the sample of teachers working in non Title 1 schools. Moderate negative correlations were found between total years of experience and content knowledge (r = -.52), PCK (r = -.45), and TCK (r = -.51), indicating that as more reported more experience, they were

less in agreement with items in the aforementioned domains. One moderate negative statistically significant correlation was found between years of experience as an ESOL teacher and TK (r = -.36).

An analysis to determine if the results of the two correlation coefficients obtained from independent samples where equal was conducted using Fisher's *r*-to-*z* transformation. The significant correlations found in Table 10 for the non Title 1 sample were compared to the same correlations found in the Title 1 sample (Preacher, 2002). For example, a comparison of the correlation between total years of experience and content knowledge for the Title 1 sample (r = -.12) and the non Title 1 sample (r = .52) found the two correlations were not statistically different from each other (z = 1.68, p =.09). A comparison of the other corresponding correlations also found no significant differences between the two samples. Although statistically significant moderately negative correlations were found in the non Title 1 sample, the Fisher's *r*-to-*z* transformation found no significant differences between those values and the non significant values found in the Title 1 sample. An explanation for this phenomenon may be the small sample size in the two samples collected in the current study. Larger sample sizes would provide significant differences between the two samples.

Table 10
Relationships Between TPACK Domains and Years of Teaching Experience

School	TPACK domain	Years of experience		
		Total	In current school	As ESOL teacher
Title 1	Technology knowledge (TK)	-.12	-.20	-.36*
	Content knowledge (CK)	-.12	.14	.25
	Pedagogical knowledge (PK)	.02	-.05	-.08
	Pedagogical content knowledge (PCK)	.05	.01	-.06
	Technological content knowledge (TCK)	.11	.19	.07
	Technological pedagogical knowledge (TPK)	-.09	-.08	-.21
	Technology pedagogy and content knowledge	-.04	-.12	-.15
non Title 1	Technology knowledge (TK)	-.06	.00	.13
	Content knowledge (CK)	-.52*	-.16	.40
	Pedagogical knowledge (PK)	-.30	.06	.50
	Pedagogical content knowledge (PCK)	-.45*	-.51*	-.10
	Technological content knowledge (TCK)	-.51*	-.37	.40
	Technological pedagogical knowledge (TPK)	.09	.19	.18
	Technology pedagogy and content knowledge (TPACK)	-.13	-.12	-.17

* $p < .05$

After reviewing the quantitative data, the qualitative data was analyzed. Descriptive analysis was used to analyze the data. This data was used to supplement the quantitative data. Data was organized and prepared by transcribing the answers given for the two questions. Each survey was numbered and the transcripts were assigned the coordinating numbers. The TPACK framework served as a guide for categorizing the transcripts. The TPACK categories used were:

Table 11
Qualitative Data Categories

Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	Category 7
Content Knowledge (CK)	Pedagogical Knowledge (PK)	Technological Knowledge (TK)	Pedagogical Content Knowledge (PCK)	Technological Content Knowledge (TCK)	Technological Pedagogical Knowledge (TPK)	Technological Pedagogical Content Knowledge (TPACK)

When creating the qualitative questions for the survey instrument, the original TPACK instrument served as a guide. When reading through the data, the researcher had the 7 categories in mind. Due to the descriptive nature of the answers, the researcher quickly found that it was difficult to categorize the data using these 7 categories alone. Teachers who answered the qualitative questions were not told about the TPACK model, the categories, or given any background information on the framework. I sought to understand what pieces of the TPACK framework second language teachers were already using, and to look for any differences that might exist between Title 1 and non Title 1 teachers within the same county. Without using something more specific as a guide, the researcher was unable to categorize the data and pull out themes for each category. The researcher began looking for more specific examples of each category.

After reviewing additional information on the TPACK and examples of each category the researcher read and applied information from *Diagramming TPACK in Practice: Using an Elaborated Model for the TPACK Framework to Analyze and Depict Teacher Knowledge* (Cox & Graham, 2006). This conceptual analysis helped to clarify blurry boundaries between some of the different TPACK categories (Cox & Graham, 2009, p.60).

Areas that were found to have particular overlap were TCK, TPK, and TPACK (Cox & Graham, 2009 p. 61). To help with determining differences between the categories, Cox and Graham reviewed different definitions, interviewed TPACK researchers, looked for model cases, and finalized their definitions and created a graphic organizer. Their graphic organizer broke PK down into 2 categories; general strategies or content specific strategies. Content specific strategies were then broken down into subject-specific strategies and topic-specific strategies. I used their expanded definitions to analyze teacher's responses further.

Using the expanded definitions from Cox and Graham as a guide, the two open-ended survey questions were analyzed. Answers were compared between teachers that came from Title 1 and non Title 1 schools. Data was reviewed with the goal of providing at least 5 examples from Title 1 and non Title 1 teachers per TPACK domain. After reviewing the open-ended survey questions, the researcher did not believe that participants had the opportunity to describe their content knowledge enough to fall into the TPACK domain CK. The researcher set out to find a minimum of 5 examples from each TPACK category and each school type. Once five examples from each school type were found for each category, open coding was used to pull themes that aligned to different categories. These key words and phrases were grouped into 6 TPACK categories. The open coding was non-hierarchical and all responses were grouped by their category. The themes that were derived them circled back to the different TPACK categories.

Table 12
Analysis of School Type, Categories, Themes, and Examples

Pedagogical knowledge (PK)			
School Type	Categories	Themes	Examples of Responses
Title One	Using Pedagogical Knowledge	• Understanding	"I enjoy checking for understanding, this is when you pause and have students demonstrate understanding."
		• Rubrics	"Our school uses rubrics to assess performance tasks."
		• Feedback	"Questioning techniques, teacher observation, oral and written feedback from students, independent comprehension activities (math), small group games, and manipulatives, Smartboard (whole group)."
		• Groupings	"Questioning techniques, teacher observation, oral and written feedback from students, independent comprehension activities (math), small group games, and manipulatives, Smartboard (whole group)."
		• Strategies	"Small group instruction, modeling with Smartboard activities (math), pairing student (math), pairing students (reading and math), partner read with small group."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Pedagogical knowledge (PK)			
School Type	Categories	Themes	Examples of Responses
non Title One	Using Pedagogical Knowledge	• Scaffolding	"I scaffold for ESOL. It's about understanding your student's needs and where they want to go. It's about listening and making a choice on what they need."
		• Performance Indicators	"How we assess is to create performance indicators. We need to have validity in our tasks."
		• Reflection	"I used rubrics for different types of grading with pictures. I also used peer grading to allow for all student input. I also use self-reflection to help with input for final grade."
		• Formative & Summative Assessment	"I use both summative and formative assessments to determine if students have mastered the content. The assessments are often project-based and student centered. The results of the formative assessments always help me to determine future instruction."
		• Rubrics	"Rubrics, student center (student choice, differentiation) teacher facilities, student self-checks, peer-editing, and presentations (final product and oral response)."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological knowledge (TK)			
School Type	Categories	Themes	Examples of Responses
Title One	Using Technological Knowledge	• Motivation	"Use technology to help motivate students to learn and understand different concepts."
		• Smart Technology	"I often use Smart technology with my students. I just recently "discovered" the record feature that I can use to record myself and use to allow students to record themselves so that I can "see" what they are doing during an independent math lesson while I work with a small group."
		• Devices	"During the school year I have used different websites, Activeboard Promethean boards, I Pads, to help enhance student involvement of learning in all subject areas. Also using I-Respond in the class."
		• Subscription Software	"Read 180 is easily tracked through the administrative link to monitor progress and lexile advancement."
		• Virtual Libraries	"I use sites such as the virtual library, education websites, Pebble Go, ABC YA, or Bookflix to teach literacy to my kindergarteners on the Activboard as a band on the center."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological knowledge (TK)			
School Type	Categories	Themes	Examples of Responses
non Title One	Using Technological Knowledge	• Bibliographic Software	"Easybibs.com- words cited page formatting."
		• Online Test Preg	"Grammarbooks.com- free quizzes –focus on grammar, usage and punctuation- similar to the college entrance COMPASS test."
		• Online Portfolio	"Create a Google page e-portfolio for the course."
		• Using Different Technologies	"Generally, I feel comfortable teaching the technology. I enjoy using, and students find engaging. These are mostly Powerpoint and Publisher. I have used these technologies teaching social studies, writing, and ELA. It has always helped when I've provided a brief "cheat sheet" that the students could use for practice at home, and also encouraged students to take notes while the lesson was being taught. When students have the opportunity to have a hands-on experience right away, I've found they are more likely to retain what is taught."
		• Web 2.0 Creation	"My biggest resource is my blog, Smartboard, and internet games. Lakeshore sells a lot of games and interactive lessons that could be loaded to the Smartboard. I mainly use it during math and reading."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Pedagogical content knowledge (PCK)			
School Type	Categories	Themes	Examples of Responses
Title One	Use of pedagogical content knowledge.	• SIOP Checklist	"I often use the SIOP checklist to assess my lesson plans and my classroom teaching approaches. I use this method in all content areas from literacy to math to science and social studies. It guides me through the 40 aspects of planning and implementation of the lesson and helps me remember too include different strategies for my students varied English proficiency levels. "
		• Problem Based Learning.	"I-Respond is used to access content in the classroom. Students have the opportunity to work on PBL where the final product is used to assess students. Most of the time it is in the form of a multimedia (product). The content taught was and the integration of math and health. The effects of making healthy choices regarding eating habits."
		• Instructional Strategies	"Science Lesson- land features and constructive/destructive forces. -Instructional strategies included small group instruction, read alouds, analyzing non-fiction text features, matching visual and vocab. -Laptop to review science until vocabulary and process with visuals (pictures) labels, record questions. -Laptop Power Point presentation assessment at the end of the unit lesson delivery and practice. Social Studies Lesson -Instructional strategies included small group reading, text to self, and text to world discussions and discourse. -Pics in the classroom, used by students to create personal published books of civil war and immigration units."
		• Scaffolding and Background Knowledge	"I have used scaffolding and background knowledge in teaching 5th graders about immigration to the U.S. in early years. Some of my students were all ELL's , they had to use the computer to research their home country, get an example of their home flag and create a passport. They had to research reasons that early immigrants came to the U.S. and then wrote a paragraph about why their families came to the U.S.. They had to develop a plan for how they would contribute to society."
		• Student Creates	"U.S. History- Smartbaord – match a concept to the definition or picture- Creating Powerpoints to teach concepts to the rest of the class- Create brochures and other office tools to make projects-I-Respond used for formative assessments and summative assessments-instant data-Powerpoint jeopardy games for review -Create a blog for class assignments -Use You Tube videos for concept"

