Using Assistive Technology

To Improve Reading Comprehension and Writing in ELL Students

by

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Abstract

This study is an investigation into the effectiveness of using assistive technology with ESOL students. I worked closely with a group of third grade students who were in a Level 3 ESOL class; the students used both read aloud and word prediction software. The study reveals that text became more accessible and reading comprehension improved when software was used to read aloud text passages. Students' written work became more verbose and fluent when they used word prediction software. During the investigation, students produced higher quality work and showed increased motivation.

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Introduction

I have worked with K – 5 students at a local elementary school's computer lab for the past seven years. The school is in the Montgomery County Public Schools (MCPS), Maryland school district located in a middle-class neighborhood that has a diverse ethnic composition (African American (9.3%), American Indian (1.2%), Asian (23.3%), Hispanic (15.4%), and White (50.9%). Our English Language Learners (ELLs) population is quite small (10.5%) compared to other schools within MCPS (Montgomery County Public Schools, 2008).

As the school's computer lab teacher, I had developed numerous projects involving research for grades 3 – 5. Frequently students are asked to read a website for content, and answer questions, or create a presentation based on what they just read. I have often wondered why some students, specifically, ELL students enrolled in our English Speakers of Other Languages (ESOL) program seem to be able to read fluently but had difficulty with comprehension. They could read it out loud – but they had no idea what they just read. It appeared to be an endless battle between what they were expected to gain from the reading and what they actually understood. Their classroom teachers often stated that these students were just being lazy and not paying attention when they read. This puzzled me; didn't reading mean that if they could say the words they should understand what they were saying?

I am currently enrolled in a two-year graduate program that is a collaborative effort between MCPS and the University of Maryland at College Park. What I have learned in the coursework over the past year is that the meaning of text does *not* reside in the words on a page — meaning is constructed in the mind of the reader (Graves, 2007).

According to the Reading Next report, "Very few older struggling readers (between fourth and twelfth grade) need help to read the words on a page, their most common problem is that they are not able to comprehend what they read" (Biancarosa & Snow, 2004, p.3).

Another puzzlement I have had over the years was students who demonstrated oral comprehension, but when they were asked to write what they just articulated, they were unable to put their thoughts on paper. Students would become laconic when asked to write. For struggling writers, translating thoughts into writing seemed like it felt overwhelming. Consequently, their writing often suffered from phonetic or inventive spelling, lack of richness, limited detail, and incoherence. Samway points out that learning to write is not a linear process, but rather developmental. Students may digress before making great progress in their writing (Samway, 2006). Perhaps this was what I was seeing in these students.

My third puzzlement had to do with both current ESOL students and those who had been exited out of ESOL. Although these students receive Redesignated-English Language Learner Plans (R-ELL), they still seemed to lag behind academically, and I realized the ELL/R-ELL groups in particular were the students I saw having difficulty reading and writing. Could these issues have to do with their language, not their particular academic skills?

These questions and several recent events led me to my research project. First, over the past year I have taken a number of courses in the use of assistive technology. Assistive technology is an umbrella term for hardware or software that helps a person use the computer; it is flexible tools for diverse learners. It can include voice recognition, text

readers that read what is on the computer screen, or portable keyboards. My training included classes in two software packages available in our school system, SOLO™ Suite (SOLO) and Kurzweil. Both programs target students grades three through twelve. SOLO is a software suite of tools specifically designed for struggling students for instructional reinforcement and guided practice. SOLO contains four learning tools (Read:OutLoud, Draft:Builder, Write:OutLoud and Co:Writer) that help students develop strategies in reading comprehension, writing, planning, organizing, revising and editing (Don Johnston, Inc., 2008). Kurzweil 3000 is a scaffolded reading, writing, and study skills solution for struggling learners, including ELL students and students with special needs (Kurzweil, 2007). These assistive technology software tool sets build learning skills in reading, writing, planning, organizing, revising and editing for students. Both of these software packages are marketed towards use in a Special Education environment, but can be used with general education students as well. Although Kurzweil is the only accepted assistive technology software that has been approved for our state mandated tests, our school only had licenses for SOLO.

I had used SOLO with both second and fourth grade general education students last year and found it did help struggling readers with reading comprehension. I also had success with several reluctant fourth and fifth grade writers when I taught them to use Co:Writer. Co:Writer is the word-prediction program module of SOLO; created for struggling writers to help expand their vocabulary and improve written expression. With Co:Writer students were able to produce grammatically-correct and topic-specific sentences within any computer program. Their text became lengthier and more detailed, and they used a higher-level vocabulary when compared to an initial assignment on

paper. Energized by this early success, I continued to look for ways that I could incorporate the use of assistive technology into projects I led in the computer lab.

This past summer I took an ESOL for Classroom Teachers class where I learned that ESOL students often take five – seven years to gain Cognitive Academic Language Proficiency (CALP) (Haynes, 1998). Cummins' research in language acquisition and development suggests there is a distinction between basic interpersonal communicative skills (BICS), better known as conversational language and CALP, academic language. Cummins used an example that best explained the problem I was seeing! Suppose there are six-year old and twelve-year old monolingual English speakers who are siblings. When compared, there would be enormous differences in their ability to read and write English and their knowledge vocabulary. However, there would be minimal differences in their phonology or basic fluency. The six-year old would understand everything within their everyday social contexts and could use language appropriately in such a setting, just like the twelve-year old. However, when asked to perform at a similar academic level, no one would be surprised that there is a great disparity in the six-year olds abilities when compared to the twelve-year old (Cummins, 2000). I had witnessed teachers who expected students to read English at the same academic level as their peers because they had no trouble conversing in English; in other words, they were asking six-year olds to read at a twelve-year old level and could not figure out why they were struggling.

It is not just a matter of being able to read the academic language; CALP includes listening, speaking, reading, and writing about content material. Students need time and support to become proficient in academic areas. In order for students to succeed in school

the CALP level of language learning is essential. Research has shown that if a child has no prior schooling or has no support in native language development, it may take seven to ten years for ELLs to catch up to their peers (Haynes, 1998; Samway, 2006). Since I worked in an elementary school it was very doubtful that many of our R-ELL students would have acquired CALP. So, even though they appear to be proficient English speakers on a social level, they lag behind on their language skills in academic settings.

I noticed that many of the strategies we were taught in my ESOL for the Classroom Teacher course aligned with how classroom teachers are expected to accommodate Special Education students. One strategy that was discussed was having students listen to books on tape as they simultaneously read the text from a book. The auditory in conjunction with the visual helps the student with reading comprehension (Parlato, 2002; Skouge, 2007; Waxman, H.C & Tellez, K., 2002). Since Read:Outloud does this using the computer, could assistive technology help these ESOL students too? Similar strategies are used to differentiate instruction in the classroom, could the use of technology also work? Research showed that text read aloud provided opportunities to enhance the literacy of ELLs by integrating effective vocabulary development practices (Hickman, Pollard-Durodola & Vaughn, 2004).

Between 1990 and 2005, enrollment of English language learners (ELL) in U.S. schools increased by 150%. During the same period of time, computers became a regular tool used in the classroom. Increasingly, teachers are using computers and software in their ESOL programs. The common thread among these programs and the use of computers is their emphasis on making text-heavy information more accessible through graphics, animation and video (Waters, 2007). These seemingly divergent topics led me

to think perhaps the use of assistive technology tools could also benefit the ESOL students.

When determining who the focus of my study would be; I was somewhat limited. I was student teaching in a classroom and had access to third graders; I decided to use this technology to focus specifically on third grade ELL students who were struggling readers and writers. I would take a small group of third grade ELL students and have the students work with SOLO to improve their MAP-R scores and BCR scores.

Research Questions

My research questions were:

1. Would the use of the assistive technology taught in a small group setting improve the reading and writing success of this group of low to mid-level readers?
2. Could the use of Read:OutLoud strategic comprehension supports further thoughtful interactions between reader and text?
3. Could the use of assistive technology help improve students' attitudes towards reading?
4. Struggling writers typically do not write enough to effectively communicate their message. After they finish composing, their revisions and edits have little impact on the text quality. Could the use of Write:OutLoud and Co:Writer, increase writing quantity and improve writing quality?

Procedures and Process

The Plan

My original intent was to use a weekly "informational text" packet that was assigned to all third grade students. This weekly assignment consisted of a short non-

fiction reading and follow-up questions. These packets were taken from Scholastic Teaching Resources: Nonfiction Passages with Graphic Organizers for Independent Practice (Blevins & Boyton, 2004). Each reading also included higher-level questions that required a short written paragraph. The Brief Constructed Response's (BCRs) were expected to be well-written responses to higher-level questions regarding the text. Normally, students were given seven days to complete this packet as homework.

