A Case Study on Use of One-to-One Laptops in English as Second Language Classrooms *

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Abstract
One-to-one laptop programs, where each student has their own laptop to use in classroom, are becoming popular in schools especially in Australia and the Unites States. The purpose of the study was to contribute to the limited knowledgebase explaining the implementation of laptop programs specifically with English language learners. Four ESL classroom teachers, six ESL students, and three school administrators participated in individually conducted, semi-structured interviews. Additionally, a total of twelve observations were completed in four ESL classrooms. Data was interpreted through Grounded Theory and open-, axial-, and selective-coding was used for coding. Three themes emerged from data analysis. The first theme focused on explaining how teacher-laptops were used. Results indicated that use of teacher-laptops ranged from making instruction visual to playing music to create a soothing classroom environment. The second theme explained use of student-laptops and indicated that they were mainly used to develop English language skills and complete projects. The third and last theme portrayed some concerns teachers and students had about technical issues and overreliance on laptops impacting instruction and classroom culture unfavorably. Implications are discussed while reporting findings of the study. The study concludes with limitations of the study and suggestions for future research.

Keywords: Ubiquitous computing; one-to-one laptop; English as a second language (ESL); English language learners (ELL).

Introduction

In technology- and information-rich 21st century, some important skills are accessing information effectively and efficiently, evaluating it critically, and incorporating it into one's knowledge base (American Library Association, 2000). Furthermore, the accessed, evaluated, and incorporated information needs to be used to accomplish a specific purpose and understand the economic, legal, and social issues surrounding the use of information (American Library Association, 2000). In order to equip new generations with these skills, schools began to attain new responsibilities such as educating information- and technology-literate citizens by offering technology rich environments and teaching technology literacy (ISTE 2007; Molnar, 1997).

* This study was part of a larger study investigating factors involved in establishing a one-to-one laptop program in an urban school with a focus on ESL students. The findings presented in this paper has not been reported or used in any research paper or conference.

In order to support schools fulfill their new responsibilities, investments on instructional technologies have increased drastically. For instance, in the U.S. approximately $2 billion had been spent on microcomputers in public schools during the 1980s (Woodward, 2001). However, in the 2003-2004 school year alone, school districts spent $7.87 billion on technological equipment (Hew & Brush, 2007). Although more current technologies such as flip cameras, Smart Boards, Kindle, and most recently the iPad, began to be used more frequently in classrooms, computers are still one of the most commonly used technology in schools. However, rather than using desktop computers located in classrooms or computer labs along with cable network connection, a current trend in schools is establishing one-to-one laptop programs, also known as ubiquitous computing, and using wireless network connection. (Hirsch, 2005; Greaves, 2008).

In one-to-one laptop programs, all students in a class or school receive laptop computers to use throughout a school day and, in most programs, they can take their laptops home (Grimes & Warschauer, 2008). The goal of one-to-one laptop initiative is to improve achievement among all student groups by providing equal access to technology-rich environments in which technology is no longer shared within groups (Gulek & Demirtas, 2005). Laptop programs are believed to provide opportunities to integrate technology more naturally into instruction by eliminating computer sharing, computer lab scheduling, student transitioning, and unequal computer access (Sandholtz, Ringstaff, & Dwyer, 1997; Warschauer, Knobel, & Stone, 2004). Australia and the United States of America are the leading countries in integrating one-to-one laptop programs into schools. While Australia has been implementing one-to-one laptop programs nationwide, some states in the U.S., such as Maine, Virginia, Texas, South Dakota, and Pennsylvania are implementing one-to-one laptop programs statewide (Gulek & Demirtas, 2005).

Following the growing popularity of laptop programs, research studies examining these programs also increased. Current studies on one-to-one laptop programs mostly investigated factors that limit the integration of one-to-one laptops (Garthwait & Weller, 2005; Lowther, Ross, & Morrison, 2003; Silvernail & Lane, 2004) and their impact on student achievement (Bebell & O'Dwyer, 2010; Franklin & Bolick, 2007; Gulek & Demirtas, 2005; Russell, 2002; Russell, Bebell, & Higgins, 2004; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). Some studies also examined the frequency of laptops' use through quantitative methods (Lei & Zhao, 2008; Russell et al., 2004). Review of existing one-to-one research literature indicates that there is limited number of qualitative studies that examine use of laptops in classrooms in detail. Moreover, there are very few, if any, studies that investigate use of laptops in one-to-one programs in English as Second Language (ESL) classrooms, with English Language Learners (ELL). Available studies on one-to-one laptop programs commonly focused and reported their findings related to students' racial demographics, rather than linguistic demographics (Donovan, Green, & Hartley, 2010; Grimes & Warschauer, 2008; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010; Suhr, Hernandez, Grimes, & Warschauer, 2010). Therefore, there is a critical need for understanding how laptops in the laptop programs are implemented in ESL classrooms with ELL students and how laptops address their needs.

Considering the increasing popularity of one-to-one laptop programs and the need for in-depth understanding of their use in ESL classrooms, the purpose of this case study was to investigate the implementation of a one-to-one laptop program in ESL classrooms in an ethnically, culturally, and linguistically diverse middle-school. The research question guiding the study, data collection, and data analysis was: How laptops are utilized in ESL classrooms as part of a one to one laptop program in an urban school context? This study was aimed to be one of the very first efforts to attract one-to-one laptop researchers' attention to specific student groups and their needs. Additionally, findings of this

study were aimed to increase the limited knowledgebase explaining how laptops are used with ESL students as part of a one-to-one laptop program.