Table 12
Analysis of School Type, Categories, Themes, and Examples

Pedagogical content knowledge (PCK)			
School Type	Categories	Themes	Examples of Responses
Non Title One	Use of pedagogical content knowledge.	• Real Life	"Poetry lesson- we read poetry. We looked out the window for inspiration for haiku wrote haiku. Got on ReadWriteThink.org and created a shape poem, printed it out, and put it in a poetry notebook. On the same website did a acrostic poem to put in notebook. 1. Assessed prior knowledge. 2. Added prior knowledge by teaching. 3. Modeled. 4. Followed by student."
		• Connecting to Experiences	"I realized we needed to provide many examples of types of poems by reading and reciting because when I first asked, students couldn't think of a poem. They didn't understand haiku until we talked about our lists we created from objects and feelings we experience from looking outside. They enjoyed getting on the computer to create poems, printed them, illustrated some of them, and showed their general education teacher, then took the poetry booklet home. They felt proud!"
		• Differentiation	"I use an IPad cart to differentiate between levels with different app in writing class. I use a Smartboard to allow students to create sequencing for storytelling and British Literature. I also use Edmondo to assess different levels of assignments."
		• Research	"I use USA test prep on a consistent basis. Students use tech to research for product production. I use tech for rubrics and for Power Points on different subjects."
		• Observation	"In the area of mathematics, I have used the Smartboard technology as an assessment tool because the student is physically able to manipulative on the board, I as the teacher can observe where they mistakes are occurring. I also require my students to talk about why they are doing- sometimes just a word (depending on their level). This approach also lends itself to peer evaluation."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological content knowledge (TCK)			
School Type	Categories	Themes	Examples of Responses
Title One	Use of technological content knowledge	• Lack of Technology	"We have no classroom and only access to technology in the media center. We have total push-in-model for teaching. "
		• Smartboard	"I like to use the Smartboard with my younger learners to support basic phonics."
		• Educational Websites	"I use sites such as virtual library, education websites, Pebble Go, ABC YA, and Bookflix to teach literacy to my kindergarteners on the Activeboard."
		• Electronic Presentations	"My students are new comers to the U.S.. I usually teach them how to make Power Point presentations. After a lesson, they use whatever grammar the learned, for example, simple past tense and create a Power Point. Once, I asked them to find pictures and write sentences about what that person did yesterday."
			"Use Smartboard to allow students to interact in geometry lesson, use computer based math programs to assess skills, interactive maps for social studies, and video demonstration for science."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological Content Knowledge (TCK)			
School Type	Categories	Themes	Examples of Reponses
non Title One	Use of technological content knowledge	• Technology to Teach Content	"Kindergarten- letter recognition (name letter) (lesson example)- and write sight words, used "my name" or "write my name" on personal IPad projected through classroom system. Students took turns spelling their own name and/or pre-evaluable words. Program requires students to trace letters using proper letter formation. Depending on student language acquisition, 1-5 students spoke letters or read words, or asked each other questions in complete sentences."
		• Apps for Language Acquisition	"When I did push in last year, I developed a lesson plan for Power Point for students final project in the American Revolution. Through the lesson was specifically on the role and implementation of Power Point (many students 4th graders had never been introduced to it), it was geared to the social studies content. In other words, I used to links to social studies websites that are contextual to what they were studying- initially, the lesson tool place in the classroom: there were follow up hands on the lesson in the computer lab."
			"Generally, I feel comfortable teaching the technology. I enjoy using, and students find engaging. I have used these technologies teaching social studies, writing, and English Language Arts. It has always helped when I provided a brief "cheat sheet" that the students could use for practice at home, and also encourage students to take notes while the lesson was being taught. When students have the opportunity to have a hands-on experience right away, I've found they are more likely to retain what is taught."
			"Students typed these papers on school laptops using the website Essayscorer. Students worked toward a specific score. Lower level kids wrote their "essay" in a word document and added pictures for visual support."
			"I have used Google Earth to maximize a social studies lesson on battles of the civil war and WWII. This lesson helped clarify geographical concepts as well as chronological concepts. Not only was the Google Earth program used, but the lesson incorporated Promethean board and projector."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological pedagogical knowledge (TPK)			
School Type	Categories	Themes	Examples of Responses
Title One	Using Technological Pedagogical knowledge.	•I-Repond	"I use I-Respond to review lessons. I create a multiple-choice questionnaire that I project in Power Point forum. Students use I-Respond to answer the question, then we go through the results. "
		• Google translate	"In teaching vocabulary, I frequently use Google Translate and Google images to bolster students understanding of the vocabulary words."
		•Google images introduce teach new vocabulary. •Using the Smartboard display model conversation (social and instructional). •Differentiate proficiency level using I-Respond.	"In teaching intensive English language, I used the Smartboard to display the model conservation (teaching social/instructional language) with several words missing. Possible answer choices (all of which fit to complete the dialogue) were available to drag and drop into place, or the student could write their own answer with the pencil. I was able to differentiate for proficiency level because the student could either select or create the response. I assessed different domains by having students select and read, or listen first and then select, or write. Students participated individually in parts, and in large groups. The technology let me assess, informally, multiple domains and skill levels in an engaging way in a very short period of time."
		•Using PowerPoint the teacher could visually see student math answers and reteach as needed.	"The math games my students play will say the number of questions they got correct. Many times I will walk around and monitor their work and whether they understand the concept. For the Powerpoint, I would read their definitions of each vocab word and make sure their pictures matched. Finally, with the Smartboard, I watched as they put each ordinal number in the correct place. It helped me see who understood and who needed more practice."
		• Using images to build background knowledge before learning new vocabulary words.	"We have Activeboards in our rooms and I would create Powerpoints with real pictures of key vocabulary words before reading the text to build background."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technological pedagogical knowledge (TPK)			
School Type	Category	Themes	Examples of Responses
Non Title One	Using technological pedagogical knowledge.	• Using websites to teach vocabulary instruction.	"I use technology in many ways in my classroom. Vocabulary instruction is particularly effective using technology. Websites such as Wordle help with key vocab instruction."
		• Students share and receive feedback.	After modeling the use of Powerpoints, we have students create Powerpoint projects/presentations. The students share with the whole group in a presentation form and are graded on a rubric. Also, peer feedback is given."
		• Student Power Point presentations. Peer feedback on presentations.	"After teaching a science lesson on magnets, students were able to explore "attraction" on science web link and were able to compare/contrast objects that would attract or repel. They were then able to take a quiz over magnets on the same website and receive immediate feedback about their understanding."
		• Taking online quizzes and getting immediate feedback.	"To teach math concepts I have used a variety of technology. Math fact fluency helps students practice math facts and improve fluency. First in Math is also effective in helping students develop math skills. With kindergarteners I have used online manipulatives. While they have enjoyed them, real manipulatives are more effective."
		• Using online manipulatives to teach math.	"After modeling the use of Powerpoints, we have students create Powerpoint projects/presentations. The students share with the whole group in a presentation form and are graded on a rubric. Also, peer feedback is given."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technology Pedagogy and Content Knowledge (TPACK)			
School Type	Categories	Themes	Examples of Responses
Title One	Using Technology Pedagogy, and Content Knowledge	• Students used interactive technology. • Design and build projects to solve problems. • Peer reviewed. • Evaluate mastery assessments.	"1. Students create a Wiki, Voki, or Animoto presentation to evaluate mastery through performance assessments in addition to standardized tests. 2. Make material relevant and meaningful connected to the lives and environment where the student sees familiar associations. 3. Content is Biology & Environmental Science. The students are involved in global local citizen science projects that are peer reviewed. 4. Students design and build projects that solve environmental issues."
		• Students compare cultures.	"When opening a thematic unit language arts on "culture", students read the "prologues" to Invisible Man" by Ralph Ellison. In an Edmodo talks to the students who had to submit from their Ipads a collage of words and images from around the building that represent their school culture. Then they each added a written post explaining how the arrangement of the items and pictures represents their school culture. Then they compared and contrasted their culture to the culture off the speaker in the prologues. The discussion board is posted for students to generate comments on the collages and thoughts of the peers. Edmondo allows me to give each student immediate feedback on their posts and their responses to other's posts."
		• Students were given immediate feedback. • Students re-teach	"Mental case is an IPad app that I use often to model content along with Discovery Ed. Videos or Nasa or other multimedia videos and text. Using interactive video, students often create a "case". A set of interactive vocabulary and net study cards. They story their own lesson and re-teach their learning to other students. The use of technology fosters both teacher-directed content learning and creative-open ended student centered learning to interact and make personal connects to content education."