My plan was to teach all third grade students how to use SOLO during their regular computer lab time. Over a period of fifteen weeks, I would focus in on a small group of third grade ELL students working specifically on these packets. These students would use Read:Outloud to complete the packets. The focus was to enhance these students reading comprehension skills. They would also have the opportunity to use Co:Writer to complete the BCRs that were tied into these and other content readings.

Although this was the plan, as Mills states "Try the process and be convinced that the investment of time and energy is worth the outcomes" (Mills, 2007, p.14). I tried the process and it was clear after several weeks that this was too much of an undertaking. I was spending several hours each week preparing these packets to use in Read:Outloud. These packets had to be converted electronically by either scanning the text or typing the text myself. Either way I had to then proofread the converted text. This brought me to another thing Mills points out, "Know that action research is a process that can be undertaken without having a negative impact on your personal and professional life" (Mills, 2007, p.14). The process soon had negative impact on not only my personal and professional life, but I soon began to resent the project because of all the preparation time it required.

I realized it was necessary for me to revise my plan to include text I could find readily available online. Although there was a plethora of e-text available online, much of the text I found was geared towards a higher-level reader, or did not have the accompanying reading comprehension questions. I was trying to save time and not reinvent the wheel. In previous years, I had used an online resource that helped prepare students for the yearly reading assessments, Maryland State Assessments (MSA). Read:Outloud can read text directly from the Internet. I decided that I would use the Kids Lab website (Theile & Stream, 2008) to continue my research. This website had grade level appropriate reading passages and online quizzes the students could take and score online.

Who

Our school had a small percentage of third grade ELL/R-ELL students for whom I could choose. Trying to select the students to include in my research was a difficult decision. I had access to all third grade students for thirty-five minutes a week in the computer lab. In addition, I had access to those ELL/R-ELL students in my coach's homeroom and reading classes. My intent was to work with those students that were either in my coach's homeroom or on grade-level reading class. I initially started with a group of six students; it soon became apparent that access to students was one of my biggest research limitations.

I spoke to the ESOL teacher at our school, Ms. H and explained my research questions and the difficulty I was having finding time to work with students. She granted me access to a third grade Level 3 ESOL class (Appendix A), she allowed me to meet

with these students three days a week over a two-month period. A majority of my project did not involve work with R-ELL students.

Chuckie

He had been at the school since Kindergarten and was enrolled in our ESOL program. His native language was Chinese. He has been a Level 3 ESOL student since 2nd grade. Chuckie was in the on grade-level reading and math classes. He was a shy quiet student who rarely participated in classroom discussions. I was curious to see if SOLO would help him gain confidence and allow him to participate more in whole class discussions.

Phil

Phil was born in Japan and had attended the school since Kindergarten. He was also enrolled in the ESOL program as a Level 3. The language spoken at home was Japanese and he travels back to Japan each summer, often missing the first month of school. Phil was in the below grade-level reading group and the above grade-level math group that I taught. He was also in my coach's homeroom class. He was a classic case of BICS vs. CALP. His teachers and parents felt that his academic performance directly correlated to his language acquisition (Anecdotal records, 1/29/08).

Pete

Pete was born in Iran and moved to the United States just before entering Kindergarten. When he began Kindergarten, he spoke no English. He travels back to Iran each summer. He was in the below grade-level reading group and the on grade-level math group. This student was not initially in my project because I did not see him in homeroom, reading or math. He was a student in the Level 3 ESOL class.

Where and When?

Even though I had all third graders in the computer lab once a week for thirty-five minutes, there were other activities I was required to complete during this assigned time. Time was a precious commodity. During the month of November, I introduced Read:Outloud as a whole group lesson to all three third grade classes within their regular assigned computer lab. There were additional students who could potentially be well served by this program and I wanted to also afford them the opportunity to use Read:Outloud and Co:Writer even though they were not be a part of my research group.

There were two computers available in my coach's classroom. These were only available during morning work, guided reading groups, handwriting and social studies. After my groups of students were taught to use SOLO, my plan was that students would spend time each week completing the homework assignments during these available times. My original plan was to rotate students through my guided reading group, allowing individuals computer time to complete their assignments.

Students would commence fifteen weeks' worth of e-text informational readings beginning in November 2007. When possible, I wanted to integrate any Science or Social Studies unit readings. This was contingent on my ability to create the e-text or find suitable content for the students to read.

The following narrative documents the journey that was my action research.

Observing MAP-R

As I designed my plan for implementation I had to also decide what data collection methods I would be using. The Measures of Academic Progress – Reading (MAP-R) was scheduled for early October and seemed like a great place to start my observations. This would be the benchmark for my project. MAP-R testing is a tool for

monitoring student growth over time. Students take the test three times a year; in the fall, again in the winter and finally in the spring. MAP-R is a computer-adaptive achievement test that quickly provides an assessment of a student's skill level in the different reading achievement areas. The students take the test in the computer lab with their class and spend a total of forty to sixty minutes completing the online assessment. The MAP-R test is unique in that it adapts to the students' level of learning as they are taking the test. Following each testing period, teachers receive a report showing students' performance. I would be able to look at all three MAP-R scores during the year and see if in fact there was an upward trend for those students selected for my study.

There seems to be a correlation between how students perform on the MAP-R and Maryland State Assessment (MSA), the yearly standardized testing given to third through eighth grade students in the spring each year. MSA provides national norm-referenced and Maryland criterion-referenced data. The norm-referenced items provide national percentile ranks to describe how well a student performed in reading and mathematics compared to his/her peers nationally. The criterion-referenced items provide proficiency scores (expressed as Basic, Proficient, or Advanced proficiency level) to describe how well a student has mastered the reading and mathematics content specified in the Maryland Content Standards.

> "MAP-R scores are reported using a Rasch Unit (RIT) scale score. Northwest Evaluation Association (NWEA) conducted a study to identify RIT scores that project the probability of a student scoring basic, proficient, or advanced on the spring MSA (Bowe and Cronin, 2005). These probability tables were reviewed by the (MCPS) Department of Shared Accountability (DSA); and working in

> conjunction with NWEA, DSA established score ranges to project students scoring in the basic category on the reading.
>
> Grade 3 students with a fall MAP-R RIT score below 184 have a high risk of scoring in the basic category on the MSA reading assessment. Grade 3 students scoring between 184 and 192 have a moderate risk of earning a basic MSA score and may require extra help and interventions. Students with a RIT score above 192 are likely to be proficient or advanced with existing instruction." (Wimberly, 2006)

I had proctored the MAP-R for the past 4 years and I was aware of how difficult it was for third grade students to take this test at the beginning of the school year. There were 42 questions and although the test was not timed, for some students it seemed to be an uncomfortable process to complete the test in an environment many of these students have never experienced. I planned on focusing in on the ELL/R-ELL students to see if their behavior differed from their native English-speaking classmates. There were no obvious differences between ELL and non-ELL students that I observed. However, I did notice that those students who scored higher on the test used their mouse to track the words on the computer screen (Field Notes, 9/24/07). What did this mean? Were the students using the mouse as a way to track where they were on the page? If lower level readers were taught this technique would it help them with reading the text on the screen? I reviewed the MAP-R scores for my three students as seen in Table 1.

Table 1

Student	Fall 2007 MAP-R scores
Chuckie	201
Phil	174
Pete	184

Phil was clearly at high risk and Pete was at moderate risk for performing below proficiency on the MSA's. These students were placed into a reading intervention group that met with the Reading Specialist at our school.

Now I had a clear starting point. Two of my students were in need of intervention; could the use of assistive technology also help them?

Preparing the Text

As I gathered my materials to convert, I was reminded of the Universal Design Language (UDL) framework that has been adopted by many in the education field (Hitchcock, Meyer, Rose, & Jackson, 2002). UDL is the practice of embedding flexible strategies into the curriculum during the planning process so that all students can access a variety of e-learning solutions. Adopted from the architectural realm, the thought is that by planning for universal access, you may provide unintended, albeit positive consequences. The example often used when describing such a consequence would be sidewalk cutaways that were originally provided for handicap access. These cutaways provide access to those who use wheelchairs, but also mothers pushing strollers and bicyclists.

The three main principles of UDL are flexible method of materials, presentation and engagement. The UDL framework was necessary for me to conduct my research. Digital content made possible an important kind of flexibility, such as embedded supports and links. Not only could content be displayed in different ways such as font size and type, but optional "smart supports" could also be provided that allowed individual students use as needed. There were a variety of tools for expression and organization that were made available through UDL. This could have included sequenced supports for

stepwise processes, graphic organizers, graphics and animation and even hyperlinks to glossaries. All of these supports were an important component to the success of assistive technology (Montgomery County Public Schools: HIAT, 2008; Hitchcock, et al., 2002).