Methods and Procedures

Context of the Study

The study was conducted at Cross Middle School*, an urban public school located in the Northeastern part of the United States. The school served a total of 632 sixth through eighth grade students that were linguistically and culturally diverse and were from low-income family backgrounds. Table 1 shows the school students' racial and ethnic demographics and compares it to the district and state students' demographics. Additionally, Table 2 compares the school's ELL students to district and state ELL student population for the 2011-2012 academic year.

Table 1. 2011-2012 Enrollment by Race/Ethnicity in Park Middle School

Enrollment by Race/Ethnicity (2011-12)			
Race	**% of School**	**% of District**	**% of State**
African American	48.6	33.7	8.3
Asian	2.5	8.3	5.7
Hispanic	44.0	43.0	16.1
Native American	0.6	0.3	0.2
White	3.2	12.6	67.0
Native Hawaiian, Pasiific Islander	0.0	0.1	0.1
Multi-Race, Non-Hispanic	1.1	1.9	2.5

Table 2. 2011-2012 Comparison of ESL students in Park Middle School, District, and State

Title	**% of School**	**% of District**	**% of State**
First Language not English	50.3	44.8	16.7
Limited English Proficient	37.5	30.6	7.3
Low-income	71.2	69.5	35.2
Special Education	24.8	18.7	17.0
Free Lunch	69.9	64.2	30.4
Reduced Lunch	1.3	5.3	4.8

The school had an ESL program divided into five levels. Level 1 and Level 2 were for beginner ESL students. Levels 3, 4, and 5 were for intermediate and advanced ESL students, who were mainstreamed into classrooms that used Sheltered English Instruction (SEI) model. Furthermore, ELL students that had interrupted formal education were placed into a program called Students with Interrupted Formal Education (SIFE). Since these students had interrupted education before coming to the U.S., they did not necessarily have literacy skills in their native languages. Therefore, these

* Pseudonyms are used for all institutions and participants throughout this study to maintain anonymity.

SIFE students had different needs than ESL students that were born in the U.S. and had uninterrupted education. While the native language of students in ESL program was predominantly Spanish, the first language of students in the SIFE program were varied which included Vietnamese, Haitian Creole, and Somali to name a few.

In 2006, a three-year Wireless Learning pilot program was launched in the school to investigate the potential of a one-to-one technology program in an urban school context. The school was one of the 33 schools that earned the distinction to be "Apple Distinguished School" in the U.S. Although the piloting period ended in 2009, the school was able to sustain its laptop program through community support and budget rearrangements.

Participants

In order to answer "How laptops are utilized in ESL classrooms as part of a one to one laptop program in an urban school context?" the school and participants were selected through purposive sampling procedure because "the investigator wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned" (Merriam, 1998). Purposive sampling is a dominant strategy in qualitative research, especially in case studies, because it seeks information-rich cases that can be studied in depth (Patton, 1990).

In this case study, the participating school was selected after examining other schools that had been implementing one-to-one laptop initiative for at least two years and had large numbers of ELL students. Cross Middle School fit the selection criterion and was contacted requesting to participate in the study. After identifying the school and acquiring necessary permissions, ESL classrooms in the school were identified and ESL teachers, who experienced the laptop program for at least two years, were requested to participate in the study. All of the four ESL teachers in the school met the selection criterion and agreed to contribute to the study.

The ESL teachers taught different content areas and had different ESL student populations. Two of the ESL teachers taught to 6^{th}, 7^{th}, and 8^{th} grade Level 1 and Level 2 Spanish-English bilingual students. These two ESL teachers shared the same students, but Mrs. Park taught ESL content and Mrs. Couple taught Math content. Both ESL teachers were bilingual in Spanish and due to their students' newly developing proficiency in English, they used Spanish frequently to clarify confusions, give directions, have quick casual chats with students, and to teach new content. The third ESL teacher taught to Level 1 and 2 ELL students in the SIFE program. Her students were recent arrivals to the U.S. and spoke various languages other than Spanish, such as Vietnamese, Somali, and more. Therefore, although she was bilingual in Spanish, she could not use Spanish with her students during instruction. The fourth ESL teacher was an ESL literacy couch with the main responsibility to support mainstreamed ESL students in various content areas and had limited knowledge of Spanish.

In order to present student views, a total of 6 students from participating ESL classrooms were purposefully selected for an interview. 7^{th} and 8^{th} grade students with higher English proficiencies were selected so that they would have used laptops for at least one year and would have enough English proficiency to share their thoughts and experiences during interviews. Moreover, based on the suggestions of researchers working in the field of technology integration in educational settings (Cuban, 2001; Hew & Brush, 2007; Inan & Lowther, 2010) some school administrators were asked to participate in the study to gather additional insightful information about the investigated topic. One of the three administrators was the school's ESL director, who worked in the school for about four years

and helped the school adjust the laptop program to the needs of ELL students. Another administrator was the school principal that initiated and led the establishment of the laptop program in the school. Finally, a teacher actively involved in the program from the beginning, who was later promoted to administrator position, was interviewed to collect more information about the program.