Table 12
Analysis of School Type, Categories, Themes, and Examples

Technology Pedagogy and Content Knowledge (TPACK)			
School Type	Categories	Themes	Examples of Responses
non Title One	Using Technology Pedagogy, and Content Knowledge	• Instructional Strategies	"Teaching instructional strategies were in the ESOL sheltered ELA classroom and pull-out ESOL classroom. It was a writing lesson where students answered warm-up questions on I-Respond. We used the active board and projector to model/view how to proof read and edit peer's papers. Students then worked in groups to proofread each other's papers. Students would switch groups every 15 minutes to proof a different paper. I call this "appointment time" as students schedule apps/groups based on the times I give them. Students used different color pencils to proofread prior to doing this, though students watched a Brain Pop on proofreading."
		• Students play games to help with fluency	"As an ESOL teacher I use internet based literature sites to support and encourage readers in my class of different language, ethnicities, and grade levels."
		• Using video to introduce topics, using hands on technology.	"I use technology to show video clips to introduce topics and as a way to enhance lessons being taught. Brainpop is a popular website I use to incorporate various content into my lessons. I also use reading A-Z as a way for my students to read, listen, and answer quizzes on books. We do these as whole group and small group time." "When I did push-in last year I developed a lesson plan for Powerpoint for students final projects in the American Revolution. Though the lesson was specifically on the role and implementation of Powerpoint (many students – 4th graders- had never been introduced to it), I was geared toward social studies content. In other words, I used links to social studies websites that were contextual to what they were studying initially, the lesson took place in the classroom: there were follow up hands on lessons in the computer lab."

The themes that were generated during the coding were similar between Title 1 and non Title 1 teachers. Given the small sample size, and a variety of completeness in answers, it is difficult to know if the similarities in answers would have not shown more differences with more participants. Based on the small sample size there does not appear to be a pedagogical divide with the delivery of instruction to ESOL students by their second language teachers. This could be because of the small sample size. It could also be that only those who were using technology choose to participate in the study. These teachers might be delivering instruction with thought to pedagogy, content, and technology because they are lifelong learner, seeking out new ways to best teach their students, reading about new educational practices, and taking the time to learn and experiment with technology provided to them by the district.

Although the qualitative results showed examples of use in the areas of the TPACK domains, there were significant limitations to this study, such as the sample size and the balance in participant type. The quantitative results of this study did show significant differences existing between TPACK domains and title one and non-title one schoolsmwhich could show a potential pedagogical divide. The quantitative results are similar to findings by Pickett who used focus groups to look at teacher technology skill levels and it's impact on integration (2009). Teachers in Pickett's focus group that were identified as being "high" technology users made comments on barriers to technology integration that included things such as "Some kids can do a whole bunch of stuff and other kids you have to start at square one which makes it a whole other level of differentiation. You need a whole other person to walk around and help out students with

technology issues" (2009, p. 92). Another person from the focus group commented on student's ability saying, "I think it is hard to even know what they can and cannot do. I [assume students] will know how to copy a picture or use Power Point and they may not have the slightest idea how to get to Power Point. Some of them know what they are doing and jump ahead" (2009, p. 93).

CHAPTER 5

Summary

The purpose of this study was to review technology integration with second language teachers K-12, and any differences that might exist between Title 1 and non Title 1 schools. By looking at how teachers use technology and differences that exist, this study reviewed a potential pedagogical divide and the combination of technology, pedagogy, and content knowledge using the TPACK model as a framework.

This study gathered both quantitative and qualitative data. Three research questions were used to guide the study and review the significance of the qualitative data.

Research Question 1

Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools?

Research Question 2

Is there a difference in how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 elementary, middle, and high schools?

Research Question 3

Is there a relationship between how second language teachers use ***technological pedagogical content knowledge*** with students in Title 1 and non Title 1 schools an years of experience?

Research question 1 proved to be highly significant, and the null hypothesis was rejected. Two specific areas within the TPACK domains were highlighted as being significant: pedagogical knowledge and technological pedagogical knowledge.

Research question 2 proved to be difficult to measure due to very low response rates from middle school and high school teachers. The low response rate caused the separate categories of middle and high school to be collapsed into one group. The null hypothesis was not rejected.

Research question 3 showed patterns of difference specifically with teachers in non Title 1 schools in the areas of content knowledge, pedagogical content knowledge, and technological content knowledge. When reviewed statistically using the Fishers r-z, the significance decreased and their differences in agreement with the three domains decreased. This could also be due to the low response rate. The null hypothesis was not rejected.

Findings and Implications

Findings for this study brought insight into how ESOL teachers are using technology in combination with pedagogy and content knowledge with second language students. Surveys were collected from 75 teachers, 69 of which were complete enough to analyze the three research questions. Female respondents made up 82.6% of participants and males 17.4%. Teachers with bachelor degrees made up 11.6% of respondents, masters degrees 63.8%, specialist degrees 21.7%, and PhD's 2.9%. Elementary teachers made up 63.8% of the sample, middle school teachers 21.7%, and high school teachers

2.9%. Teachers working in Title 1 schools made up 66.7% and teachers in non Title 1 schools 33.3%. The average number of years teaching was 12.55%, the average number of years working in current school was 5.49%, and the average number of years working as an ESOL teacher was 6.41%. The composition of the sample served to be a limitation to the study. The sample was heavy with elementary teachers and those working in Title one schools.

Research question 1 looked at the TPACK and the possible differences that exist between Title 1 and non Title 1 ESOL teachers. Although the results did not show significant differences in all areas of the TPACK, pedagogical knowledge and technological pedagogical knowledge did present themselves as areas where differences between the two types of schools did exist. These findings could imply a pedagogical divide.

The comparison of teacher responses between Title 1 and non Title 1 teachers was done to analyze potential differences that could show a pedagogical divide. Quantitative data from research question 1 did show differences in two areas of the TPACK framework for Title 1 and non Title 1 teachers; PK Pedagogical Knowledge and TPK Technological Pedagogical Knowledge.

The quantitative results are similar to findings by Pickett who used focus groups to look at teacher technology skill levels and it's impact on integration (2009). Teachers in Pickett's focus group that were identified as being "high" technology users made comments on barriers to technology integration that included things such as "Some kids can do a whole bunch of stuff and other kids you have to start at square one which makes it a whole other level of differentiation. You need a whole other person to walk around and help out students with technology issues" (2009, p. 92). Another person from the focus group commented on student's ability saying, "I think it is hard to even know what they can and cannot do. I [assume students] will know how to copy a picture or use Power Point and they may not have the slightest idea how to get to Power Point. Some of them know what they are doing and jump ahead" (2009, p. 93).