The text I was using for my actual research project was not available electronically; I quickly grew to appreciate the practical application of UDL. When you develop a lesson using UDL, you are providing open materials that can be used in a variety of ways. By creating a more flexible curriculum, I was opening more learning opportunities for all students, not just those in my research project. Although I was using SOLO for this particular project, creating flexible content meant that I could have used Kurzweil or other software. I was bound to put in the upfront work myself because the lessons I was using were not designed with UDL in mind.

Intro to Read:Outloud Using Text

I had a few lessons prepared and felt ready to introduce Read:Outloud to the third grade during their computer lab time in early November. The first week I was able to introduce the text reading feature. Most of the students had been introduced to Read:Outloud the previous school year in second grade. They quickly remembered how to use the software and for most, they enjoyed having the computer read the non-fiction text passage to them. However, not everyone was enthused about using the software. I made the following comments in my journal following the initial introduction:

> It is interesting to see that the better readers do not particularly like using Read:Outloud. Those students who were not using their headphones or the read along feature were all from Mrs. S's reading class [the higher level reading class.] Luckily, all the ELL and R/ELL students seem to be using the software with their headphones. (11/2/07)

Issues with enough time to complete a reading passage and completing the questions became apparent immediately. Again I noted my concern from my first journal entry:

> The class was late for the lab today, which gave us less than 30 minutes to use SOLO once they logged in and created a User ID within SOLO.
>
> This may be a problem, especially for the struggling readers who need to revisit the text. They won't have enough time to read the passage and answer the questions. I'm not sure what the solution to this is, they are coming from math class and we are running up against the end of the day. (11/2/07)

The other issue I encountered was that not every class was able to visit the lab on a regular basis within the month of November. We had several days off due to Parent-Teacher conferences, an election day and the Thanksgiving holiday. Students were not getting consistent access to the materials. The next lesson was to have students go beyond just reading the text, but also answer several reading comprehension questions. For some, there just wasn't enough time to read through the passage and answer the questions. This became an obstacle because each time they were in the lab; they had to start back at the beginning of the process; re-read the story and answer the questions. The students who moved at a slower pace were making no progress through the materials. This proved to be more difficult than I anticipated. Although I had another adult in the room to help with questions, there were more student questions than adults or time to answer the questions. Also, there was a "bug" in the SOLO program that requires some students to create a new user name each time they logged in. This meant that each time the class entered the lab a handful of students would have to remember how to create a new user!

As I point out in my journal entry, not all students liked having the text read aloud to them. Those students who did not like this feature could choose not to wear

headphones or turn off the volume. Bob, one of the students I originally had planned to include in my study, was in fact one of the handful of third grade students who did not like using the software.

It became quickly evident to me that due to time constraints and student accessibility, I needed to revise my plan.

Good News

Before I decided to revise my plan, I did have a very positive experience that kept my hopes up. Patrick, a student I originally had planned to include in the study, had a quintessential experience with Co:Writer. This R-ELL student would sit for an entire class period and refuse to write one word on his paper. While working on another project for a third grade teacher I introduced Patrick to Co:Writer and asked him to write a Brief Constructive Response (BCR) to the non-fiction text that he had just read in Read:Outloud. Typically, this student has to have a teacher standing directly over him to have him produce any words to a page. I gave him his instructions and walked away to help another student. When I returned five minutes later, Patrick had an entire paragraph written. When I asked him about using Co:Writer, his reply was, "This is cool!" (Anecdotal record, 11/27/08). It was like a magic bullet! I had never seen this student produce so much text in the short amount of time in all the years I had known him. I quickly shared my results with his classroom and reading teacher. Although his reading teacher seemed pleased with my story, she admitted to me that she had no idea how to use the software and had no idea how she would be able to incorporate it into her routine. That night I noted the following interaction in my journal:

> I shared my experience with Patrick and Co:Writer today at our team meeting. Ms. P noted that she didn't have any idea how to

> use the software. "You know how I am with technology," she said. Yes, I do know, that means that he won't be following up in reading. Maybe I can talk to Ms. K (the school's resource teacher) and see if she can use Co:Writer with Patrick." (11/27/07)

Things Are Not Working As Planned

As November grew to a close, it became very apparent that I was not going to have access to my selected students for my study. I was not able to access students during the times I originally planned. When I pulled students for my study aside during reading to work on Co:Writer the reading teacher preferred that I work on other existing projects and papers due in the limited amount of time that she had with her students. I was also preparing for my upcoming student teaching during the month of January and I found that keeping up with converting text was much more time consuming than I expected. Apparently motivated, students were reading through the passages faster than I could convert them into electronic text. Typing each reading comprehension packet was not going to work.

During December, I took a class on assistive technology considerations through the MCPS Office of High Incidence Accessible Technology (HIAT). I shared with my classmates and instructors my findings thus far and the frustrations I was experiencing. Everyone was enthusiastic about what I was doing. This gave me hope. This feedback also helped me go back to my classroom in the quest to get the story right (Mills, 2007, p. 94). I realized I was going to have to revise my plan in order for my project to work.

Reassess the situation

January was my student teaching month. I knew that there was little I would be able to accomplish during this time. Although I would have loved to have students rotate into one of the two computers I had access to in my room, the reality was that I did not

have text prepared for them to use. Also, I was able to get a firsthand experience at how difficult it is to use computers during the school day when you have twenty-plus students and only two machines, it simply was not feasible. I better understood Ms. P's reluctance to have Patrick work in Co:Writer. I thought that with all my technology experience, I would be able to incorporate this type of center activity into my lessons; I was mistaken. I learned how UDL would make life easier. If I had most of materials electronically, I would have been able to provide these resources in a variety of ways for my students. I spent a great deal of my student teaching creating these resources for future use.

During my student teaching I was able to administer the Scholastic Reading Placement Tests: Third Grade reading assessment (Scholastic Professional Books, 2002) that specifically broke down reading text (Appendix B). The test was from a concise, ready-to use collection of assessments to use at the beginning of the school year. With these tests, you can determine each child's level of proficiency in reading; identify instructional needs for individuals and for a group as a whole. My team selected this test to identify the areas we needed to work for MSA prep. The assessment that I administered had forty questions. Ten of the questions were phonics related. Questions eleven through twenty were on vocabulary. Questions twenty through 40 were assessing reading comprehension. This data provided me with data on the specific areas that my group needed targeted instruction.

As my student teaching drew to a close, I began to once again reassess my project. I needed to have access to text, students and computers. I knew which areas in which I could focus the text but I also needed the buy in from the other staff members.

Begin with ESOL group

I met with Ms. H and the three ESOL students from her Level 3 class on a Monday morning in early February. The boys were excited to be in the computer lab. I explained to Ms. H the areas in which I wanted to focus. There were several areas that the students seemed to struggle with on the reading comprehension assessment included: using context clues; compare and contrast; main idea/details; making inferences; and drawing conclusions.

Before they began, I had them fill out the student surveys to get a sense of how they felt about reading in general, and computers in particular (Appendix C). I then had them log in and begin their first access to the Kids Lab site using Read:Outloud. Since they had used this program earlier in the year, I gave a quick refresher course. Pete was heard to say, "Cool beans, it even reads the answers from the list" (Anecdotal records, 2/4/08). They were clearly enthusiastic on reading the Main Idea tutorial and then moving on to the quiz area.

Chuckie, the stronger reader in the group, was able to finish his assignments at a quicker pace. During the lesson, the students would have headphones and I would periodically stop them and ask them questions about the process. All three boys were exuberant participants. Some of the comments were: "This is really fun"; "I really like doing this"; and "How come we only get to do this three days a week?" (Anecdotal records, 2/5/08)

I had their enthusiasm, but was it making a difference?

Winter MAP-R

Soon after I began meeting with the students, they participated in the winter MAP-R testing. Two out of three of their scores dramatically improved (Appendix D).

None of the students was now considered to be at high risk for the MSA's, which were scheduled for the spring. Clearly there were a number of factors that were playing a part in their improvement. Two of the students were meeting with the Reading Specialist several times a week in a small group environment and their reading teacher had also introduced other programs aimed at helping them increase their scores. I could not help but wonder, how in the world am I going to tell if what I am doing is making a difference? I was at the very least giving them an opportunity to work on reading from the computer, which I think is another type of reading on to itself.

Biography Debacle

Inspired by the students' attitude towards my project, I shared my good news with my third grade team at a planning meeting in early February. We were discussing the upcoming "Wax Museum" project that the entire third grade would be participating in mid-March. In the past, students selected a famous American and wrote a biography based on the research they did at home. On a school day, students would dress up as their famous American, and give a short two-minute speech about what made them famous. The "Wax Museum" was set up with students spread out across the gymnasium floor and entire school would visit. Visitors would activate the famous American by pushing on a sticker button located on the third graders hand. The student would then give their two-minute speech.