Data Collection and Analysis

In order to fulfill the goals of this study, a qualitative, single-case study with exploratory purposes was used. As Merriam (1998) explains, in a case study "by concentrating on a single phenomenon or entity, the researcher aims to uncover the interaction of significant factors characteristic of the phenomenon. The case study focuses on holistic description and explanation" (p. 29). Furthermore, case studies with exploratory purposes examine a situation in which little theory is available or measurement is unclear (Yin, 2003).

One of the data collection methods was semi-structured interviews (Berg, 2007), which were 40 minutes long on average. The interview questions were constructed after a rigorous, iterative, multistep process. The interview protocols in existing studies examining one-to-one laptop initiative, as well as technology integration in general, were found. A list of interview questions was generated in the light of the research question of this study. After creating the list of interview questions, they were examined for their language to ensure that they were clear and simple. The questions for teachers and administrators were piloted with a teacher and some questions were eliminated or reframed and the order of some questions was changed. The questions created and piloted for teachers were later simplified and adapted to students. Interview questions created for the students were piloted with an ESL student and based on the results of piloting the student interview protocol was further simplified.

Interviews were individually conducted, one-time interviews and took place at the school. Interviews were beneficial for collecting in-depth information (Hesse-Biber & Leavy, 2006). Although interviews can be used as the primary source for data, they can also be used in conjunction with other sources such as observations and document analysis (Bogdan & Biklen, 1982). In this study, semi-structured interviews were used in conjunction with classroom observations for triangulation purposes.

During the observations, Classroom Observation Protocol, which was adapted from the Classroom Observation Tool (ICOT®) by International Society for Technology in Education (ISTE), was used. The Protocol was piloted and some minor changes were made for practical purposes. Each of the four ESL classrooms was observed three times within one week. Each observation started with the arrival of students to school and ended with their departure for home. A total of twelve observations were completed. The researcher was in the non-participant role to be as unobtrusive as possible while sharing the same context with students and teachers. The observations offered a first-hand account of how students and teachers used laptops in ESL classrooms and the problems experienced while using them. Observations were conducted after the interviews were completed, enabling the researcher to compare teachers' and students' statements to their classroom practices. Finally, conducting classroom observations assisted the researcher become familiar with classroom contexts, helping her understand and interpret interview data more meaningfully.

Collected data was analyzed through grounded theory (Glaser & Strauss, 1967) using open, axial, and selective coding (Strauss & Corbin, 1990; 1998). In open coding, data are conceptualized and given names as the first step of data analysis. The researcher reached saturation in open coding when no

new codes were identified. The purpose of axial coding is to reassemble data that were fractured during open coding and to create a core category (Strauss & Corbin, 1998). Finally, during selective coding relationships among the categories are created and related to the core category (Strauss & Corbin 1990). HyperRESEARCH, a software program, was used for managing and coding qualitative data, which allowed easy retrieval and analysis of large interview and observational data. Member-checks were done by sending interview transcripts to participants and asking them to elaborate, change, or delete their statements if needed.

Findings and Discussion

Teacher and student interviews as well as classroom observations indicate that laptops are used in various ways in ESL classrooms. The results are grouped under three themes. The first theme explains use of teacher-laptops, the second theme discusses use of student-laptops, and the third theme portrays some concerns around use of laptops. Each theme has subsections that explain findings in more detail based on interviews and classroom observations as summarized in Table 3. Within the subsections, complementary and contradictory information collected from interviews and classroom observations will be mentioned.

Table 3. Summary of Findings with Three Major Themes and Subthemes

How laptops are utilized in ESL classrooms as part of a one to one laptop program in an urban school context?		
Theme 1: Uses of Teacher Laptops in ESL Classrooms	**Theme 2: Uses of Student Laptops in ESL Classrooms**	**Theme 3: Concerns about Use of Laptops**
To make instruction visual	To support language development and practice	Limited amount of ESL specific software programs
To show videos	To differentiate reading levels of texts	Limited ESL software programs in unique languages such as Somali or Taiwanese
To practice learned content	To write	Technical issues with laptops and network system
To prepare instruction and communicating	To complete projects and presentations:	Overreliance on laptops
To create a soothing environment	To assess students	

Uses of Teacher Laptops in ESL Classrooms

Analysis of interviews and classroom observations related to use of teacher-laptops showed that teacher laptops were used mainly for five purposes: to make instruction visual, show videos, play online games to practice learned content, prepare instruction and communicate with colleagues and parents, and create a soothing classroom environment by playing background music.

Making Instruction Visual: All of the four ESL teachers mentioned frequently using their laptops along with an LCD projector to make instruction visual, which was confirmed by classroom observations. Teachers stated that their laptops and LCD projectors was important because they were able to make instruction as visual as possible for their ESL students, who were still improving their English language proficiencies. Mrs. Park expressed this importance as, "I have a laptop and a projector, so we have that technology [projector] too, which I do not know how I would teach without a projector." Teachers' efforts to make their instruction visual is parallel to Meskill and Mossop (2000), who state that supporting instruction visually is important to lighten the cognitively overwhelming and exhausting process ESL students experience while trying to understand and communicate in another language.