Although the null hypothesis of research question 1 was rejected, showing that differences exist between how ESOL teachers use TPACK in Title 1 and non Title 1 schools, the survey instrument did not specify how they are different.

Qualitative responses did not show specific differences and in at least 5 examples showed similarities. It was predicted that teachers might describe learning situations in which they needed to teach students to use technology because some of them did not have access to it at home. No such descriptions were given in any qualitative responses reviewed. Instead, descriptions were given that included the teaching of content with technology, and a variety of different instructional strategies used for doing so. Pedagogical activities described in many cases clearly included technology and a fair number of examples included all elements of the TPACK framework. The qualitative

data is also limited because many of the some open-ended survey questions were left blank and some were incomplete. There were also more respondents from Title 1 schools than non Title 1 schools. The qualitative data gave additional insight into how teachers are actually using technology.

Research question 2 looked at differences in technology, pedagogy, and content within different school levels; elementary, middle, and high school. Unfortunately, fewer teachers from middle and high school fully completed this section of the survey. Noting the impact of how the school level impacts technology, pedagogy, and content knowledge made this difficult to assess. More than half of these surveys were from elementary schools. Cox (2008) writes that elementary teachers "have stronger TPCK and less TCK, while college professions have stronger TCK" (p. 35). Polly and Brantley-Dias (2009) wrote about how more research needs to be done with the TPACK framework, specifically as to how it looks in practice when working with different levels of students (p. 27). Qualitative data responses did support differences in how teachers working in different school levels used technology. Examples given from elementary ESOL teachers were on more specific skills and concepts, while middle and high school teachers described more in depth projects. Teachers in both Title 1 and non Title 1 schools and in all school levels described different types of assessments that included the use of technology. Answers by high school teachers included assessments where students conducted self-evaluations and gave feedback to their peers in more complex ways. Elementary examples of evaluations using technology included technology applications such as I-Respond for quick assessments used throughout the district.

Research question 3 looked at the teacher's years of experiences that the differences in how they use TPACK in Title 1 and non Title 1 schools. The first statistical analysis done on the quantitative data showed significance, but when re-examined, the data was not significant. Teachers years of experience and their age had potential correlations, and given a larger sample from different age groups this area may have shown greater significance. Teacher's years of experience was not reviewed in the qualitative comments because the null hypothesis was rejected and the sample size was very small. Future researchers working with a larger sample size may find this an area of interest.

Implications for Practice

One reoccurring theme from the open-ended questions related to the use of the Push-In model for teaching ESOL. The ESOL teacher not only has to share a learning environment with the general education teacher, but often times has to follow their lessons. They might also have to work with a special education inclusion teacher. These variables all in one space created challenges for ESOL teachers who want to use technology. The teachers who made reference to the Push-In model overwhelmingly felt the model created challenges when planning and using technology as evident in their comments. One teacher said she has to take her ESOL students out of the classroom while the lead teacher is doing science to try to catch students up on vocabulary they do not know. Another teacher described how they have to work in the back of the classroom with students, and therefore do not have access to the Smartboard. They also wrote about how not having their own classroom made it difficult to consistently use technology.

This was similar to comments made by itinerant teachers who work out of multiple rooms, making consistency of technology difficult.

The Push-In model is often compared or called co-teaching. Research has been done on co-teaching and ESOL teachers. McClure and Cahnmann-Taylor (2010) asked the question, "Do some ESOL teachers in the United States embrace the Push-In model while others push back?" (p. 103). Challenges noted when examining that question brought light to skills such as flexibility, individual personalities, power, status, and conflicting personalities (McClure & Cahnmann-Taylor, 2010, p. 107). I believe that by examining challenges ESOL teachers face, co-teaching partnerships could be strengthened and they could make better use of technology resources available to them. ESOL teachers noted in their qualitative comments many examples of successful technology integration that included different pedagogical strategies and contents. Only those who had a difficult time finding a space to work noted challenges. This problem could be specific to individual schools and local administration may have impact on it.

Research question 1 showed a divide between Title 1 and non Title 1 teaching in the two areas. The results of this study did not specifically show how a digital divide was happening, but indicated it was in the areas of pedagogical knowledge and technological pedagogical knowledge. The digital-divide found in the qualitative data was primarily from the standpoint of a digital-divide between classroom teachers and intinerant teachers. Some divide was also seen between Title one and non Title one teachers, and is an area that could be further reviewed. As discussed in the literature review, globally it

is still very present and is an area that could be further researched. Dudeny and Hockly write,

> This then is the state of technology in ELT in the year 2012: wider communication and sharing opportunities, better and simpler electronic tools and technologies, and greater access to a world of knowledge. It should, of course, be born in mind that this situation is still rare in many parts of the world, and in these circumstances teachers are more likely to be reliant on their own technologies than on any access at their place of work. Where technology is concerned, we are never too far away from the notion of the 'digital divide', be it economical defined or skills based." (2012, p. 539).

The digital divide could also be thought of in terms of the divide between what students are doing with technology. Nelson, Christopher, and Mims (2009) wrote, In the fall of 2005, nearly 100% of public schools had Internet access (NCES, 2006). They write that students are using the internet for social networking, including writing, music, photos, and videos. They go on to write, "Our youth "live with Web 2.0 tools, but schools must help them use the tools to acquire new skills, not just play with them" (Solomon & Schrum, 2007, p. 19). Nelson, Christopher, and Mims (2009) write, "teachers who integrate Web 2.0 technologies in meaningful ways have well developed TPACK. Such teachers have a deep understanding that learning must be transformative" (p. 81-81). Qualitative survey questions mentioned many different Web 2.0 tools that teachers are currently using with students. Teachers in the study said they had students create e-portfolios in Google, had students present using Wikis, Voki's and Animoto. Many teachers mentioned video as a way to visually introduce content and to enhance lessons.

Wang and Vasquez (2012) write about Web 2.0 pedagogical implications and motivation to students, "Additionally, a number of studies have indicated that, in general,

learners tend to have favorable attitudes toward the pedagogical use of Web 2.0 technologies (Antenos-Conforti, 2009; Armstrong & Retterer, 2008; Chen, 2009; Dippoid, 2009; Ducate & Lomicka, 2008; Lord, 2008). More specifically, several studies reported that Web 2.0 technologies increased students' interest and motivation in language learning (Liou & Peng, 2009; Kessler, 2009; McCarty, 2009; Pinkman, 2005, Roman-Mendoza, 2009), reinforcing that Web 2.0 used as TPACK is beneficial for ESOL students learning (p. 423).

Participant responses from qualitative data also mentioned how technology was motivating to ESOL students (see appendix G). Teachers mentioned that it was beneficial for this reason. In the open ended survey questions, teachers made the following comments, such as "it helps to motivate" and "the inclusion of technology even in its most basic form enhances the relevance to students." They also mentioned its use as a tool, "technology is an amazing tool that helps to engage most students. " Nelson, Christopher, and Mims (2009) write, "Constructing knowledge is relevant to students lives when teachers facilitate learning through skilled pedagogy. Students are naturally motivated through effected pedagogical and technological use" (p. 80).

The implications of the findings from this study were exciting. As the researcher, I was excited by the openness of the qualitative question answers and am hopeful about the implications in may have on future practice.

Questions for Further Research

What does this mean for schools today? How does this information impact the future research of second language instruction to benefit student learning? This study

offers only a glimpse as to how teachers are combining technology, content knowledge, and pedagogy. The data sample served as a limitation in the sense of truly seeing how teachers use TPACK with ESOL instruction. Their open-ended questions did help provide further insight into how specifically they are combining technology, pedagogy, and content knowledge, but this data was also limited. This study produced the following questions for further research.

The TPACK survey served as a starting point when looking at how ESOL teachers are combining technology, pedagogy, and content knowledge. A lot of research has been done on the use of TPACK with pre-service teachers and teaching them how to think about the different domains while designing instruction. A ERIC search using the search terms "TPACK and Pre-Service Teachers" produced 32 results. Less research has been done on classroom teachers and TPACK. Polly and Brantely- Dias (2009) reviewed 5 articles that included TPACK. They wrote that the TPACK can help teachers integrate technology, but that more research is needed to further discover how teachers can further develop activities for teachers, their pedagogical knowledge as they design lessons.

They write that research is "needed to examine how teacher educators and professional developers can best develop activities to further develop the TPACK of K-12 teachers" (Polly & Brantely- Dias, 2009, p. 46). Cox and Graham wrote something similar stating, "the field has a dire need to further study into what TPACK looks like in practice, specifically examining components related to pedagogical knowledge" (Polly & Brantely- Dias, 2009, 47). Since the modified TPACK survey served as a starting point

for measuring ESOL teachers technological pedagogical content knowledge, additional work on the needs to be done to further understand how teachers are using TPACK with different groups of students. Polly and Brantely- Dias also wrote about this as a "research issue relating to the TPACK", saying, "research that hopes to analyze teachers' TPACK during teaching must collect data from classroom observations, videotapes of teaching and classroom artifacts" (2009, p. 47). My first question for continued research is how can researchers better gain an understanding of teachers TPACK?