My coach who had also taken classes through HIAT and was aware of assistive technology thought it would be a great idea if we altered the project this year to have the students' research their famous American using SOLO. When I expressed my concern

about having access to appropriate text, I was assured that I would be given lots of help finding and converting text. Surely, this data would help my study!

Unfortunately, not all of my team members were what Prensky calls "digital natives." I had to agree with his premise is that today's students are no longer the people our education system was designed to teach. He defines the phrase "digital natives" which refers to today's students because they are native speakers of technology, fluent in the digital language of computers, video games and the Internet. Those who were not born in to the digital world are referred to as "digital immigrants". Educators, considered digital immigrants, have slid into the 21st century – and into the digital age – still doing a great many things the old way (Prensky, 2001). This pointed out the roadblocks I had encountered in my own research. The "digital immigrants" did not understand the methods needed to teach the "digital native." They were viewing the technology as "fluff" and were not strong supporters of its use.

I soon found that without complete support from each teacher, this project was not going to be successful. I spent two weeks creating and preparing over 70 biographical texts for students to use. Limited access to the computer lab once again became a major issue. Some students had plenty of time to use Read:Outloud and Draft:Builder, the electronic graphic organizer component of SOLO. Others did not have enough access or did not want to use SOLO to write their biographies. The advantage to creating the e-text was that I was able to create a website that made the text available to students from home.

The one thing I observed during this project was that the three ESOL students who were already familiar with SOLO were able to use the software to their advantage. They were able to navigate through the software and use the tools to begin to write their

papers. They used Draft:Builder to take notes and organize their paper. Perhaps working with the software allowed them to navigate more fluidly through the assignment. During the time in the lab with their other classes, all three students were seen assisting their English-speaking classmates (Anecdotal records, 3/3/08). They had by de facto become the class experts.

Continue MSA Prep

Using the data from the reading comprehension assessment, I selected areas from which I wanted the students to concentrate. These included: main idea, context clues, making inferences and drawing conclusions. Kids Lab had several lessons and quizzes that aligned directly with their needs (Appendix E). The first week I had the students working in SOLO they focused on context clues. I had the students first complete the Kids Lab tutorial on Direct Definition Context Clues Tutorial (Appendix E).

We then discussed reading strategies they would use to better understand the text. I reminded them that good readers are active, engaged and strategic thinkers who plan what they will learn and use strategies to control and self-regulate their learning. Good readers weave their personal experiences with what they read and actively construct meaning. As Rhoder points out that it is imperative that all teachers teach these strategies regardless of the subject area they teach (Rhoder, 2002). It was clear that the students had been introduced to these strategies and were trying to use them as they read the text. We also discussed how going back and rereading the text was another strategy that they could also use when reading online.

The students then moved on to complete the Kids Lab Context Clues Online Practice Quizzes. For data and accountability purposes, I had students keep a log of their

quiz scores. In rare occasions that they did not score 100%, they consistently reread the passage and retook the quiz until they scored 100% (Appendix F). They were eager participants in the process.

Several weeks into the study, Ms. H went away for a few days. Typically, she cancelled her ESOL classes when she was gone. I asked her if I could still meet with her group during their scheduled time and she agreed. All three students were more than willing to continue *without* their teacher.

Another sign of their motivation was that when we first began the study, they would meet at the ESOL room on the other side of the building and then walk to the lab as a class. Soon they began showing up directly from third grade without stopping off at ESOL. I asked Pete why he didn't go to ESOL first, he replied, "I want more time to work in SOLO" (Anecdotal records, 2/25/08). One day when I was not in the lab at our regular time, Phil and Chuckie tracked me down in another part of the school to make sure that I was in fact coming to the lab to allow them to work.

BCR's and CoWriter

Although I had the students tracking their quiz grades from the Kids Lab quizzes, I was concerned that I was not tackling my writing question. How was I going to measure the students' improvement in writing? I spoke to Ms. H and explained my dilemma. She told me that she had writing samples from just before we started meeting, would I be interested in looking at those? I certainly was interested.

I took the packet that they had worked on just before we started using SOLO. I converted the text and questions and had the students re-read the text and answer the

comprehension questions (Appendix G). I had to laugh at the conversation that took place the morning I had them complete the assignment.

> I had the group use the Marc Brown text today. Pete cracked me up. Phil said, "Hey, I've read this article before." Pete said, "Yeah, but this is more fun." Chuckie said he remembered it too, but they all began to talk about how much they liked doing this kind of assignment on the computer instead of out of the book. When I asked Pete why he didn't mind reading the text again, he said, "I like when the computer reads it to me." (Journal entry, 3/4/08)

We did have some issues with using Co:Writer. I had not initially set up the options correctly, so the first morning we tried to write the BCRs the text did not save. Feeling a bit frustrated, Phil said to me, "That's okay Mrs. Doerrman, I like using Co:Writer. I'll just do it again tomorrow" (Anecdotal records, 3/4/08). The technology was clearly not frustrating these digital natives! I had to keep reminding myself this was encouraging news. The students understood better than I did that my study really was about the process, and not the product.

Now I had a sample of writing from each student from before they started using SOLO and using Co:Writer. Table 2 illustrates the difference that Co:Writer made in Phil's response. The results were promising. His BCR response was lengthier and used a higher level vocabulary.

Table 2

Work Examples
Phil's original written response:
His grandmother helped him by taling him storys. This helped him because so he have ideas how he can make the storys. His grandmother helped him be a illustrator because She have his art work. It help him because so he an draw the people good and copey from his art work.
Phil's response using Co:Writer:
His grandmother helped him by saving his artwork. In the text it said she also saved all his artwork from the time he was a young boy. Brown said he knew his work was special because his grandmother didn't save his work that much. In the text it said Brown said his grandmother considered his work special because his grandmother didn't save lots of work.

I had reservation about my results. This was the second time the students had seen the text and questions. Were these improved BCRs because of the implementation of appropriate scaffolding, or were they improved because this was the second time they had seen the assessment?

If I had more time, I would explore this issue further. It would be interesting to see over time if using assistive technology transfers to their reading comprehension without being read aloud.

Times Up!

The study was up against a time limit. Although Ms. H was enthusiastic to have her students participate in my study, the reality was that she had a curriculum to teach. Spring Break began early this year, and I had access to the students until March 19. After the break students would be taking the MSAs.

This deadline did leave me with most of my questions unanswered. However, I was assured that this is often the case when conducting teacher action research.

Data Collection

Triangulation of Data

As I gathered information from a variety of sources over the course of the project, I was thoughtful of what Mills (2007) refers to as triangulation, or the use of multiple sources of data to strengthen the validity of my findings. I created a Triangulation Matrix (Appendix H) to help me better identify the source of my data. I then further categorized the data into three primary fieldwork categories (see Table 3): experiencing, enquiring, and examining (Wolcott, 1994, as cited in Mills, 2007).

Table 3

Experiencing	Enquiring	Examining
BCR (written and with Co:Writer) Kids Lab Quiz Scores MAP-R	Student survey Interview with students Interview with teacher	Personal journal Anecdotal notes from lessons Artifacts from class work

MAP-R

Chuckie showed no growth in his MAP-R score from the fall to the winter (see Table 4). This is not all that uncommon among students who score above 200 in the fall. Of the 33 students who scored over 200 in the fall, 19 showed little or no growth or had a lower score when they were tested in the winter. He was still considered proficient.

Phil had the largest growth in his MAP-R score from the fall to the winter. He went from being at less-than-proficient to proficient.

Pete also showed significant growth in his RIT score. He is now within the expected range for his age group and in the middle of the proficient performance level.

These trends (Appendix D) would be more reliable if there was a third score to also include. The students will not be taking the spring MAP-R until early May and so their third set of scores are unavailable for analysis at this time.

Table 4

Student	Fall RIT Score	Winter RIT Score	Difference
Chuckie	201	201	0
Phil	174	197	23
Pete	184	200	16

BCR

Students had been working on their written responses all year in their reading class. As part of the data gathering, students kept track of their BCR scores in their data notebook (see Table 5). I was able to look at this data to see how they were performing in

their written work using regular classroom assessments; this provided a source of primary data.

Either the individual reading teacher or the reading specialist scores BCRs. They use a three-point rubric (Appendix I).

Table 5

Date – BCR Title	Chuckie's Scores[1]	Phil's Scores	Pete's Scores
November – Brainy Birds	2	2	2
November – Saved by a Fly	1	0	2
December – Character Traits	1	1	0
December – Zora Neal Hursten Character Traits	Did not complete	2	1
January – Since Hannah Moved Away	1	2	2
January – Point of View Poetry	2	2	2
February – Which Animals Will Be Extinct?	0	2	2

[1]Chuckie is out of the classroom during the regular administration of these assessments. Unlike his classmates, he has to complete these BCRs when regular classroom instruction is taking place.