Teachers also mentioned that when they presented information visually, students are more motivated to listen to the instruction because they are able to follow and understand the instruction better and stay focused longer. Previous quantitative studies on ubiquitous computing also reported increased levels of engagement among students (Bebell & Kay, 2010; Lowther, Ross, Strahl, Inan, & Pollard, 2005; Suhr et al., 2010). However, these studies did not discuss the reasons. This study may contribute to existing research by suggesting that a potential reason for increased student engagement and interest in learning might be related to presenting instruction more visually through laptops and other available technologies. Despite receiving visualized instruction, students requested even more visualization and asked their teachers to, "show [them] new vocabulary from websites, photos, and videos so that [they] can understand better."

Showing Videos: Besides making instruction visual, a few student interviews indicated that some teachers used their laptops and LCD projectors to show videos from the Internet. A student explained that his teacher "put[s] videos of the TED talkers and talk about the main points of the video and then put them on open response." Despite the student accounts about watching videos through teacher laptops, classroom observations did not indicate any instances where laptops were used to watch videos. One reason for lack of observations capturing the use of teacher laptops in the stated way could be that at the time of observations teachers had recently received their laptops for the academic year, which might not have given them enough time to integrate laptops into their instruction.

Practicing Learned Content: Another way some teachers used their laptops was to practice learned concepts through online games. During interviews students explained that in Math "teacher put[s] some questions that [they] have to solve and got them all right in a certain amount of time." The classroom observations confirmed the student statements about how teacher laptop was used for practice purposes in ESL math class. During an observation Mrs. Couple used her laptop along with an LCD projector to connect to a Math website to practice solving equations. The activity was in a game format and was based on the TV competition program named "who wants to be a millionaire." The teacher divided the class into two groups and each group had to answer the question the website presented. When they answered correctly, they earned money. Students were observed to be highly engaged in the activity.

Preparing Instruction and Communicating: Besides making instruction visual, showing videos, and doing practice activities, teachers also mentioned using their laptops to prepare instruction and communicate with colleagues and parents. Teachers explained that they use their laptops to prepare lesson plans and upload their plans to their personal school WebPages. They mentioned that parents and students could access these pages to learn about the topics that will be covered during the week.

Teachers also stated to use their laptops during the day to check their e-mails since it was one of the most commonly used methods of communication between teachers, administrators, and parents.

Creating a Soothing Environment: Finally, although teachers did not mention it in the interviews, classroom observations revealed that they also used their laptops to create a soothing environment in their classrooms. For instance, some teachers were observed to play music from their laptops as students came to classrooms in the mornings. Moreover, they also played soothing music while students worked silently on some activities, such as independent reading.

Uses of Student Laptops in ESL Classrooms

Interviews and classroom observations indicated that student laptops were used for five purposes in ESL classrooms: to develop and practice English language skills, differentiate reading levels of texts, write essays, prepare and present projects, and complete assessments. While using student laptops to fulfill these purposes, specific tools and software programs were used, which is described in detail.

Language Development and Practice: Participants mentioned using student laptops to support ELL students' language development. In order to fulfill this purpose subscription-based software programs, Rosetta Stone (RS) and Achieve 3000, and non-subscription programs, such as GarageBand and iMovie, were used in the ESL classrooms.

All ESL teachers praised RS and Mrs. Park mentioned RS to be "great for the most basic students who don't have any English skills" because:

> *"there is a speaking component, so the kids can talk into the computer, building basic literacy skills, so being able to recognize sight words, a lot of basic grammar that you can teach in class but you do not need to spend a lot of time on, so Rosetta Stone kind of get that into their heads, so you can just go pass that in class."*

Besides finding RS beneficial to practice listening and speaking skills, ESL teachers found it helpful also because it allowed them to give individual support to those in need as other students proceed learning at their own pace on RS. The ESL teachers' statements about providing individual attention to students through the individual use of educational technologies confirms previous studies that mention similar benefits of instructional technologies (Meskill & Mossop, 2000; Whitehurst & Fischel, 2001).

In addition to the teachers, ESL students also praised RS. When talking about RS, a student said that "[i]t is a program that helped [her] a lot." Multiple students similarly expressed that they "learn a lot" through RS and they "get so happy" while using it. Students' interest in using and learning English through RS "positively surprised" some ESL teachers. A teacher explained her surprise by stating that the levels of RS "are very, very basic, so [she] thought maybe they'd [students] become bored by that, they'd think it was too easy. But they really enjoy doing it, and it really does help them practice English." Students explained that they enjoy learning English through RS because it is entertaining. Teachers elaborated on students' explanation by discussing multiple factors. One factor was the points system RS had for each activity. Teachers stated that the point-score system turned the learning process into an entertaining experience. Additionally, the point system showed students their improvement over time. Finally, another reason teachers gave explaining students' interest in using RS was the listening and speaking features of the program that made the language learning process more active.

Despite the praise it received from ESL teachers and students, classroom observations revealed that only Mrs. Park's ESL classroom used Rosetta Stone. Mrs. Park used it specifically with 6th grade students because their English proficiency was at early stages of language development compared to higher-grade ESL students. Mrs. Couple did not use the software since she taught Math. Mrs. Years expressed her consideration to use RS with her mainstreamed ESL students but did not start using it because she "was not familiar with it" and also she was informed that her students would be too advanced to use it. Finally, Mrs. Frances found the program very beneficial but, similar to Mrs. Years, she did not use it because she was not familiar with it. Teachers' limited knowledge in using available educational technologies was also acknowledged by students. A student said, "… sometimes the teacher just say "Oh, you gotto do this" and they do not explain and [he does] not know how to do it and it is on the laptop." Existing studies also illustrate that teachers' limited knowledge and skills in available technologies impact their technology use negatively (Baylor & Ritchie 2002; Drayton et al., 2010; Eteokleous 2008; Hernandez-Ramos, 2005; Inan & Lowther, 2010; Office of Educational Technology, 2004; Russell et al. 2004; Wenglinsky, 2005).