The second question for continued research is the continued use of skill and drill programs that are behavior based for ESOL students, such as Read 180 and Read 360. Although these programs use technology, they do not pose constructivist learning opportunities for students. They are a shift back towards original computer programs for second language learners that stress the learning of rote facts and provide quick feedback and praise. While these programs may be beneficial for some students who are behind, there is a link between the use of these types of programs and Title 1 schools. Although these programs are not used in isolation, teachers would have to provide ESOL students with additional opportunities to use technology that would allow them to construct meaning to create a balance between behaviorist learning theory and constructivist learning theory. Without this balance, students who are comfortable using a variety of Web 2.0 tools, might not learn how to use them for learning.

This study showed that many ESOL teachers that were included in the sample know how to use technology and that they have moved away from asking themselves how to use technology. When thinking in terms of the TPACK framework, the how

becomes a why…why should they use the technology they are using. Those asking why are more likely to engage all the domains of the TPACK and lesson the pedagogical divide that could exist between teaching different groups of students. Understanding that teachers have moved away from how, to why is good for planning instruction that includes pedagogy, technology, and content knowledge.

The third question for future research is not how do teacher's use technology, but how do they use it with more than one teacher in the same room. What technology is needed for different groups of students and different teachers who are all working in the same room? Second language teachers need to synergize what they know about the push-in model or co-teaching with pedagogy, content knowledge, and technology. This particular group of teachers made have circled back to the how and instead of asking how do they use technology, they need to ask how do we use technology while co-teaching.

The fourth question for continued research is how can school districts help ESOL teachers combine technology, pedagogy, and content knowledge while creating lessons for students. Are administers helping to facilitate this through scheduling and additional technology resources? Are they aware of additional challenges posed to ESOL teachers who work out of more than one room? After becoming aware, it may be necessary to plan professional development for all teachers who work in classrooms with more than one teacher to look at different ways the TPACK can be used with all students to further their educations.

The last question for further research is how can Universities help prepare future teachers for technology, pedagogy, content knowledge and pushing-in. Preparing ESOL teachers for the challenges of working in a co-teaching environment in teacher education programs may prove to be a valuable skill. Teachers who are prepared will be able to work closely with others, and conquer challenges such as space and personality and can offer ESOL students with technology infused authentic tasks and project-based learning opportunities that will enrich the learning of second language students. It may be an area of need to have universities include a modified version of the TPACK for pre-service second language teachers, one that includes a "how to use TPACK while co-teaching."

Conclusion

The purpose of this study was to review the use of technology and the differences that exist between Title I and non Title I schools. This study served to assess the current state of technology integration and offer suggestions to enhance future integration. This paper concludes with questions for further research with the hope of enhancing technology, pedagogy, and content knowledge for ESOL students. Although there where limitations with the sample, which weighed heavily with elementary ESOL teachers and those working in Title 1 schools, the following areas presented themselves as ones that may benefit from further investigation. The first is the continued examination of how teachers use of technology while following the Push-In model for ESOL instruction. How does their pushing into another teacher's classroom hinder their use of technology in combination with pedagogy and content knowledge. One researching this area, might also include research on the primary classroom teacher and the ESOL teacher

collaborating not only on content knowledge, but also on the use of the available technology. Do general education teachers and ESOL teachers have time to collaborate? Does administration feel this is important, and is this an area that they support their teachers in?

Additional research needs to be done to further explore the differences that exist between Title 1 and non Title 1 ESOL teachers. This study found that differences did exist between the two groups of teachers in the areas of pedagogical knowledge and technological pedagogical knowledge. The TPACK framework used allowed these two areas to come through as areas of differences, but did not show specifics. Additional research in this area may require a focus group or interviews to better understand what pedagogical knowledge and technological pedagogical knowledge differences exist within ESOL instruction. Banister and Reinhart (2011) write, "PCK is more than a "bag of tricks," of the various teaching methods that a teacher uses as he or she peruses through course content, week-by-week" (p. 8). I believe co-teachers technological pedagogical "bag of tricks" needs to include teaching strategies that include more than one teacher. If the TPACK were to be used in the future with a group of teachers that co-taught, the model might need to be slightly modified to include this additional area that impacts all domains. Future research needs to be done on the TPACK. Cox and Graham (200) write, "Studies should be conducted with current teachers with all levels of technological knowledge and in all school situations- from wealthy suburban schools to struggling urban schools to spare rural schools" (p. 61). It is important to continue research in the area of second language learners and technology, as many teachers

mentioned how motivating it is for students.

APPENDIX A: DEFINITION OF TERMS

Achievement gap. According to the U.S. Department of Education (2004), the achievement gap is "The difference between how well low-income and minority children perform on standardized tests as compared with their peers. For many years, low-income and minority children have been falling behind their white peers in terms of academic achievement" (section: Elementary & Secondary Education).

Adequate yearly progress (AYP). According to the U.S. Department of Education (2004) AYP is defined as, "An individual state's measure of yearly progress toward achieving state academic standards. AYP is the minimum level of improvement that states, school districts and schools must achieve each year" (section: Elementary & Secondary Education).

Content knowledge (CK). Content knowledge is about the subject area a teacher instructs (Koehler, Mishra, & Yahya, 2007). It answers the question of "what will be taught?" (Sahin, 2011, p. 99).

English as a second language (ESL). Formerly used to designate ELL students, ESL increasingly refers to a program of instruction designed to support the ELL. It is still used to refer to multilingual students in higher education (National Council for Teachers of English, 2008).

English language learner (ELL). An ELL is an active learner of the English language who may benefit from various types of language support programs. This term is used mainly in the United States to describe K–12 students (National Council for Teachers of English, 2008).

English to speakers of other languages (ESOL). ESOL is a state funded instructional program for eligible ELLs in Grades K–12, as defined in Georgia School Law Section 20-2-156 Code 1981, Sec. 20-2-156 and enacted in 1985 (Georgia Department of Education, 2010). The ESOL program is a standards-based curriculum emphasizing social and academic language proficiency. This integration will enable ELLs to use English to communicate and demonstrate academic, social, and cultural proficiency. It is critical that instructional approaches, both in ESOL and general education classes, accommodate the needs of Georgia's ELLs. To the extent practicable, it is appropriate to use the home language as a means of facilitating instruction for English language learners and parental notification (Georgia Department of Education, 2010).

No Child Left Behind (NCLB). According to the U.S. Department of Education (2004), NCLB is "an Act to close the achievement gap with accountability, flexibility, and choice, so that no child is left behind" (section: Elementary & Secondary Education).

Pedagogical content knowledge (PCK). Pedagogical content knowledge refers to teaching knowledge applicable to a certain subject area (Harris, Mishra, Koehler, 2007). It is necessary to "turn content into instruction, like presenting a subject in different ways

or adapting instructional materials, based on student needs and alternative ideas. This supports the links between curriculum, assessment, and pedagogy" (Sahin, 2011, p. 99).

Pedagogical knowledge (PK). Pedagogical knowledge includes teaching strategies for addressing individuals' learning needs and methods of presenting the subject matter (Kanuka, 2006). It refers to "practice, procedure, or methods necessary for teaching and learning" (Sahin, 2011, p. 98).

Technological content knowledge (TCK). Technological content knowledge helps teachers visualize instances where technology can be effectively integrated into their teaching (Margerum-Leys & Marx, 2002). For example, significant developments can be realized by computer simulations in physics and math areas (Koehler & Mishra, 2009). This knowledge type shows that technology and content affect and support each other. Hence, "teachers must have an idea about their content areas, as well as the use of certain technologies that improve student learning" (Sahin, 2011, p. 99).

Technological knowledge (TK). Technological knowledge includes all instructional materials from blackboard to advanced technologies (Koehler et al., 2007). In general, it refers to "a variety of technologies used in the learning environment" (Sahin, 2011, p. 98).

Technological pedagogical knowledge (TPK). Technological pedagogical knowledge requires an understanding of general pedagogical strategies applied to the use of technology (Margerum-Leys & Marx, 2002). It requires an understanding of how teaching and learning will change with use of certain technologies. It consists of the integration of technological tools and equipment with appropriate instructional designs

and strategies by realizing their strengths and limitations. The majority of popular computer software is not designed for educational purposes (Koehler & Mishra, 2009). Instead, they are produced for business, entertainment, communications, and social-interaction purposes. Thus, "teachers need to go beyond the general uses of these technologies and integrate them into instruction" (Sahin, 2011, p. 99).