I also had the BCRs the students had completed in ESOL and for my study. When I reviewed both BCRs with Ms.H and discussed the differences between the two pieces of writing, she noted that the BCRs written in Co:Writer were more verbose. We agreed that while all three students needed to continue to work on their responses, the BCR written with Co:Writer had improved over their original written work. They were lengthier and used a bit more sophisticated vocabulary.

Survey and Student Interview

Student attitudes towards reading, writing and computers were important to trying to see the whole student. The archival data I examined gave me a sense of where the students were performing academically, but it did not give me an idea of what they felt about reading, writing and computers.

I had an attitude survey I had used at the beginning of the year to get a sense of those students in my guided reading group. It was a great place to start in terms of the

types of questions I was after, and I liked the format. However, I needed to tweak it just a bit in order to get a better understanding of the three students' I was using in my study.

I divided the survey attitude questions into three types: reading, writing, and technology. I used a likert scale to allow students a continuum from which to choose their feelings towards these subjects (Appendix C). The survey was administered anonymously so the data is reported as Student 1, 2 and 3.

Figure 1 shows that students had a better attitude towards reading then I expected. They survey suggests they all like getting books as gifts, going to the bookstore to get a new book, and starting a new book. Their feelings towards talking about reading appeared to be more reluctant. Only one of the students liked answering question that a teacher posed and none enjoyed talking about books with their friends.

Figure 1 – Reading Attitudes

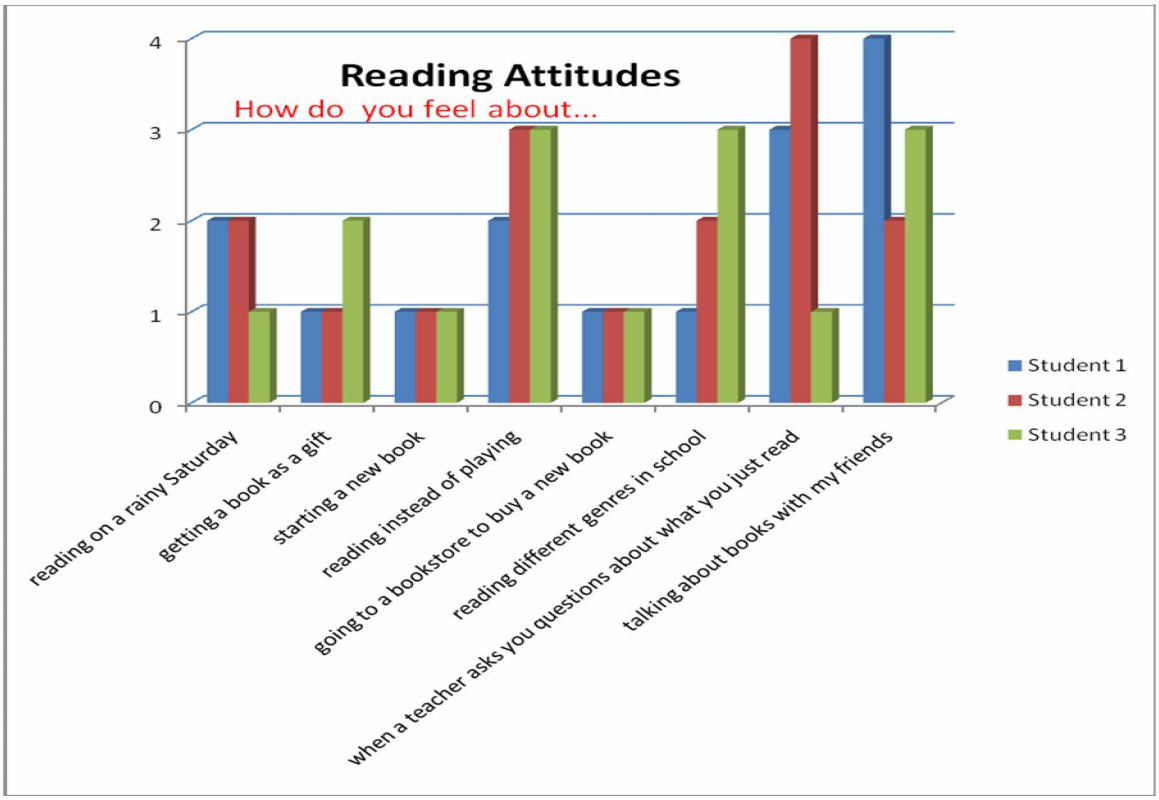

Figure 2 - Writing Attitudes

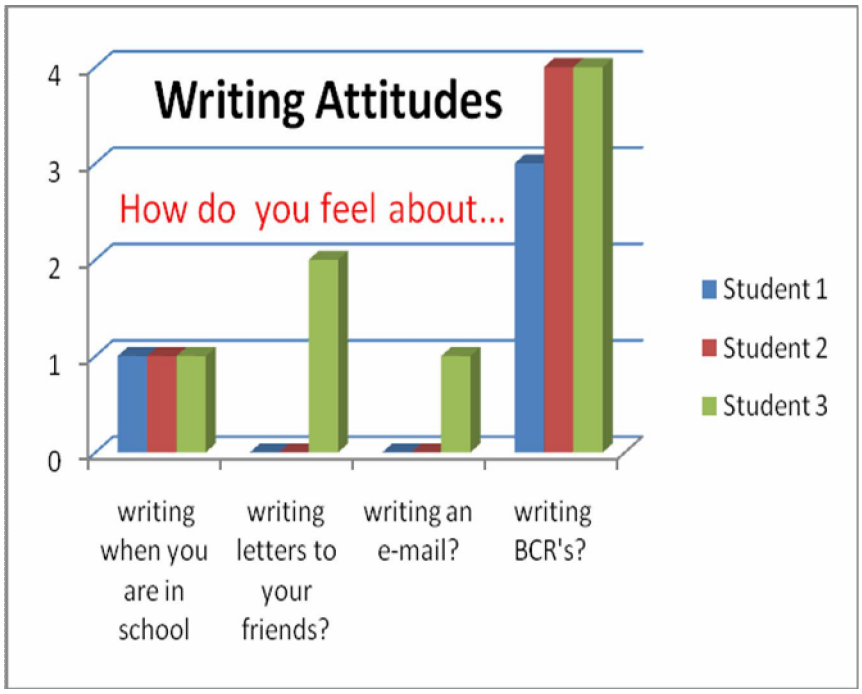

Figure 2 shows that all the students reported they liked to write while they were in school; however they did not like writing BCRs. Two of the respondents did not have experience with writing letters to friends or sending e-mails.

Figure 3 – Technology Attitudes

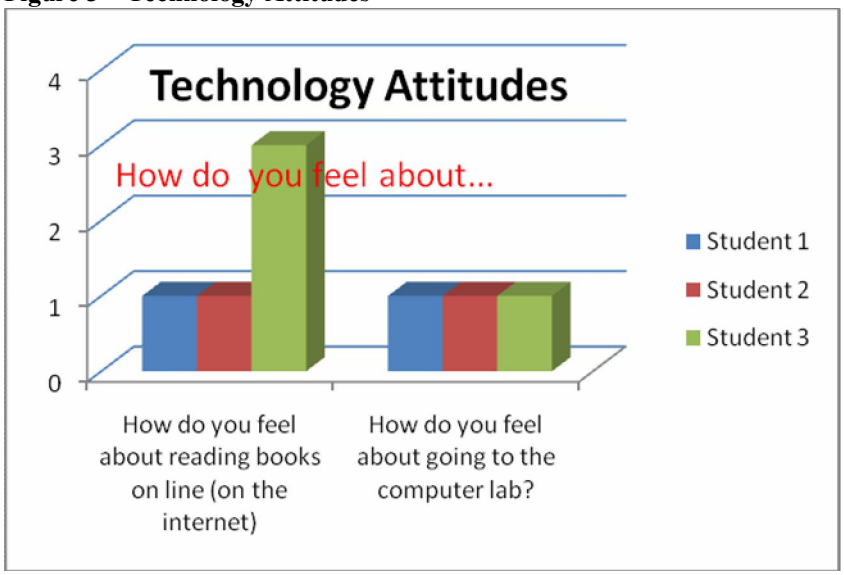

Figure 3 reveals that these students were positive towards technology. One student felt ambivelant towards reading books online and on the internet.

Although the Reading Attitude Survey gave me a bit of insight into what students were feeling, it did not give me student specific information or the details I wanted to know.

I have interviewed students for past projects and found this type of tool a double edged sword. Although you could get more detailed information, students were not used to an adult asking them these types of questions, and often seemed uncomfortable. I had a good relationship with all three students and felt that this might still give me a better picture into their thoughts about reading and writing. Additionally, I wanted to get a direct answer as to how they liked SOLO. What were their thoughts about this study, was it something they were interested in doing?