These teacher and student statements about teachers' limited knowledge and skills in using some available tools highlight the importance of receiving appropriate professional development. An implication of this finding could be providing continuous professional development sessions, which are also considered important by Jaber and Moore (1999). In addition to offering continued professional development sessions, these sessions should be adjusted to the needs of teachers based on their content area, but more importantly based on the features and needs of ESL student populations teachers have. As Loucks-Horsley, Love, Stiles, Mundry, and Hewson (2003) state, "…[p]rofessional development does not come in one-size-fits-all. It needs to be tailored to fit the context in which teachers teach and their students learn." (p. 53)

Besides using RS, teachers also mentioned using non-subscription programs to support students' English language development. Most commonly mentioned non-subscription programs were GarageBand and iMovie. The ESL director explained that when she was teaching in ESL classrooms before being promoted to the director position, she asked her ESL students to record their voices or make videos through GarageBand and iMovie. She explained that recording their voices or making movies allowed her students to produce language, which is considered to be an essential part of language development by the most recent second language acquisition theories (Swain, 1995). According to Swain (1995) actively using a second language to produce output requires a higher level of engagement with the language than simply listening and receiving input. This higher engagement involved in using language increases language learners' awareness about what they already know and what they need to know to produce the intended language and meaning in the second language (Lucas, Villegas, & Freedson-Gonzalez, 2008).

The ESL director added that after asking students to record their voices, she would ask them to send their recordings and movies to her for feedback. Some students even sent their recordings proudly to their relatives back in their home countries. The ESL director stated that GarageBand and iMovie encouraged students to practice their English speaking skills and made recording easier, which in return increased their motivation to learn English and be proud of their learning process. Despite the detailed explanation the ESL director provided about how she implemented GarageBand and iMovie with her ESL students, classroom observations did not capture any use of these tools in current ESL classrooms. A reason explaining the failure to capture use of GarageBand and iMovie through observations could be again related to the fact that teachers received their laptops late in the

semester. As a result of this late distribution of laptops, teachers might not have had enough time to integrate them to their instruction.

Differentiating Reading Levels of Texts: Another subscription-based software program the school purchased that all participants mentioned was Achieve 3000. Teachers praised the program mainly because it enabled them to adjust texts' reading levels to appropriate student levels without making students with low-reading abilities feel uneasy or "stigmatized" about their reading levels. Another teacher mentioned that the program allows her to constantly challenge her students by slowly increasing the reading level of texts without their knowledge, which was important to her because students did not loose their motivation to read a text knowing that it was slightly higher than their current reading level. Finally, a few teachers mentioned that since Achieve 3000 differentiated reading levels of texts, they were able to save time from differentiating texts personally and "give more thoughtful planning elsewhere."

Despite the commonly and positively mentioned features of Achieve 3000, classroom observations revealed that it was used only in Mrs. Frances's SIFE classroom. Classroom observations also revealed that another feature of Achieve 3000, which could be beneficial for ESL students, was not used in ESL classrooms. Achieve 3000 had texts available both in English and Spanish. According to Cummins's (1979) language transfer theory, once something is learned in the first language, it may be transferred to a second language. This is why strong language skills in native language are associated with successful learning of a second language and high academic achievement (Thomas & Collier, 2002). ESL teachers in the Cross Middle School did not mention and were not observed to use Achieve 3000 to support Spanish-speaking students' first language development. On the other hand, although Mrs. Frances used Achieve 3000 in her SIFE classroom, she was not able to use the program's discussed feature because her students' native languages were not Spanish. This finding is important for one-to-one laptop research field as it uncovers the need for software programs available in unique languages to support ESL students' second language development through first language. Therefore, an implication of this study is to encourage companies that produce educational software programs, to create programs with multiple languages so that ESL students' native language could assist their second language acquisition.

Writing: Besides using student laptops to facilitate students' language development and to differentiate reading levels of texts, teachers collectively mentioned that student laptops, specifically Word document (WD), were used for writing. However, classroom observations captured limited use of WD in ESL classrooms. Moreover, further analysis revealed conflicting beliefs among teachers towards students' use of WD for writing. While some teachers considered WD helpful for writing, some teachers discussed it as a potential disadvantage. There were also teachers who believed that benefits of using WD might change based on the purpose of writing.

One of the ESL teachers that considered using WD helpful for students' writing process was Mrs. Park. She explained that through "word processing, kids learn how to type proficiently, and use the computers to type their work and polish their writing…" Similarly, Mrs. Years explained that students get immediate feedback from the automatic spell checker available in WD about their misspellings and correct them. She further added that through the automatic spelling corrections, students "do not get so frustrated with the mini things and they just let their ideas flow on their paper." Moreover, these teachers considered writing through WD as an important skill for every pace of life including high school, college, and work.

