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Building background knowledge in science: English language learners, sheltered instruction, and first graders

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BUILDING BACKGROUND KNOWLEDGE IN SCIENCE: ENGLISH LANGUAGE LEARNERS, SHELTERED INSTRUCTION, AND FIRST GRADERS

by
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ABSTRACT

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Sheltered Instruction, a strategy used in teaching English Language Learners (ELLs), can improve the educational experience of ELLs. In this action research project, one component of Sheltered Instruction, building background knowledge, was used to teach science in a first grade classroom to see if it could the increase science comprehension of ELLs. Many strategies were used to teach vocabulary during the first four days of each science unit. These strategies included setting aside a vocabulary only day, playing vocabulary games and activities, having a science word wall, reading informational storybooks, and using real objects for the students to connect with. The analysis of the data revealed that the focus group students were more confident during science class, were eager to learn and were able to correctly use the select vocabulary.

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Introduction

The United States of America's population becomes more diverse each year. An influx in the Spanish-speaking population has our schools struggling to change with the population. Teachers need to be taught effective ways to educate English language learners (ELLs) (Echevarria, Vogt, & Short, 2004). ELLs are not getting the education that they deserve. Strategies and rationale behind effective teaching must change to provide ELLs the same learning opportunities as students who speak English as their first language. Sheltered Instruction is a teaching approach that extends the time students get in school for language support while also teaching content (Echevarria, Vogt, & Short, 2004). In this study, I used one component of Sheltered Instruction, building background knowledge. I was curious if using strategies to build background would increase the comprehension and vocabulary usage. In the analysis of data, many themes and new questions arose.

Story Behind the Research

I can relate to being in a foreign county where the majority of people do not know your native language. As an undergraduate student, I spent a semester studying abroad in Italy. One of my courses was taught solely in Italian. I had never felt so lost and confused in a classroom. I did not really learn too much in this class and most subject matter was beyond me. Upon returning to the United States, my perspective changed on non-native speakers in our country. I understand how simple tasks turn into very difficult tasks when faced with a language barrier.

During elementary school and high school, I have witnessed many ELLs not being taught in ways that best suit a non-native speaker. Although as a student I was not

trained in effective teaching practices, I could tell that sitting in a classroom listening to a teacher lecture in a language you did not understand was not helping ELLs. I could tell that some teachers were annoyed to even have these students in their classes. I believe these unfortunate teachers are of the mindset that if students are in the United States, then students should be speaking English. It is disheartening that teachers could ever be so cold-hearted, but it happens often because teachers lack training of effective ways to teach English Language Learners. In my experience as a student, teachers just expected these students to acquire English as we went along and provided no special accommodations or strategies for these students to learn. However, I believe that teachers should accommodate ELL students and be trained in teaching approaches that are beneficial to effectively teaching ELL students.

Problem

In my first few weeks of student teaching, I observed my co-operating teaching doing extensive work with building background knowledge during reading, however, when it came to teaching science, little was done to help build background knowledge. Since those with knowledge or background of a topic have better success in learning more about the topic than those with limited knowledge, teachers try to "catch-up" those with the limited knowledge by building background within the student's knowledge. Building background knowledge includes pre-teaching vocabulary, connecting experiences of the students and introducing a framework for the students. Thier states that "science and language are interdependent because "each is based on processes and skills that are mirrored in the other" (2003, as cited in Carrier, 2005). Without the

language and background, learning and applying science concepts become a frustrating task for students.

Much of the science curriculum at my student teaching placement was reading from a text and doing accompanying worksheets. With limited time to teach science lessons, my cooperating teacher did not to take time to build background knowledge. When teaching science in a second grade classroom, DeCristofano, de Romero & Slater (2006) found that taking time to make sure their students understood vocabulary in science provided great results. I was curious to see my student's participation and comprehension would increase if I took the time to build background knowledge in science. I decided that for my action research project, I would concentrate on taking the extra time in science to teach students new vocabulary and to do other activities that would help to build their background knowledge.

Critical Question

During my action research, the question that guided my study was: How can concentrating on strategies to build background knowledge, specifically with vocabulary, increase science comprehension in a first grade classroom?

Integrated Action

In my action research project, I focused on one aspect of Sheltered Instruction (SI), building background knowledge. SI is a teaching technique proven to be effective in teaching ELLs. Sheltered Instruction Observational Protocol (SIOP) is a SI model which has eight components: lesson preparation, building background, comprehensible input, strategies, interaction, practice/application, lesson delivery and review/assessment.