I created the formal interview questions I wanted the students to answer and met with Chuckie on February 29, 2008. I pulled him aside in the computer lab to ask him the questions. I first began the interview (Appendix J) by explaining that I wanted to know more about what he thought about reading, writing and computers. I told him I wanted to use the information for my class at school and would he mind if I used his answers. He said, “I’ll answer your questions, but I don’t want you to write about it.” This may have run into a ethical dilemma for me, however at the end of the interview, when asked if I could use his interview he consented. My intent was to ask only questions from the formal interview, but I found it necessary to ask some clarifying questions. Chuckie was clearly uncomfortable with the process. When asked open-ended questions, he did not elaborate.

From the interview I was able to learn that he does not see himself as a good reader because he cannot read long words. I found it interesting that when asked to describe a good reader that he chose a scientist. Could it be that he realizes that academic language is what he is still struggling with and is the measure he is using to compare his reading skills?

I found that due to the awkwardness of some of the questions I asked during the initial interview some of the questions needed to be revised (Appendix K). The interview with Phil showed me that he is comparing himself to his brother and sister and other students in his class. He judges himself a poor reader because he is in the lower level reading class. Although students are told there are no levels in the reading classes, it is evident to them that those who struggle are all grouped in one class and those who accelerate are grouped in another. I wonder; how much this plays into students' own views as learners?

Pete's interview showed a continuation of this theme. He named Chuckie as a good reader because of his reading class. Pete's enthusiasm for using the software program became evident when asked about using SOLO to read or write. It would be interesting to see if the novelty of using this software wore out after a longer amount of time. For now, his excitement seemed evident.

Interview with ESOL Teacher

When I initially approached Ms. H about having her students be a part of my study, I shared my thoughts and why this might be a win/win situation for us both. She agreed, and throughout the process she was encouraging and thought that this type of program would be beneficial to all of her students. We discussed the BICS vs. CALP

aspect of language acquisition and she agreed that having the text read aloud certainly would benefit her students.

I interviewed her at the end of the study to see if she saw any progress in her students.

> *What do you see as a benefit to using assistive technology?*
> "I certainly see an element of interest having the text on the computers makes it more relevant to them. The being read to part aids in their comprehension."
>
> *Would you use this type of technology in the future?*
> "I would like to learn to use this myself. I can think of several students in my population here who would greatly benefit from its use."
> (Ms. H, personal interview, March 19, 2008)

Validity of My Research

Much of what I have used as my results has been qualitative. As with any action research, issues of validity and ethics must be discussed. Validity of my study was an area that required examination. I was still new to teacher action research and found this consideration an uncomfortable process.

For this, I chose to follow Wolcott's strategies, see Table 6, for ensuring the validity of my action research:

Table 6

Wolcott's Strategies for Ensuring the Validity of Action Research	How I Addressed the Criteria
Talk little, listen a lot	Student interviews and anecdotal notes.
Record observations accurately	My anecdotal notes of the computer lab lessons.
Begin writing early	Personal journal.
Let readers "see" for themselves	Including primary data in the Appendices.
Report fully	Discrepant data has been included.
Be candid	
Seek feedback	Peer editor and colleague feedback.
Write accurately	

(Wolcott, 1994, as cited in Mills, 2007, pg.92)

Results and Implications

One of the outcomes from this study was that as the students had more access to the software, the better they became at using it and the more the focus could be on what it was supposed to be helping them with, reading comprehension or writing. I was working with third grade students, and I believe learning to use the software took a little longer than if they had been in older students. However, the students were able to master the software and begin to really work on making their way through the program, which was exciting to see.

Another unintended consequence was that the students became classroom experts at using the software! They were happy to help their classmates when the students would become "stuck". I believe this helped with the ELL students' self-esteem.

My background is in Marketing Communications. When talking about a project, we often spoke of "the golden triangle" referring to time, money and manpower. If you had a shortage on one end, the other two ends would grow. An example would be an ad that was due in a short amount of time it could be finished given more money and manpower. We were always trying to find a balance so that the cost was not too much for any of the three.

I use this analogy because I see a golden triangle for using assistive technology with ELL students. You need a balance of computer access, student access and teacher acceptance. Without the balance of all three, you have to pay for it with more energy into the others.

Student access is necessary to get a program like this off the ground. Students need to have time to learn how to use the software and then the time to work on the

projects. Once students work through the learning curve as to how to use the software, they can then become independent and have little teacher supervision.

Our school was unusual in that we had a regularly scheduled computer lab time each week with an instructor. This gave students more access to assistive technology than if they were only given time in a regular classroom. There are certainly limitations when you have two computers in a regular classroom with over twenty students. The ESOL classroom only had access to one computer and this year they were not scheduled for individual computer lab time. I would recommend that ESOL classes be scheduled for regular computer lab time so that they could have access to the software.

Another alternative would be to purchase portable word processors such as NEO. This type of hardware is available for under $250 dollars and has software such as Co:Writer available. Purchasing several of these would make the assistive technology that much more accessible.

With a growing group of students who are “digital natives”, teachers need to be aware that there are alternatives to reaching these students. If the ESOL teacher could take what I have started and expand upon it next year, perhaps classroom teachers will see ways in which they could incorporate it into their own classrooms.

I began my action research because I wondered whether using assistive technology would help ELL and R-ELL students with their academic language. I am unsure that I answered my own questions, but I do feel that I piqued my interest in this subject and I would like to explore this further.

As assistive technology becomes more predominate in schools and students have more experience using it, I believe the benefits of its usage will increase exponentially.

There are several obstacles that must first be addressed in order for I see the effectiveness of such a program.

As I mentioned throughout this paper, the availability of digital content is necessary for implementation. It is estimated that only five percent of printed materials worldwide are currently produced in accessible formats (Bookshare.org, 2008). Organizations like Bookshare.org provide e-text for free online. However to comply with copyright law and agreements with publishers and authors, users must provide proof of a print disability, such as blindness, low vision, a reading disability, or a mobility impairment that makes it difficult or impossible to read standard print. ELL students are not considered having a print disability and so they would not have access to this type of text.

According to the Don Johnston website, "Beginning at the start of the 2008-09 school year, qualified students will have the opportunity to use Don Johnston's Read:OutLoud Bookshare.org Edition text reader (Windows Version) to access more than 36,000 books, magazines and newspapers in the Bookshare.org library" (Chernek & Harrison, 2008). This means that qualifying students will now have access to text and software from home.

I certainly would recommend continuing to collect more data as the year continues. Looking to see if the use of this technology transfers over to the students written work would be something I would like to explore. Also, seeing if consistent use of reading online helped these students in their third MAP-R test would be something I would like to evaluate. Will Chuckie finally make some great progress in his springtime

score? If so, could his improvement be tied to the use of SOLO? I will have to look at the data and see.

The HIAT office offers a variety of classes for all teachers within our school system. Perhaps they should contact the ESOL office and explain how this software training might also benefit their staff and more importantly the needs of their students.

However, training is not enough. I had taken numerous classes and have an extensive background in computers and found that there was a bit of a learning curve to setting up files in SOLO. This is a closed system that does have some nuances that I only discovered once I really began to work with the software. I would recommend that teacher's start on a small scale and build their library of e-text and as they become more comfortable they will find ways in which this type of technology can be incorporated into their curriculum program.

Another area I would like to explore further is the use of podcasts to make text more accessible. During this past year I began teaching a podcasting class to a group of third through fifth grade students as a before school club activity. One of the ideas that I had was that we could create an audio library of folk tales for use in the primary grades. Our PTA, who generously provided funds to purchase MP3 players for each kindergarten, first and second grade classroom, embraced this idea. Even though I was working with the students in ELL students for the assistive technology project, it never occurred to me to also ask for funding for the ESOL program. I would like to purchase additional players for ESOL next year. I believe that having student produced audio recordings would be another way in which ELL students' needs could be met.

This is another area that I could continue with yet another action research project!

Recommendations

One of the largest undertakings during this project was the availability of appropriate text. Although there is increasingly more e-text available, I would say this is one of the major hurdles that must be overtaken in order for students to have electronic access. I have grown to appreciate the UDL framework even more and continue to create lessons I develop using this framework. Whenever a colleague shares an idea or lesson plan with me I ask, "Do you have it electronically?" I explain the advantages of UDL whenever possible.

A key component for successful implementation of lessons using assistive technology is to work with small groups. Although assistive technology allows students individual instruction, I found the reality is that until the students feel comfortable working with the technology and the glitches that may arise, a group that is no larger than six is a reasonable number that one trained teacher can handle.

I am interested in exploring this issue further and I would like to see more research on this particular subject; it is worth pursuing. There are so many aspects of assistive technology that I was unable to examine and hope this study piques the interest of others and that some of my questions will eventually be answered.