Unlike Mrs. Park and Mrs. Years, Mrs. Frances believed that using laptops for writing was a hindrance to ESL students' writing development. She expressed her disapproval of using WD as:

> *"A lot of teachers are about typing papers out, and then when you ask the kids to write something, they can't even print. And they can't spell, because when they're typing, they use the spell check. So it really takes away from the language development in the written sense. … I don't allow my kids to type out papers for me. … I don't care if it's a thousand typos or they can't spell simple words, I want it written out."*

Mrs. Years did not approve use of WD since the automatic spell check "[took] away from the language development." She did not want her students to become dependent on automatic spell check, but instead wanted them to fully experience the writing process. Some ESL students also shared Mrs. Years's concerns about excessive dependence on spell-check.

Despite the opposite views teachers had about use of spell check, the ESL director discussed use of WD and spell check from a more neutral perspective. She mentioned that a positive feature of WD is the flexibility it offers to its users to turn on and turn off the spell check based on the purpose of the writing activity. She said that when she was teaching in ESL classrooms, she would leave the spell check turned on when she wanted her students to "focus on accuracy" and receive "immediate feedback" on the functions of writing, such as capitalization. However, when she "did not want the students to worry about accuracy" and "wanted to hear their ideas" she would turn off the spell check.

Despite the collective statements about using student laptops for writing, classroom observations captured only one instance supporting the statements. Students were observed to use WD for writing only in Mrs. Years's ESL classroom only for once. At the time of the observation, students used WD to type their already written texts. Observations also revealed that all the student essays displayed on the classroom walls were handwritten. Student interviews confirmed the limited use of WD as a student said, "… [they] write a paragraph that [they] will put in a project then [they] type it in the computer and print it and post it."

The limited use of student laptops for writing that observations and student interviews revealed might potentially be explained by a student comment, which stated:

> *"… they [teachers] saw that our class got the lowest scores [on standardized tests] and they do not want us to use many computers. They want us to solve how to answer open response question."*

In other words, teachers might have limited students' use of laptops for writing in order to prepare students to the writing section of standardized tests, which is completed through paper and pen. This finding indicating tests' unfavorable impact on use of educational technologies supports Schneiderman (2004) and Watts (2009), who state that emphasis on testing and achievement press undercuts the potential promise of technology as a teaching and learning tool, and lowers levels of teachers' technology use. Besides repressing the potential promise and use of educational technologies in classrooms, findings also indicated that some participants perceived standardized tests "disadvantageous" for students who are used to utilize educational technologies. For instance, the school principal complained about the old-fashioned nature of standardized tests that require students write through paper and pencil. She critiqued the tests as:

> *"… And the testing they [state officials] use does not allow technology, which I find incredibly ironic since none of us would write a paper without technology and they are expecting kids to write 4 page essays by hand."*

While the school principal finds it ironic that using 21st century technologies during tests is prohibited, multiple studies repeatedly show that tests underestimate student performance on open-ended items when students are not allowed to use the writing tools they are accustomed to utilize (Russell, 1999; Russell & Haney, 2000; Russell & Plati, 2001; Russell & Plati, 2002). Therefore, researchers recommend giving students an option to choose writing tools they would like to use to complete open-ended sections of state tests (Russell & Plati, 2002).

Furthermore, researchers indicate that there is a misalignment between the skills measured in standardized tests and the 21st century skills technology use could promote because current tests do not and cannot accurately assess 21st century skills (Baker, Gearhart, & Herman, 1994; Grimes & Warschauer, 2008; McNabb et al., 1999; Partnership for 21st Century Skills, 2006; Russell, 2002). Therefore, there is a need for creating new measurement tools that assess not only the skills expected by the federal policies, but also the 21st century skills (Partnership for 21st Century Skills, 2006). Alternative evaluation methods and instruments, such as essays, portfolios and projects, should be used to evaluate student learning with technology (Lei & Zhao, 2008).

Finally, although teachers did not mention it, student interviews and classroom observations revealed use of student laptops to access Google translator for writing. Some students stated that writing through the help of translator was easier because:

> *"… our problem is with writing now because we do not really know all the words. We do not really know how to write everything. Writing on the computer is more easy because if you go to the Google translator you will write in Spanish and it will translate it in English in the computer. But writing in the paper, not always you say "oh, I know how to write this."*

Although the student stated that Google translator helps him with vocabulary and writing, the same student also believed that writing with laptops on a regular basis would not help their writing development. He explained this potential disadvantage as: "if we write on the computer, we will learn almost nothing because if we write on the computer we will go to the translator for everything." Therefore, the student added that they should use laptops only to type their written papers.

Projects and Presentations: Besides using student laptops for writing, another way students used their laptops was for projects and presentations. The school principal explained that with the launch of the laptop initiative, teachers adopted a project-based learning approach. Existing studies investigating one-to-one laptop programs also indicate an increase in student-centered and inquiry-based learning practices that use hands-on activities (Lowther & Ross, 2003; Lowther, Strahl, Inan & Bates, 2007; Norris & Soloway, 2004; Sandholtz, Ringstaff, & Dwyer, 1997; Swan, Van'T Hooft, Kratcoski, & Schenker, 2007; Swan, Kratcoski, Mazzer, & Schenker, 2005).