The model is based on current knowledge and research-based practices for supporting learning with ELLs (Echevarria, Vogt, & Short, 2004). I specifically concentrated on building science vocabulary with the students. With the implementation of strategies specifically targeted to build background knowledge of ELLs, my goal was to make science less frustrating, have the students feel more confident in using vocabulary and to increase participation among ELLs.

The main strategies that I used were having a vocabulary only day to familiarize students with vocabulary for the topic we were studying, having a science only word wall and dictionary at the student's desk, reading simple storybooks about topics being studied as a stepping stone to more complicated text, and finally using *realia* or real objects to teach the vocabulary.

During the vocabulary only day, students focused only on five or six key vocabulary words that would be critical to comprehension of the unit. First, students were shown flash-cards with pictures of science vocabulary words on them. The lesson was very slow and relaxed. Students would have the chance to guess what the word was and they could look at the picture provided as an example of the meaning of the word. Next, the students played a simple game with vocabulary. The two games that we used were vocabulary memory and "guess who" vocabulary. In memory, a student was paired with a partner and they had to find match the vocabulary word with its picture. Vocabulary "guess who" involved the students working with a partner and taking turns reading a clues about the words. After listening to the clue, the students had to guess the correct vocabulary word that went with the description.

The non-fiction storybooks were read to the students on the second and third days of the unit. The storybooks were informational, yet simple in meaning and had a storyline that students could relate to with many pictures and illustrations. One author that writes excellent informational storybooks is Gail Gibbons. For instance, we read *From Seed to Plant* by Gibbons during the plant unit. This book uses colorful and simple illustrations to show the meaning of the vocabulary. The book gave the students a great way to connect to the subject matter. Although the storybooks that I used taught similar content about science subjects as traditional textbooks, the illustrations and simplicity approached the content in a less intimidating manner.

On the third day, the same flash cards we used during the vocabulary only day were put on the science only word wall. Students were told to use this word wall the same way they use the sight-word word wall in our classroom. Students also had a dictionary they were given to use as a tool to reference. The words were on a ring for the students to easily access. They were given an index card with the word and a brief definition. The students were responsible for adding a picture to the card. The dictionary was used at the student's discretion.

Reaila helped students truly understand the vocabulary by using real objects to create meaning for words. On day four, *realia* was introduced. Students were shown *realia* and then given a chance to have hands on experience with the items. For example, in our plant unit, we took apart at a daffodil plant to and examined an example of each of the vocabulary words. Then, we planted seeds and watched them grow. Vocabulary was constantly reinforced with the growing of the seeds.

Context for the Research

School and Community

Big Street School is one of six K-8 elementary schools in the Bright City School District, which is an Abbot District. The state of New Jersey classifies an Abbot district as one with a very low socio-economic status and provides additional funding to the school. Bright is located in Southern New Jersey in rural Cumberland County. Once bustling with glass and textile industries, during the 1980s the city suffered an economic downturn. However, in recent years, an influx of immigrants from southern Mexico has started to revitalize the city.

Big Street School houses the greatest number of students of all the Bright elementary schools. As of January 2008, there are approximately 920 students enrolled in the school (Power School, February 8, 2008). The building that houses Big Street School was built in the 1920s and was the originally a high school. From 1958 until 2003 it was used as a middle school. In 2003, the middle school was eliminated and the building was converted to a K-8 elementary school. Although the building houses an elementary school, very few physical changes were made to accommodate the younger population.

Big Street School is the bilingual school for the district, thus it is seventy percent Hispanic. According to PowerSchool, the rest of the student population is twenty four percent African American students and six percent Caucasian students (2008).

Big Street School has not met Annual Yearly Progress (AYP) standards and is in jeopardy of being taken over by the state if the test scores do not improve. The school is faced with many challenges that it must overcome in order to meet AYP. Ninety percent

of the students at the school receive free or reduced lunch and many of the students are raised by one parent or by grandparents. Twenty-five percent of the student population speaks Spanish as a first language (New Jersey State Report Card, 2006) and many Hispanic students transfer back and forth from Mexico during the school year.

Classroom

My first grade classroom at Big Street School has sixteen students, six males and ten females. The students are either six or seven years of age. Nine students are Hispanic and only speak Spanish at home. Three are White and three are Black and they speak English at home. The classroom is a place where each child feels safe and secure. The majority of the students perform at grade-level. Most of the students live with large extended families and/or non-traditional families and enjoy sharing stories about their home life. Students stay in the classroom to learn all subjects. When asked about their favorite subject, seven students said they like Math the best.