Technology pedagogy and content knowledge (TPACK). Technological pedagogical content knowledge is an emergent form of knowledge that goes beyond all three components (content, pedagogy, and technology). This knowledge is different from knowledge of a disciplinary or technology expert and from the general pedagogical knowledge shared by teachers across disciplines. TPACK is

> The basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones. (Mishra & Koehler, 2006, p. 1028–1029)

Title 1. Title I is legislated in the first section of the Elementary and Secondary Education Act and refers to programs aimed at America's most disadvantaged students. The Act provides assistance to improve the teaching and learning of children in high-poverty schools and "enables those children to meet challenging State academic content and performance standards" (U.S. Department of Education, 2004). About 12.5 million students enrolled in both public and private schools are served by Title 1 funds.

APPENDIX B: SURVEY INSTRUMENT

Technology is a broad concept that can mean many different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use (i.e., computers, laptops, iPods, handhelds, interactive whiteboards, and software programs).

Please response to all items. If you are uncertain of or neutral about your response you may select *neither agree or disagree*.

1 strongly disagree	2 disagree	3 neither agree nor disagree	4 agree	5 strongly agree

1.	I know how to solve my own technical problems.	1	2	3	4	5
2.	I can learn technology easily.	1	2	3	4	5
3.	I keep up with important new technologies.	1	2	3	4	5
4.	I frequently play around with technology at my school.	1	2	3	4	5
5.	I know about many different technologies.	1	2	3	4	5
6.	I have the technical skills I need to use technology.	1	2	3	4	5
7.	I have sufficient knowledge of second language instruction.	1	2	3	4	5
8.	I am knowledgeable in different types of language instruction.	1	2	3	4	5
9.	I have various strategies to develop my understanding of ESOL instruction.	1	2	3	4	5
10.	I know how to assess student performance in a classroom.	1	2	3	4	5
11.	I can adapt my teaching based upon what students currently understand or do not understand.	1	2	3	4	5
12.	I can adapt my teaching style to different learners.	1	2	3	4	5
13.	I can assess student learning in multiple ways.	1	2	3	4	5
14.	I can use a wide range of teaching approaches in a classroom setting.	1	2	3	4	5
15.	I am familiar with common student understandings and misconceptions.	1	2	3	4	5
16.	I know how to organize and maintain classroom management.	1	2	3	4	5
17.	I can select effective teaching approaches to guide ESOL student thinking and learning in ***mathematics***.	1	2	3	4	5
18.	I can select effective teaching approaches to guide ESOL student thinking and learning in ***literacy***.	1	2	3	4	5
19.	I can select effective teaching approaches to guide ESOL student thinking and learning in ***science***.	1	2	3	4	5
20.	I can select effective teaching approaches to guide ESOL student thinking and learning in ***social studies***.	1	2	3	4	5
21.	I know about technologies that I can use for understanding and teaching mathematics to ESOL students.	1	2	3	4	5
22.	I know about technologies that I can use for understanding and teaching literacy to ESOL students.	1	2	3	4	5
23.	I know about technologies that I can use for understanding and teaching science to ESOL students.	1	2	3	4	5
24.	I know about technologies that I can use for understanding and teaching social studies to ESOL students.	1	2	3	4	5
25.	I can choose technologies that enhance the teaching approaches for a lesson.	1	2	3	4	5
26.	I can choose technologies that enhance students' learning for a lesson.	1	2	3	4	5
27.	I am thinking critically about how to use technology in my classroom.	1	2	3	4	5
28.	I can adapt the use of the technologies to different teaching activities.	1	2	3	4	5
29.	I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn.	1	2	3	4	5
30.	I can use strategies in my classroom that combine content, technologies and teaching approaches that I learned in professional development courses.	1	2	3	4	5
31.	I can provide leadership in helping others to coordinate the use of content, technologies, and teaching approaches at my school and within my district.	1	2	3	4	5
32.	I can choose technologies that enhance the content for a lesson.	1	2	3	4	5
33.	I can teach lessons that appropriately combine ***mathematics***, technologies, and teaching approaches.	1	2	3	4	5
34.	I can teach lessons that appropriately combine ***literacy***, technologies, and teaching approaches.	1	2	3	4	5
35.	I can teach lessons that appropriately combine ***science***, technologies, and teaching approaches.	1	2	3	4	5
36.	I can teach lessons that appropriately combine ***social studies***, technologies, and teaching approaches.	1	2	3	4	5

Demographic information

Gender
_____1) female
_____2) male

Years of teaching experience
_____total
_____as ESOL teacher
_____in current school

Highest degree ***obtained***
_____1) Bachelors
_____2) Masters
_____3) Ed. Specialist
_____4) Doctorate

Grade level taught
_____1) elementary
_____2) middle school
_____3) high school

School status
_____1) Title 1
_____2) non-Title 1

Please continue on the back ►

Describe instructional strategies you have used that effectively demonstrated or modeled content, technology, and teaching approaches in a classroom lesson. Please include in your description what content was being taught, what technology was use, and what teaching approach was implemented.

Describe how you assessed the effective content, technologies, and teaching approaches in a classroom lesson. Please indicate in your description what content you taught, what technology you used, and what teaching approach(es) you implemented.

APPENDIX C: RESEARCH INFORMATION

Title of Study: *"Bridging the Divide: Second Language Teachers, Pedagogy, Content Knowledge, and Technology"*
Principal Investigator (PI): Margo J. Fryling
Instructional Technology
313-577-1827

Purpose:
You are being asked to be in a research study investigating how second language teachers use technology in combination with their pedagogy and content knowledge. As a second language teacher, you have been identified as a potential participant.

Study Procedures:
If you agree to take part in this research study, you will be asked to complete the attached survey. The survey consists of 43 questions, 41 Likert scaled survey questions and 2 open ended survey questions. The survey will take approximately 30 minutes to complete.

Benefits
As a participant in this research study, there will be no direct benefit for you; however,
information from this study may benefit other people now or in the future.

Risks
There are no known risks at this time to participation in this study.

Costs
There will be no costs to you for participation in this research study.

Compensation
You will be compensated for your time with a $5.00 Starbucks gift card upon the completion and return of your survey to the principal investigator.

Confidentiality:
You will not be identified in the research records by a code name or number. Your identity in this study will be completely anonymous. You will be referred to as only a teacher in a school level (elementary, middle school, or high school).

Voluntary Participation /Withdrawal:
Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships
with Wayne State University or its affiliates.

Questions:
If you have any questions about this study now or in the future, you may contact Margo J. Fryling at the following phone number 313-577-. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628.

Participation:
By completing the survey you are agreeing to participate in this study.

APPENDIX D: TEACHER LETTER

Dear valued ESOL teachers,

Your work in the classroom is significant and valuable. Your dedication to teaching in the field of ESOL truly impacts student's academic success and their daily lives. Your insight into how technology is used in combination with your content knowledge and pedagogy is important to the field of second language instruction, is beneficial to second language teachers around the country, and especially to other second language teachers here within the district.

I am conducting a study to determine how second language teachers are currently combining technology with different content areas and their classroom pedagogy. You will receive a survey via email that asked you to identify how you look at technology, content, and pedagogy when teaching second language students.
The survey will take approximately 20 minutes to complete. It includes some demographic information that will remain anonymous, and two open-ended questions.

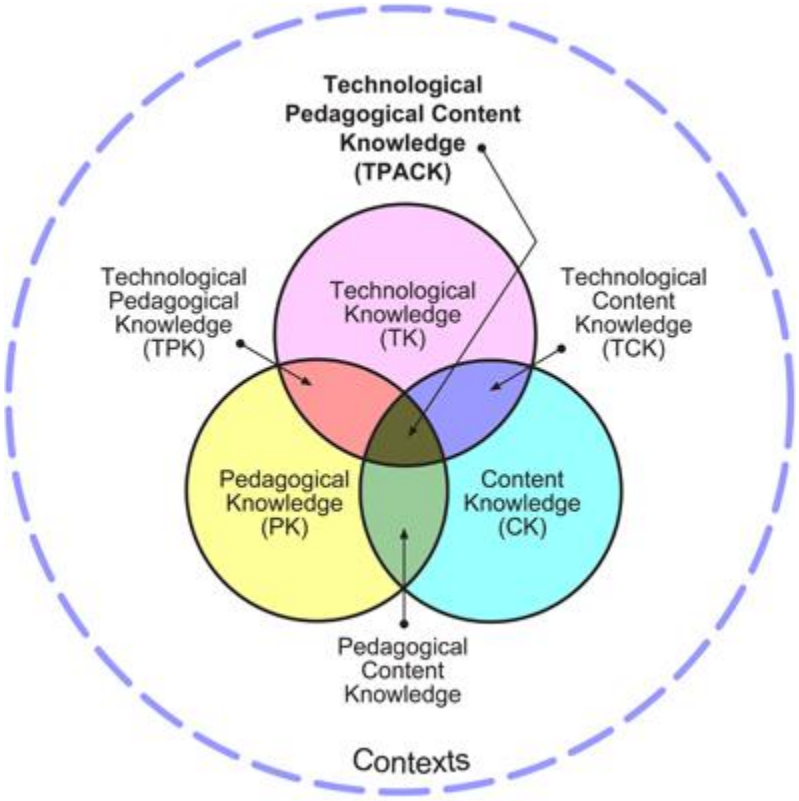
Your willingness is not only appreciated by the researcher, but will help impact the future of technology integration for other classroom teachers. A high number of survey returns is needed for successful validation of data.