Teachers explained that depending on the projects, students worked individually or in groups. An individually prepared student project discussed during interviews asked students to search and choose a college they want to attend. After the selection process, they collected information about it and wrote a short essay introducing the college and explaining why they want to attend to that college. They presented the college and their essays to their classmates. While the visual section of the presentation was prepared on PowerPoint along with short scripts, the essay part of the project was

completed on Word Document. The essays were later hung on the walls in the hallways. Although the presentation section of the project had already been completed before the classroom observations, the essays were still on the walls.

Students were also reported to prepare medium scale projects in small groups, which were presented to the whole school. Moreover, a few participants mentioned that students used their laptops for bigger projects, in which the audience was not simply the class or the school, but the whole neighborhood. A participant explained that after the flood in Gonaives, Haiti, students in the school, majority of whom was Haitian, prepared a presentation about Haiti. Students were reported to read many resources to collect information, which was beneficial for their reading skills. After collecting and synthesizing information they narrated an essay, which addressed their writing skills. Following the narration of the essay, they presented their work to the whole school- and neighborhood-members, which promoted their speaking skills. Finally, after the presentation, students planned and executed a march to collect donations for Haiti.

Teachers reported that ESL students collaborated with their peers, became more active and engaged in their learning process in order to complete the projects. Similarly, Lowther, Strahl, Inan, and Bates (2007) also observed increased collaboration and engagement through use of laptops. Different from existing studies, the findings of this study revealed that in the ESL classroom in Cross Middle School laptops were used for projects that required use of higher-order thinking skills. Existing studies reported lower-use of laptops for practice and drill activities at high-risk schools (Newman, 2002; Ross, Smith, Alberg, & Lowther, 2004). Additionally, Ross, Smith, Alberg, and Lowther (2004) found that student-centered activities such as project-based learning and independent inquiry were rare at high-risk schools. Cross Middle School was also a high-risk school due to being an urban school serving linguistically and culturally diverse students from lower income backgrounds. However, despite being an at-risk school, the ESL teachers in the school used laptops for projects and student-centered learning, which contradicts findings of existing studies.

Assessment: Finally**,** student laptops were used to assess and monitor students' language development. The subscription-based software programs the school purchased, Rosetta Stone or Achieve 3000, had assessments embedded in them and each students' score was traceable. The results of these assessments were available both to teachers and students, which were also communicated to parents and other teachers.

Teachers found the assessment features embedded in the programs "fascinating" and "phenomenal" for two main reasons. The first reason was related to the efficiency they provided in evaluating students. Through these easily accessible and traceable assessment results, teachers were able to obtain information about each student quicker than evaluating each student personally. As a result of this faster assessment process, teachers were also able to identify student needs more rapidly and provide necessary support quicker. The second reason for finding the assessment feature of the programs beneficial was because students were able to monitor their own improvement in short- and long-term, motivating them to strive to learn more.

The results of this study regarding the use of student- and teacher-laptops was important in terms of illustrating what tools were used with ESL students and how they met ESL students' specific needs. The available tools also enabled students learn English in an entertaining way and overcome language barrier they experience in their second language. A teacher, who has been involved in the laptop program from the beginning, explained the benefit as:

> *"It allows students to bring another skills set that may cross language barrier, that they may not be very competent in speaking English but can use a computer in any language and can create on these computers. It allows you to see students in a different light. You realize the things they can do."*

The teachers' quote is also important because it shows that the available tools helped not only students, but also teachers to "realize the things they can do." Approaching students from an asset perspective and planning instruction based on students' strengths, rather than weaknesses, was a valuable lesson teachers learned. The findings of this study indicate that teachers reached this realization about student strengths when students were able to complete projects and express themselves through use of laptops and accessing various tools.

Concerns about Use of Laptops

During the interviews besides discussing the use of teacher- and student-laptops, teachers also shared their concerns related to use of laptops. The concerns were categorized in three main themes: limited amount of educational software programs available specifically for ELL students speaking unique native languages, technical issues that inhibit use of laptops, and heavy reliance on laptops.

During the interviews multiple participants mentioned that software programs available specifically for ESL students that attend to middle or high school were limited. This limitation of sources available for ESL students created surprise, even disappointment, among ESL teachers. Besides the limited amount of ESL specific software programs, the available programs were further limited by the fact that they mostly targeted language learners with commonly spoken first languages, such as Spanish. ESL teachers were not able to find software programs available in unique languages, such as Somali or Taiwanese, which created an even deeper disappointment, especially for SIFE teachers. For instance, Mrs. Frances, who taught in the SIFE classroom stated, "[she] thought there would just be more specific programs for [her] students. [She] just thought it would be easier for [her] as a teacher, but it's really not." The laptop initiative was hoped to "be another way" for the school to provide resources to students speaking unique languages due to the nature of its student population. The disappointment teachers experienced after realizing the limited availability of programs in unique languages may indicate that ESL teachers were aware of the impact a well-developed first language has on the acquisition of second language.

A second concern teachers mentioned was technical issues experienced with not only the laptops but also the network system. At the time of the study, laptops were 5 years old and had technical issues such as missing keyboards, low battery life, lost power cables and more. Teachers mentioned that students could not use their laptops to the fullest potential due to such technical problems. Classroom observations confirmed teachers' statements about the issues with student laptops and their impact on learning. In most of the observations, students were observed to use their laptops plugged into outlets continuously to charge due to laptops' short battery life. However, students had to take turns while charging their laptops because classrooms did not have enough outlets. Moreover, the outlets available in classrooms were at different parts of the class, hence, students had to move their tables to be able to reach them. During students' relocation to reach outlets, instruction got interrupted, classroom ambiance changed, and classroom management became problematic, which were also reported in previous studies (Lowther, Ross, & Morrison, 2003; Lei & Zhao, 2008).