Participants

I chose to focus on six of the ELLs in my classroom, three girls and three boys. I chose these six out of the nine ELLs because they had a wide range in ability. In reading, as of March 2008, two of the students were reading above grade level, two were on grade level and two below grade level. However, in Math all of the students were maintaining an "O" average: between ninety-three and one-hundred percent. All of these students also have good attendance and were good candidates to look at a wide variety of their work. These students are very eager to learn and were always very helpful to me in my research.

Review of Relevant Literature

English Language Learners

In the past several decades, we have seen the population of the United States explode and become more ethnically and linguistically diverse. The National Clearinghouse for English Language Acquisition reports that "from the 1991-1992 school year through the 2001-2002 school, the number of identified students with limited English proficiency in public schools grew by 95 percent," (Echevarria, Vogt, & Short, 2004, pg 3). With the increase of English language learners (ELLs) students also comes the increase in the achievement gap between ELLs and native English speakers. Most schools are not meeting the needs of their linguistically diverse students (Echevarria et al, 2004).

Sheltered Instruction

Sheltered Instruction (SI) is one way to improve academic success of ELLs. SI combines good teaching practices with those ideal for ELLs (Abadiano & Turner, 2002). A SI classroom can be described as one that "integrates language and content and infuses socio-cultural awareness" and one that "is an excellent place to scaffold instruction for students learning English," (Echevarria, Vogt, & Short, 2004, pg 12). The students are at the heart of teaching and learning in the classroom. Sheltered instruction directly addresses the needs of the student's second language development (Abadiano & Turner, 2002).

The Sheltered Instruction Observation Protocol was developed to provide concrete examples of sheltered instruction. The protocol has eight main components: preparation, building background, comprehensible input, strategies, interaction,

practice/application, lesson delivery, and review and assessment (Echevarria, Vogt, & Short, 2004). Echevarria, Powers & Short have shown that when instruction using SIOP features were consistently and systematically used, the writing performance improved significantly over similar students who had not been taught using SIOP methods (2006). One of the eight components of SI, building background, focuses on teachers activating students' background knowledge explicitly and linking that knowledge to concepts or texts. Teachers must understand where their students are coming from and what schema they are familiar with. Carter (2007) states that many ELLs enter the classrooms with a different set of experiences than English speakers. It is very possible that students may have a valid, but different schema than the teacher. Vocabulary emphasis is another way a teacher can build the background of students. Vocabulary development and academic achievement go hand in hand. To be effective, vocabulary and the subject matter being studied should be very closely related (Echevarria, Vogt, & Short, 2004).

Science and the English Language Learner

Science is often the forgotten subject in elementary school. Time is spent concentrating on mathematics and language literacy, leaving a student short-changed for science. Gibbons argues, "all teachers share the important task to make science comprehensible for all learners" (2003, p. 373). In science classrooms across the country, English language learner's lack of background knowledge and word usage impedes learning. Thier states that "science and language are interdependent because "each is based on processes and skills that are mirrored in the other" (as cited in Carrier, 2005). Native speakers and new learners are equally as capable of achieving in science. ELLs just need to be provided with the proper tools to achieve (Clark, Medina, Medina-

Jerez, Ramirez-Martin, 2007). Designing lesson plans that specifically target building background knowledge can increase science comprehension for non-native speakers.

Building Vocabulary

One of the biggest components of building background knowledge is building vocabulary. In many classrooms learning new vocabulary becomes a mundane task. In classrooms where students were working on acquiring a second language, interactive instruction in vocabulary was found more effective than less interactive approaches. Interaction helps students make connections to the language (Tran, 2006). Building and supporting new vocabulary is critical to the development of new concepts for any learner, but specifically vital for those learning another language.

Recent studies have provided results of successful strategies to build vocabulary. DeCristofano, de Romero & Slater (2006) found that taking time to make sure their students understood vocabulary in science provided great results. A strategy for helping students understand vocabulary is providing them with *realia*. *Realia* are real objects that students can see and touch in order to better understand words or concepts. Teachers who used *realia* and related vocabulary to objects that were familiar to the students found students were able to integrate using the new vocabulary terms into classroom conversation and felt confident using the new vocabulary. Thus, teachers were able to use more collaborative learning in their classrooms after the students could speak using the new vocabulary (August, Carlo, Dressler, Mclaughlin, Lippman, Lively, & White, 2004).