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Appendixes

Appendix A: Description of ESOL Level 3

ESOL LEVEL 3 - Advanced

This document describes expectations for student performance in each skill area *by the end of the ESOL level*. ELL Teams use this document to determine appropriate level placement in the ESOL instructional program. This document is also used to determine strategies for differentiated proficiency.

SPEAKING

Communicates with ease in a range of situations using:

- relevant description and detail
- a wide range of grade-level vocabulary and grammatical structures
- near-native like pronunciation and fluency with few errors

LISTENING

Comprehends:

- a wide range of grade-level vocabulary
- a range of complex sentences
- oral presentations or discussions presented in grade-level language without difficulty

READING

Comprehends leveled text with:

- a wide range of grade-level words and grammatical structures
- a moderate range of figurative language.

WRITING

Composes text using:

- a wide range of details, grade-level vocabulary, and grammatical structures.
- mostly effective transitions
- appropriate format and writing conventions

Appendix B: Reading Comprehension Assessment Scores

		Reading Assessment out of 40		numbers missed	Vocabulary	21. Plot	22 Use Context Clues	23. Sequence	24. Make Predictions	25. Draw Conclusions	26. Main Idea/Details	27. Use Context Clues	28. Main Idea/Details	29. Cause Effect	30. Make Inferences	31Setting	32 Use Context Clues	33. Summarize	34. Sequence	35. Plot	36. Compare/Contrast	37. Draw Conclusions	38. Cause/Effect	39. Compare/Contrast	40. Main Idea/Details
Chuckie		34	85	20, 26, 30, 36, 39, 40	20						x				x						x			x	x
Phil		36	90	22, 30, 37	16		x								x							x			
Pete		32	80	21, 26, 30, 32, 37, 40	17, 19	x					x				x		x					x			x

X	Indicates an incorrect answer

Above		90 or higher
On		60 - 89%
Below		Less than 60

Appendix C: Reading Attitude Survey

Reading Attitude Survey

To help me plan for our time together in the lab I'd like to know how you feel about reading. Please answer the questions in this survey honestly. Do not write what you think your friends might write, or what you think your parents or teacher might hope you'll say. Your responses to this survey will be kept private.

Here's the rating scale you should use when responding to the questions:

The happy face (Yeah!) – This is one of your favorite things to do and you would do it all the time if you could! [Note: for tracking purposes this is assigned 1]

The slightly smiling face (Whatever) – This is something you like and don't mind doing. [Note: for tracking purposes this is assigned 2]

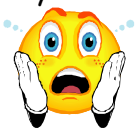
The mildly upset face (I guess it's okay) – You only do this when you have to! [Note: for tracking purposes this is assigned 3]

The very upset face (Blech, I'd rather eat dirt) – Anything is better than this. It makes you miserable. [Note: for tracking purposes this is assigned 4]

1. How do you feel when you read a book on a rainy Saturday?


Yeah!


Whatever

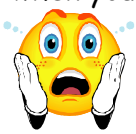

I guess it's okay


Blech, I'd rather eat dirt

2. How do you feel when you are asked to write when you are in school?


Yeah!


Whatever

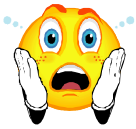

I guess it's okay


Blech, I'd rather eat dirt

3. How do you feel about getting a book for a gift?


Yeah!


Whatever

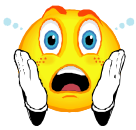

I guess it's okay


Blech, I'd rather eat dirt

4. How do you feel about starting a new book?


Yeah!


Whatever

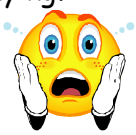

I guess it's okay


Blech, I'd rather eat dirt

5. How do you feel about reading instead of playing?


Yeah!


Whatever


I guess it's okay


Blech, I'd rather eat dirt

6. How do you feel about going to a bookstore and buying a new book?


Yeah!


Whatever

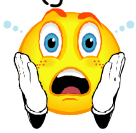

I guess it's okay


Blech, I'd rather eat dirt

7. How do you feel about reading different types (genres) of books?


Yeah!


Whatever

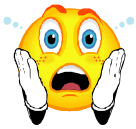

I guess it's okay


Blech, I'd rather eat dirt

8. How do you feel about writing BCR's?


Yeah!


Whatever

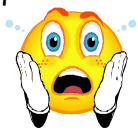

I guess it's okay


Blech, I'd rather eat dirt

9. How do you feel when the teacher asks you questions about what you read?


Yeah!


Whatever

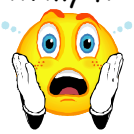

I guess it's okay


Blech, I'd rather eat dirt

10. How do you feel about talking about books with my friends?


Yeah!


Whatever

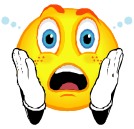

I guess it's okay


Blech, I'd rather eat dirt

11. How do you feel about writing to a friend?


Yeah!


Whatever

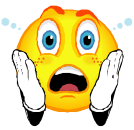

I guess it's okay


Blech, I'd rather eat dirt

12. How do you feel about reading books online (on the internet)?


Yeah!


Whatever


I guess it's okay


Blech, I'd rather eat dirt

13. How do you feel about going to the Computer Lab?


Yeah!


Whatever

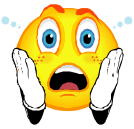

I guess it's okay


Blech, I'd rather eat dirt

14. How do you feel about writing e-mails?


Yeah!


Whatever


I guess it's okay


Blech, I'd rather eat dirt

Appendix D: MAP-R Results

Chuckie

Season/Year	Student Score Range	District Average RIT	Norm Group Avg	Student %ile Range
W08	198 – **201** - 204	201	194	56 – **65** - 75
F07	198 – **201** - 204	195	190	68 – **76** - 85

General Reading: Processes	Avg.
Informational: Var / Feat/ Patterns	Avg
Informational: Ideas/Language	HiAvg
Lit: Features and Elements	HiAvg
Lit: Ideas / Lang	HiAvg

Lexile Range: 520 - 670

Phil

Season/Year	Student Score Range	District Average RIT	Norm Group Avg	Student %ile Range
W08	194 – **197** - 200	201	194	45 – **53** - 65
F07	171 – **174** - 177	195	190	11 – **14** - 19

General Reading: Processes	LoAvg.
Informational: Var / Feat/ Patterns	High
Informational: Ideas/Language	Avg
Lit: Features and Elements	Avg
Lit: Ideas / Lang	HiAvg

Lexile Range: 449 - 599

Pete

Season/Year	Student Score Range	District Average RIT	Norm Group Avg	Student %ile Range
W08	197 – **200** - 203	201	194	53 – **62** - 71
F07	181 – **184** - 187	195	190	25 – **31** - 40

General Reading: Processes	Avg.
Informational: Var / Feat/ Patterns	Avg
Informational: Ideas/Language	High
Lit: Features and Elements	Avg
Lit: Ideas / Lang	HiAvg

Lexile Range: 503 - 653

Explanatory Notes:
Season/Year – The season (F-fall, W-winter) and the year the test was administered.
Student Score Range:
The middle number is the RIT score the student received. The numbers on either side of the RIT score define the score range. If retested, the student would score within this range most of the time.

District Average RIT
The average score for all students in the school district in the grade who were tested at the same time as the student.

Norm Group Avg.
The average score observed for students in the 2005 NWEA Norming Study, who were in the same grade and tested in the same season.

Student %ile Range
The number in the middle is the student's percentile rank – the percentage of students in the 2005 NWEA Norming study that had a RIT score less than or equal to the child's score. The number on either side of the percentile rank defines the percentile range. If retested, the student's percentile rank would be within this range most of the time.

Goal Performance
Each goal are included in the test is listed along with a descriptive adjective of the student's score. The possible descriptors are Low (<21 percentile), LoAvg (21 – 40 percentile), Avg (41 – 60 percentile), HiAvg (61- 80 percentile), and High (>80 percentile).

Lexile Range
The difficulty range of text that can be understood by the student 75% of the time.

Appendix E: Kids Lab Selections and Example

Kids Lab Selections

- Direct Definition Context Clues Tutorial
- Context Clues Online Practice Quizzes
  - Matter
  - Nouns
  - Verbs
  - Spiders
  - Habit Adaptations
  - What is a Globe?
- Inferential Context Clues Tutorial
- Main Idea Tutorial
- Main Idea Online Quizzes
- Locating Specific Information
- Locating Specific Information Online Quizzes
- Put It Together Questions Tutorial
- Compare and Contrast Tutorials
- Compare/Contrast Online Quizzes

Example of Inferential Context Clue Tutorial taken from Kids Lab

- **Did you ever ask a teacher the meaning of a word only to have her say, "You can figure it out! The answer's right there!"**

To you the meaning is not "right there" at all! The fact is, the meaning is hidden in the rest of the words in the sentence! Here is an example of what I mean.