This finding illustrating technical issues and their impact on learning enhances information about conditions when laptops could impact teaching and learning positively. Some researchers state that laptop initiatives may allow teachers to integrate computers more naturally into their instruction by eliminating computer sharing, computer lab scheduling, student transitioning from classrooms to computer labs, and unequal computer access (Sandholtz, Ringstaff, & Dwyer, 1997; Gulek & Demirtas, 2005; Warschauer, Knobel, & Stone, 2004). However, findings of this study show that without resolving technical problems, such natural integration cannot be accomplished.

Another technical concern teachers discussed was the unreliable wireless Internet network. Teachers' said that the Internet would get disconnected during the school day, impacting their instruction unfavorably. Mrs. Couple indicated that the Internet problems made her and other teachers hesitant to use student laptops. She further explained that she was planning to use student laptops to watch Khan Academy, but the Internet was disconnected and she had to change her instruction. Concerns around the network issues and the limitations they caused on instruction were also captured through classroom observations. During a lesson, Mrs. Couple connected to a free website to play an online game with the whole class to practice some math equations. Towards the end of the game, the school network got disconnected and she could not ask the last question. Therefore, she had to create her own question and wrote it on the board and asked students to solve it. Such instructional changes teachers had to make due to technical issues were also reported by other scholars (Lowther et al., 2003; Lei & Zhao, 2008). In addition to impacting teachers' instructional plan, technical issues also impacted students' learning. Students were observed to be upset about the network problems, which changed the momentum and excitement in solving the last question. The network related issues indicate the importance of having robust network systems to support needs of laptop programs.

A third and final concern teachers had about use of laptops was teachers' potential to use laptops heavily. An ESL teacher expressed her concern as:

> *"I fear that some teachers would replace the technology with just the teaching … I think it's very easy to be like, "OK go on FastMath and let's practice this skill," and every kid is one on one, by themselves, practicing, rather than engaging and interacting with other students and learning from the community."*

Overreliance on laptops worried teachers because they believed that allowing students to work on their laptops individually for long periods would create "a very solitary" classroom, "[r]ather than a community." Another teacher also added that besides creating a solitary environment, heavy reliance on laptops also create a "sedentary" classroom.

Conclusion

The purpose of this qualitative, single-case study was to explore use of laptops in ESL classrooms implementing one-to-one laptop programs. Data collected from interviews and classroom observations were helpful to triangulate findings, which were presented under three themes. The first two themes explained how teacher- and student-laptops were used in ESL classrooms. Findings indicated that teacher laptops were mainly used to prepare instructional plans and to improve delivery of instruction by making lessons visual. Student laptops were mainly used to support ESL students' language development and prepare projects. Additionally, the assessment and tracking features of the programs also helped teachers and students to monitor their progress. The third theme presented

some concerns teachers had with laptops and the network system, as well as the potential to overrely on laptops.

While some of the results of this study were parallel to earlier investigations, this study is one of the earliest in its field investigating one-to-one laptop programs with ELL students. This study showed that laptops are used to meet language related needs of ESL students. Related to meeting specific needs of ESL students, a suggestion for future research is investigating the role and contribution of ESL teachers and specialist in the one-to-one laptop programs, adjusting the use of laptops to the specific needs of ESL students. Additionally, this study highlighted standardized tests' impact on teachers' use of laptops with their ESL students as well as the need for new assessment tools evaluating 21st century skills. Future studies could investigate the impact of laptop programs specifically on ESL students' and develop new assessment tools.

The results of this study were helpful to understand implication of laptop programs in ESL classrooms. However, future studies could contribute to the knowledgebase by addressing the limitations of this study. A limitation of this study was the length of classroom observations. Initially, classroom observations were planned to be conducted for 5 consecutive days in each ESL classroom to capture a fluid representation of how laptops were used in classrooms. However, based on teachers' suggestions and availability, observations were conducted for 3 days. In order to overcome this limitation, teachers were asked whether they were going to use laptops on the days when the observations were not conducted. Therefore, future research should design longitudinal studies because as Lei (2010) states, most studies capture a snapshot of the one-to-one laptop by conducting research in a short and limited time frame.

Another limitation of the study is related to its construct validity, external validity, and reliability (Yin, 2003). In order to increase the study's construct validity Yin's (2003) suggestions were followed: multiple sources of evidence were used, a chain of evidence was established, and some key informants reviewed the interview transcripts and interpretations. Regarding external validity, results from qualitative research cannot be generalized to other populations as in quantitative methods (Merriam, 2002). However, through detailed descriptions of context and participants as well as member checks, readers can be presented valuable information to decide whether the results could be applied to other contexts. Finally, related to reliability of this study, replication of a qualitative research study is difficult in general because of the inconsistent and changing human behavior (Yin, 2003). Based on Yin's (2003) suggestions, the reliability of this study was increased by taking notes and memoing rich details of the study through field notes.

Despite the limitations of this qualitative case study, researchers should continue to qualitatively examine the laptop programs to provide rich descriptions of how they are used, what are some issues in implementing them, how they can be used more effectively, and how their use varied based on different student populations.

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