Be assured that your surveys will remain confidential. Study results will be made available to all teachers, and the researcher is happy to answer any questions you have regarding the study at any time. Please contact the researcher directly with questions, or for survey results. Thank you for your willingness to participate and impact the field of technology integration for second language teachers.

Sincerely,

Margo J. Fryling

APPENDIX E: TPACK MODEL



(Koehler & Mishra, 2009, p. 63)

APPENDIX F: TPACK QUALITATIVE DATA

Pedagogical Knowledge (PK)	
Title 1	Non Title 1
"I enjoy checking for understanding, this is when you pause and have students demonstrate understanding"	"I scaffold for ESOL. It's about understanding your student's needs and where they want to go. It's about listening and making a choice on what they need."
"Our school uses rubrics to assess all performance tasks"	"How we assess is to create performance indicators. We need to have validity in our tasks."
"Used a formative assessment in which students used the new vocabulary learned from the lesson in for the form of multiple choice, create-a-sentence, and application questions (open-ended)."	"I used rubrics for different types of grading with pictures. I also used peer grading to allow for all student input. I also use self-reflection to help with input for final grade."
"Questioning techniques, teacher observation, oral and written feedback from students, independent comprehension activities (math), small group games, and manipulatives, Smartboard (whole group)."	"I use both summative and formative assessments to determine if students have mastered the content. The assessments are often project-based and student centered. The results of the formative assessments always help me to determine future instruction."
"Small group instruction, modeling with Smartboard activities (math), pairing student (math), pairing students (reading and math), partner read with small group."	"Rubrics, student center (student choice, differentiation) teacher facilities, student self-checks, peer-editing, and presentations (final product and oral response)"

Technological Knowledge (TK)	
Title 1	Non Title 1
"Use technology to help motivate students to learn and understand different concepts."	"Easybibs.com- words cited page formatting."
"I often use Smart technology with my students. I just recently "discovered" the record feature that I can use to record myself and use to allow students to record themselves so that I can "see" what they are doing during an independent math lesson while I work with a small group."	"Grammarbooks.com- free quizzes –focus on grammar, usage and punctuation- similar to the college entrance COMPASS test."
"During the school year I have used different websites, Activeboard Promethean boards, I Pads, to help enhance student involvement of learning in all subject areas. Also using I-Respond in the class."	"Create a Google page e-portfolio for the course."
"Read 180 is easily tracked through the administrative link to monitor progress and lexile advancement."	"Generally, I feel comfortable teaching the technology. I enjoy using, and students find engaging. These are mostly Powerpoint and Publisher. I have used these technologies teaching social studies, writing, and ELA. It has always helped when I've provided a brief "cheat sheet" that the students could use for practice at home, and also encouraged students to take notes while the lesson was being taught. When students have the opportunity to have a hands-on experience right away, I've found they are more likely to retain what is taught."
"I use sites such as the virtual library, education websites, Pebble Go, ABC YA, or Bookflix to teach literacy to my kindergarteners on the Activboard as a band on the center."	"My biggest resource is my blog, Smartboard, and internet games. Lakeshore sells a lot of games and interactive lessons that could be loaded to the Smartboard. I mainly use it during math and reading."

Technological Content Knowledge (TCK)	
Title 1	Non Title 1
"We have no classroom and only access to technology in the media center. We have total push-in-model for teaching. "	"Kindergarten- letter recognition (name letter) (lesson example)- and write sight words, used "my name" or "write my name" on personal IPad projected through classroom system. Students took turns spelling their own name and/or pre-evaluable words. Program requires students to trace letters using proper letter formation. Depending on student language acquisition, 1-5 students spoke letters or read words, or asked each other questions in complete sentences."
"I like to use the Smartboard with my younger learners to support basic phonics."	"When I did push in last year, I developed a lesson plan for Power Point for students final project in the American Revolution. Through the lesson was specifically on the role and implementation of Power Point (many students 4th graders had never been introduced to it), it was geared to the social studies content. In other words, I used to links to social studies websites that are contextual to what they were studying- initially, the lesson tool place in the classroom: there were follow up hands on the lesson in the computer lab."
"I use sites such as virtual library, education websites, Pebble Go, ABC YA, and Bookflix to teach literacy to my kindergarteners on the Activeboard."	"Generally, I feel comfortable teaching the technology. I enjoy using, and students find engaging. I have used these technologies teaching social studies, writing, and English Language Arts. It has always helped when I provided a brief "cheat sheet" that the students could use for practice at home, and also encourage students to take notes while the lesson was being taught. When students have the opportunity to have a hands-on experience right away, I've found they are more likely to retain what is taught."
"My students are new comers to the U.S.. I usually teach them how to make Power Point presentations. After a lesson, they use whatever grammar the learned, for example, simple past tense and create a Power Point. Once, I asked them to find pictures and write sentences about what that person did yesterday."	"Students typed these papers on school laptops using the website Essayscorer. Students worked toward a specific score. Lower level kids wrote their "essay" in a word document and added pictures for visual support."
"Use Smartboard to allow students to interact in geometry lesson, use computer based math programs to assess skills, interactive maps for social studies, and video demonstration for science."	"I have used Google Earth to maximize a social studies lesson on battles of the civil war and WWII. This lesson helped clarify geographical concepts as well as chronological concepts. Not only was the Google Earth program used, but the lesson incorporated Promethean board and projector."

Pedagogical Content Knowledge (PCK)	
Title 1	Non Title 1
"I often use the SIOP checklist to assess my lesson plans and my classroom teaching approaches. I use this method in all content areas from literacy to math to science and social studies. It guides me through the 40 aspects of planning and implementation of the lesson and helps me remember too include different strategies for my students varied English proficiency levels. "	"Poetry lesson- we read poetry. We looked out the window for inspiration for haiku wrote haiku. Got on ReadWriteThink.org and created a shape poem, printed it out, and put it in a poetry notebook. On the same website did a acrostic poem to put in notebook. 1. Assessed prior knowledge. 2. Added prior knowledge by teaching. 3. Modeled. 4. Followed by student."
"I-Respond is used to access content in the classroom. Students have the opportunity to work on PBL where the final product is used to assess students. Most of the time it is in the form of a multimedia (product). The content taught was and the integration of math and health. The effects of making healthy choices regarding eating habits."	"I realized we needed to provide many examples of types of poems by reading and reciting because when I first asked, students couldn't think of a poem. They didn't understand haiku until we talked about our lists we created from objects and feelings we experiences from looking outside. They enjoyed getting on the computer to create poems, printed them, illustrated some of them, and showed their general education teacher, then took the poetry booklet home. They felt proud!"
"Science Lesson- land features and constructive/destructive forces. -Instructional strategies included small group instruction, read alouds, analyzing non-fiction text features, matching visual and vocab. -Laptop to review science until vocabulary and process with visuals (pictures) labels, record questions. -Laptop Power Point presentation assessment at the end of the unit lesson delivery and practice. Social Studies Lesson -Instructional strategies included small group reading, text to self, and text to world discussions and discourse. -Pics in the classroom, used by students to create personal published books of civil war and immigration units."	"I use an IPad cart to differentiate between levels with different app in writing class. I use a Smartboard to allow students to create sequencing for storytelling and British Literature. I also use Edmondo to assess different levels of assignments."
"I have used scaffolding and background knowledge in teaching 5th graders about immigration to the U.S. in early years. Some of my students were all ELL's , they had to use the computer to research their home country, get an example of their home flag and create a passport. They had to research reasons that early immigrants came to the U.S. and then wrote a paragraph about why their families came to the U.S.. They had to develop a plan for how they would contribute to society."	"I use USA test prep on a consistent basis. Students use tech for research all for product production. I use tech for rubrics and for Power Points on different subjects."
"U.S. History -Smartbaord – match a concept to the definition or picture - Creating Powerpoints to teach concepts to the rest of the class -Create brochures and other office tools to make projects -I-Respond used for formative assessments and summative assessments-instant data -Powerpoint jeopardy games for review -Create a blog for class assignments -Use You Tube videos for concept"	"In the area of mathematics, I have used the Smartboard technology as an assessment tool because the student is physically able to manipulative on the board, I as the teacher can observe where they mistakes are occurring. I also require my students to talk about why they are doing- sometimes just a word (depending on their level). This approach also lends itself to peer evaluation."