Suppose you were reading about some kids who had been hounding their mom and dad for a hound, or a puppy. If you read the following sentence, you might ask your teacher what a certain word means.

Let's Try It! The elated children jumped up and down as Dad brought their new puppy to the car.

You, the reader, might go to your teacher and say, "What does elated mean?" And she would reply, "Blah, blah, blah, blah, blah! Blah, blah, blah, blah!" Not much help, huh?

Look at the sentence this way:
The bright red words give you a major clue to what elated means! When you have figured it out, you have inferred the meaning. Aren't you smart??!!

The elated children jumped up and down as Dad brought their new puppy to the car. Take a chance!!

- **1. In this sentence elated means:**

-- Choose an answer --

- **You got [ ] out of [1] correct.**

Your Score: [ ]

Appendix F: Kids Lab Collection Sheets

Kid's Lab

Name Chuckie

Solar System: Right There Questions Practice Sheet

Right There Questions Practice	**My Score**
I Completed the Right There Questions Tutorial	
The Sun	100%
Mercury	100%
Venus retake: 100%	missed 3/5 40%
Mars retake 100%	60%
Jupiter	100%
Saturn	100%
Uranus	100%
Neptune retake 100%	80%
Pluto	
The pencil	100%
The sun	100%
Snow [illegible]	[illegible]
[illegible]	100%

Page 1 of 1

Kids' Lab

Name Chuckie

Main Idea Practice Sheet

Main Idea Practice	**My Score**
I Completed the Main Idea Tutorial	100%
The Surprise Party	100%
Water	100%
Turtles and Tortoises	[illegible]
Rules	100%
Light Houses	100%
Plants	100%
George Washington	100%
Tiger Goes Home	100%
What is the Best Title? #1	100%
What is the Best Title? #2	100%
What is the Best Title? #3	Not available online

Sent on to Locating Specific Information

http://www.manatee.k12.fl.us/sites/elementary/palmasola/mainideasheet.htm 2/25/2008

Name — Phil ———————

Solar System: Right There Questions Practice Sheet

Right There Questions Practice	My Score
I Completed the Right There Questions Tutorial	100%
The Sun	re test 100% 100%
Mercury	100%
Venus	100%
Mars	100%
Jupiter	100%
Saturn	100
Uranus	100%
Neptune	100%
Pluto	

Name Phil _____

Main Idea Practice Sheet

Main Idea Practice	My Score
I Completed the Main Idea Tutorial	1 out of 1 100%
The Surprise Party	1 out of 1 100%
Water	1 out of 1 100%
Turtles and Tortoises	1 out of 1 100%
Rules	1 out of 1 100%
Light Houses	1 out of 1 100%
Plants	
George Washington	
Tiger Goes Home	
What is the Best Title? #1	
What is the Best Title? #2	
What is the Best Title? #3	

Name Pete

Solar System: Right There Questions Practice Sheet

Right There Questions Practice	My Score
I Completed the Right There Questions Tutorial	
The Sun	100%
Mercury	100%
Venus	100%
Mars	100%
Jupiter	100%
Saturn	100%
Uranus	100%
Neptune	100%
Pluto	
The Pencil	100%

Name Pete

Main Idea Practice Sheet

Main Idea Practice	My Score
I Completed the Main Idea Tutorial	100%
The Surprise Party	100%
Water	100%
Turtles and Tortoises	100%
Rules	100%
Light Houses	100%
Plants	100%
George Washington	100%
Tiger Goes Home	0%
What is the Best Title? #1	100%
What is the Best Title? #2	100%
What is the Best Title? #3	

Appendix G: Original BCR data vs. BCR written in Co:Writer

Example of BCR's original written response and the subsequent response written in Co:Writer

Think about what you learned about Marc Brown. One of the people who encouraged him to draw was his grandmother. She also had an ability to tell wonderful stories. On the lines, tell how you think Marc Brown's grandmother helped him become the author and illustrator he is today.

Be sure to use capital letters and the correct punctuation. Proofread your work. Check for correct spelling.

Chuckie's original written response:
Marc Brown's grandmother helped Brown by telling him good storys. It helped him get Ideas. When his grandmother saved his pictures. Then his grandmother gave him his pictures to place it in his book that he's making.

Chuckie's response using Co:Writer:
His grandmother encouraged him to draw and save his artwork. He saved his artwork because when he is making a book he can just put it in. His grandmother also helped him by telling good stories so he could get ideas. In the text it said that his grandmother told good stories.

Phil's original written response:
His grandmother helped him by taling him storys. This helped him because so he have ideas how he can make the storys. His grandmother helped him be a illustrator because She have his art work. It help him because so he an draw the people good and copey from his art work.

Phil's response using Co:Writer:
His grandmother helped him by saving his artwork. In the text it said she also saved all his artwork from the time he was a young boy. Brown said he knew his work was special because his grandmother didn't save his work that much. In the text it said Brown said his grandmother considered his work special because his grandmother didn't save lots of work.

Pete's original written response:
Marc Brown's grandmother helped him by ceaping his artwork. In the text it said, "She also saved all his artwork from the time he was a little boy." She also told him storys. Storys helped Mar Brown, because he will get ideas. So his grandmother did help him.

Pete's response using Co:Writer:
His grandmother encouraged him to draw by saving his artwork. In the text it said, "Brown said, "He knew that his grandmother considered his work special." So his grandmother encouraged him to draw and that's how he got better.

Appendix H: Triangulation Matrix

Research Questions	**Data Source**		
	1	**2**	**3**
1. Would the use of the Assistive Technology taught in a small group setting improve the reading and writing success of this group of low to mid-level readers?	Student Surveys/ Teacher Interview	Reading Comprehension Test/ MAP-R tests	Anecdotal notes/Journal
2. Could the use of Read:OutLoud strategic comprehension supports further thoughtful interactions between reader and text?	Reading Comprehension Test/ MAP-R tests	Online Comprehension Results	Student Interview
3. Could the use of assistive technology help improve students' attitudes towards reading?	Written BCR's	Online BCR	Interview with Students and Teacher
4. Struggling writers typically do not write enough to effectively communicate their message. After they finish composing, their revisions and edits have little impact on the text quality. Could the use of Write:OutLoud and Co:Writer, increase writing quantity and improve writing quality?	Archival artifacts of students written work	Written BCR/ Online BCR	Interview with Students and Teacher

Appendix I: BCR Rubric

Name_____

BCR Rubric

3 Wow!	• I answered all parts of the question or prompt. • I used at least (2) ideas or facts from the text to support my answer. • My text support proves my answer is correct.
2 Okay	• I answered all parts of the question or prompt. • I used at least (1) idea or (1) fact from the text to support my answer. • My text support partially proves my answer is correct.
1 So So	• I answered part of the question or prompt. • I used at least (1) idea or (1) fact from the text to support my answer. • My text support does not prove my answer is correct.
0 Oops	• I did not answer the question or prompt.

Appendix J: Student Interviews

Reading Interview

1. Are you a good reader? Why or why not?
2. Who do you think is a good reader?
3. Why do you think a Scientist is a good reader?
4. How can you become a good reader?
5. What about reading makes you a good reader?
6. What is your favorite genre?
7. Do you have any favorite book or author?
8. When you read your favorite book – what kinds of things will make you stop reading?
9. What causes you the greatest difficulty when you are trying to understand what you are reading?
10. What about in reading class?
11. What do you do when you come across a word that you don't understand?
12. When you are reading and you have difficulty what do you do?
13. Do you ever repeat what you are reading I your own words?
14. Do you ever reread something that does not make sense?
15. Do you ever ask yourself questions as you read?
16. Do you have a conversation with yourself in your head when you read?
17. What is a strategy you might use to help you understand what you are reading?
18. What do you think about using Read:Outloud to read to you?
19. Do you read the words on the screen when you listen to the text?
20. Would you like to use Co:Writer to write BCR's?
21. Would you like to use SOLO in other subjects other than reading? If so, which subject?

Appendix K: Student Interviews (revised)

Are you a good reader? Why or why not?

Who do you think is a good reader?

Why do you think a Chuckie is a good reader?

How can you become a good reader?

What about reading at home makes you a good reader?

Do you like to read?

What is your favorite genre?

Do you have any favorite book or author?

What causes you the greatest difficulty when you are trying to understand what you are reading?

What do you do when you come across a word that you don't understand?

When you are reading and you have difficulty what do you do?

Do you have a conversation with yourself in your head when you read?

What is a strategy you might use to help you understand what you are reading?

What do you think about using Read:Outloud to read to you?

Do you read the words on the screen when you listen to the text?

Would you like to use Co:Writer to write BCR's?

Does Co:Writer help you write better?

Would you like to use SOLO in other subjects other than reading? If so, which subject?

Would you like to use Read:Outloud for your next math test?