Another successful method used to introduce new concepts was to read a storybook to students (DeCristofano et al, 2006). Reading storybooks has been found to provide framework of introducing vocabulary that is beneficial to ELLs. Storybooks keep

the learning process simple, yet at the same time provide opportunity for students to process the words deeply. Story books also provide many illustrations that can help students make a connection to vocabulary (Hickman, Pollard-Durodola & Vaughn, 2004).

Simple tools can be incorporated into daily classroom routines to help students with vocabulary acquisition and comprehension. Most commonly, a word-wall is known as a tool used in classrooms with emergent readers. The wall contains sight words and students with spelling and basic sight word recognition. DiCristofano et al (2006) found that a science-only word-wall was valuable strategy in an elementary classroom to aide in the spelling and recognition of science vocabulary. It is also a visual reminder of the vocabulary being studied. Similar to a word wall, Tran (2006) has found that a student-generated dictionary is a useful device in tackling vocabulary building. Students keep the dictionary in their desks to reference when needed. As more vocabulary is learned, it is added to the dictionary. Providing students with a sentence builder is another way to that has been shown to help ELLs use their science vocabulary in grammatically correct sentences (Carrier, 2005). Students can apply what they know about vocabulary without feeling frustrated about forming a sentence. Word-walls, student-created dictionaries, and sentence builders are three easy ways that have been found to help build vocabulary and thus build a student's background knowledge.

Science instruction can be modified in to provide all learners in the classroom with an opportunity to learn. Success has been seen in classrooms with teachers that design lessons to incorporate three main components to facilitate building vocabulary. *Realia*, reading storybooks with visual illustrations and providing simple tools for

students have shown that simple modifications create a more meaningful environment for ELLs.

Research Methods

What is Action Research?

Action research is a methodical inquiry done by teachers to help gather information and improve aspects of teaching and school community life (Mills, 2007). Effective teachers have always critically reflected about teaching processes, yet action research provides teachers with a systematic way of reflecting on teaching practices. Wolcott sums up the action research processes by saying that action research provides teacher researchers "with provocative and constructive ways" of thinking about their work (1989, p. 137 as cited in Mills 2007). The goal of action research is help to improve the lives of students and teachers (Mills, 2007).

According to Mills (2007), the basic process of conducting an action research project has four steps: identifying an area of focus, collecting data, analyzing and interpreting data, and devolving an action plan. An area of focus can be a problem or something that the researcher is interested in studying. Once the area of focus is identified, data should be collected from at least three different sources to ensure triangulation. Next, data will be analyzed and interpreted using data analyzing techniques. Finally, the teacher researcher will make conclusions about the action research and create an action plan. Action research is an ongoing process with an action plan often leading to identifying a new area of focus.

Data Collected

Three different types of data were collected: observations, interviews and artifacts. Observations were made in two ways. First, field notes were taken after watching videotape of lessons taught. There were six lessons video taped. They included two of the vocabulary-only day lessons, two lessons storybooks were read and more vocabulary was gone over, and two lessons were we went over our science word wall and dictionary. The field notes provided an insight on student's participation during the lessons and language used during each lesson. The second way observations were made was by writing a journal entry after teaching a lesson. I reflected on what my teaching practices were and how the lesson went. There were a total of 22 journal entries. An entry was written after each science lesson was taught. The journal entries provided an insight to how I felt that the lessons went. When journaling, I tried to always have my critical question in the back of my mind and tried to always write about how the lesson answered the question.

Interviewing students was another data collection tool that I executed during my action research project. Informal interviews were done with each of the six students in my focus group before I started my action plan. I wanted to see how the students felt about the way science was being taught. I asked the students what they liked and did not like about science and what made science confusing. I did a similar interview at the end of my action plan, asking similar questions. The goal of the final interview was to see what had changed during my action plan and if science was still confusing to the students. The interviews were very informal and although I had guiding questions (Appendix B), I let the students talk freely. A survey (Appendix C) about our lessons in science was also given to all the students in my class at the end of my action plan. In

this, they evaluated our lessons and were able to state what they liked or did not like about our science lessons. This survey was on the student's first grade reading level and thus, very simple with students either circling yes, no or maybe.