Technological Pedagogical Knowledge (TPK)	
Title 1	Non Title 1
"I use I-Respond to review lessons. I create a multiple-choice questionnaire that I project in Power Point forum. Students use I-Respond to answer the question, then we go through the results. "	"I use technology in many ways in my classroom. Vocabulary instruction is particularly effective using technology. Websites such as Wordle help with key vocab instruction."
"In teaching vocabulary, I frequently use Google Translate and Google images to bolster students understanding of the vocabulary words."	After modeling the use of Powerpoints, we have students create Powerpoint projects/presentations. The students share with the whole group in a presentation form and are graded on a rubric. Also, peer feedback is given."
"In teaching intensive English language, I used the Smartboard to display the model conservation (teaching social/instructional language) with several words missing. Possible answer choices (all of which fit to complete the dialogue) were available to drag and drop into place, or the student could write their own answer with the pencil. I was able to differentiate for proficiency level because the student could either select or create the response. I assessed different domains by having students select and read, or listen first and then select, or write. Students participated individually in parts, and in large groups. The technology let me assess, informally, multiple domains and skill levels in an engaging way in a very short period of time."	"After teaching a science lesson on magnets, students were able to explore "attraction" on science web link and were able to compare/contrast objects that would attract or repel. They were then able to take a quiz over magnets on the same website and receive immediate feedback about their understanding."
"The math games my students play will say the number of questions they got correct. Many times I will walk around and monitor their work and whether they understand the concept. For the Powerpoint, I would read their definitions of each vocab word and make sure their pictures matched. Finally, with the Smartboard, I watched as they put each ordinal number in the correct place. It helped me see who understood and who needed more practice."	"To teach math concepts I have used a variety of technology. Math fact fluency helps students practice math facts and improve fluency. First in Math is also effective in helping students develop math skills. With kindergarteners I have used online manipulatives. While they have enjoyed them, real manipulatives are more effective."
"We have Activeboards in our rooms and I would create Powerpoints with real pictures of key vocabulary words before reading the text to build background."	"After modeling the use of Powerpoints, we have students create Powerpoint projects/presentations. The students share with the whole group in a presentation form and are graded on a rubric. Also, peer feedback is given."

Technological Pedagogical Content Knowledge (TPCK)	
Title 1	Non Title 1
"1. Students create a Wiki, Voki, or Animoto presentation to evaluate mastery through performance assessments in addition to standardized tests. 2. Make material relevant and meaningful connected to the lives and environment where the student sees familiar associations. 3. Content is Biology and Environmental Science. The students are involved in global local citizen science projects that are peer reviewed. 4. Students design and build projects that solve environmental issues."	"Teaching instructional strategies were in the ESOL sheltered ELA classroom and pull-out ESOL classroom. It was a writing lesson where students answered warm-up questions on I-Respond. We used the active board and projector to model/view how to proof read and edit peer's papers. Students then worked in groups to proofread each other's papers. Students would switch groups every 15 minutes to proof a different paper. I call this "appointment time" as students schedule appts/groups based on the times I give them. Students used different color pencils to proofread prior to doing this, though students watched a Brain Pop on proofreading."
"I have given students the requirements (Math II) and they created a word problem. They typed it in a Smartnotebook. Then they recorded themselves solving the problem using the Smartnotebook record feature to create a podcast. The podcasts were posted on Blackboard so they could access and review each other's work."	"As an ESOL teacher I use internet based literature sites to support and encourage readers in my class of different language, ethnicities, and grade levels."
"When I taught a geometry lesson- how the radius of an sphere affects the surface area, I used an interactive computer application that allowed them to manipulate a sphere and investigate the changes. The students completed an informal assessment and they did very well. They game me feedback on the technology. I used their feedback as reflected on the lesson to determine the effectiveness of the technology."	"Assessment is usually done by teacher observation. I often use "Ticket Out the Door" at the end of a session to determine if the student has a grasp of the concept. I also see students pre & post classroom test to follow progress made. Math Fact Fluency tracks student progress and I access those reports to follow them. Students and I play a variety of games to help with fluency. By participating with them, I can observe them progress."
"When opening a thematic unit language arts on "culture", students read the "prologues" to Invisible Man" by Ralph Ellison. In an Edmodo talks to the students who had to submit from their Ipads a collage of words and images from around the building that represent their school culture. Then they each added a written post explaining how the arrangement of the items and pictures represents their school culture. Then they compared and contrasted their culture to the culture off the speaker in the prologues. The discussion board is posted for students to generate comments on the collages and thoughts of the peers. Edmondo allows me to give each student immediate feedback on their posts and their responses to other's posts."	"I use technology to show video clips to introduce topics and as a way to enhance lessons being taught. Brainpop is a popular website I use to incorporate various content into my lessons. I also use reading A-Z as a way for my students to read, listen, and answer quizzes on books. We do these as whole group and small group time."
"Mental case is an IPad app that I use often to model content along with Discovery Ed. Videos or Nasa or other multimedia videos and text. Using interactive video, students often create a "case". A set of interactive vocabulary and net study cards. They story their own lesson and re-teach their learning to other students. The use of technology fosters both teacher-directed content learning and creative-open ended student centered learning to interact and make personal connects to content education."	"When I did push-in last year I developed a lesson plan for Powerpoint for students final projects in the American Revolution. Though the lesson was specifically on the role and implementation of Powerpoint (many students – 4th graders- had never been introduced to it), I was geared toward social studies content. In other words, I used links to social studies websites that were contextual to what they were studying initially, the lesson took place in the classroom: there were follow up hands on lessons in the computer lab."

APPENDIX G: PUSH-IN QUALITATIVE DATA RESPONSES

"As a push-in teacher in a science classroom I follow her lead as she presents content. I have taken my students out to work on the academic vocabulary and skills they do not know."
"I wish that I had more availability to technology! Our classroom teachers use Smartboard, etc. but I'm always in the back."
"We have no classroom and only access to technology in the media center. We have total-push-in model for teaching."
"I find it difficult to use technology when I push-in to the classrooms. Often I use the active board of my regular ed. co-teacher."
"As an itinerant ESOL teacher I travel to many different schools. Therefore I don't have access to many of the same tools as others (i.e.Smartboard, LCD projector, tv) However, I do utilize technology on my laptop for teaching ELA-I differentiate my instruction as well."
"I wish we had more instant access to laptops and or iPads for kids- not enough of them. Eg: each class is allowed only 2 days per month in the writing lab. This limits what we can do. I do not necessarily think that use of technology automatically means better teaching."
"It is difficult to implement technology, as I am itinerant ESOL teacher. The rooms I use for instruction barely have enough chairs for my students to use let alone computers, a T.V, or smart board. I have used websites, such as stafall.com for my "Level1" ESOL students, but other than an occasional website. I was not able to utilize technology very often."
"I love technology but hard to use in inclusive classroom. I try hard but sometimes it is almost impossible in the Inclusion Model. "
"I have had more limited use for technology in my classroom as the majority of the time has been focused on guided reading."

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ABSTRACT

BRIDGING THE DIVIDE: SECOND LANGUAGE TEACHERS, PEDAGOGY, CONTENT KNOWLEDGE, AND TECHNOLOGY

by

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May 2013

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Major: Instructional Technology

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This study examines the use of technology, pedagogy and content knowledge with second language teachers, and comparing Title 1 and non Title 1 schools. Technology can be used to provide unique learning opportunities for second language learners. Second language students can benefit from technology by practicing skills, increasing motivation, providing authentic materials, creating interaction between students, teachers and peers, creating individual learning, encouraging global understanding and increasing communication in safe ways (Lai & Kritsonsis, 2006). Although technology shows promise for increasing second language student achievement, students continue to have varied access at home, perpetuating the digital divide that was thought to disappear with large financial investments. By looking at how K-12 second language teachers use technology and the differences that exist between title I and non-title I schools this study will serve to assess the current state of technology integration and offer suggestions to

enhance future integration. This study used the TPACK framework to examine second language teachers use of technology with their students.

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