Student work samples as artifacts were also collect as data during my action research project. The work was done after the lessons that were deliberately meant to build background knowledge and increase vocabulary usage. Most of the work collected was observational sheets where students were expected to write about the subject we were studying. These sheets were one of the reasons I knew that the students needed help using vocabulary. They could not correctly use terms on the worksheets, so looking at them as an end result was really helpful in seeing if my extra measures to build vocabulary worked.

Analysis of Data

After all data was collected, it was sorted and analyzed (see Appendix D). Analysis was conducted using a coding system. Coding is the process of taking data and trying to find patterns and meaning in the data (Mills, 2007). I used the coding guidelines as outlined by Mills (2007). First, all data was read through and labels were added to blocks of text. In the interviews and observations, the themes that emerged and that were coded for evidence of an increasing eagerness to learn, participation and use of vocabulary. Student work samples were coded for vocabulary usage. Then, using note cards, these chunks of data were transferred onto 3 x 5 cards to make them more manageable for sorting. Then, cards were grouped together with contained similar labels.

Trustworthiness

A qualitative study is considered trustworthy if it can establish credibility, transferability, dependability and conformability (Guba, 1981 as cited in Mills, 2007). I have used components of each of the four qualities of research that makes it trustworthy.

There are three components of my research that add to its credibility. Peer debriefing was used to reflect and gain new insights on my research. Many of my peers helped me along the way while conducting this study. I have spoken with my co-operating teacher, a Rowan University professor, other action researchers, and lastly my boyfriend who had listening ear to my frustrations and triumphs. I also have collected three different types of data: observations, interviews, and artifacts. By collecting data from three different sources, the data can be triangulated.

My action research project is also valid because it is transferable. I provide a lot of context for the reader to see how my research can be carried out in other contexts. The data I collected during my action research project is dependable. All data collection was deliberate. The analysis and interpretation have been audited by critical friends and others.

The last component of trustworthiness research, according to Guba, is conformability. Two ways that conformability can be achieved is triangulation and reflexivity. Once again, triangulation is important because it uses a variety of different data sources. I also kept a journal to write reflections and frustrations about the research.

Potential for bias

There is a potential for bias in this project. Data could be skewed because of my closeness and connection to the research. It is easy to overlook things when it is your

research design and study. Another way in which I could have bias is in fact that I grew up in the town where I conducted this project. My entire family lives in this town and I know much about the history and dynamics. Although originally I thought that this would be to my advantage, it could also have let me overlook some aspects of the context. I already knew about the school, what types of students attended the school and the history of Big town before even beginning my student teaching or research. I did not have to look up very much information because the community was my community. However, this is just my perspective and the perspective of my family. If someone from outside of my community did this research, their perspective could be completely different.

Limitations of the Study

There are some limitations to my study. Time was a big limitation. I had only about three weeks to conduct the integrated action into my teaching, and then it was time for student teaching to be over. My focus group of students was all of Mexican decent. Although I learned a lot about their culture, I believe this is a limiting factor because I do not know their culture like I do my own. I believe cultural differences limited the interviews I did with the students, especially the initial interview. In the Mexican culture, a way of showing an adult respect is to not make eye contact. Students were shy and reluctant to talk openly with me and to make eye contact. Another shortcoming on the study was that this was my first experience with SIOP. Although I went to a workshop, read extensively about the subject and talked with others about this method of teaching, I am still a novice. I would like to believe that I did everything exactly as it should have

been, but I think it is important to point out that this was my first experience with this approach.

Findings and Interpretation

Emerging Themes from Outcome of Integrated Action

In the analysis of my data there were three major themes that resulted from the implementation of the integrated action. The confidence of the students in my focus group increased, students were excited and eager to learn science each day, and students were able to correctly use vocabulary words in written and oral language.

Confidence. "Sometimes I am not sure I want to answer questions because I don't think I am right" and "I can't think that fast when we ask questions on the carpet." (April 1, 2008) These two statements said by Marisol[1] and Jesus during the initial interviews that I conducted before I implemented my action plan when I asked why they sometimes do not answer questions. In their own words, the students expressed exactly what I noticed; they were not confident in the language and did not feel comfortable enough in themselves and the subject matter to actively participate. I could also sense a lot of insecurity in the student's body language and the change from beginning

After the first "vocabulary only day," when students were specifically taught vocabulary, during the rest of the unit of study I saw increased participation during class discussions. During one of my field note observations (April 14, 2008), five of the six students raised their hands to answer questions asked. I noticed that students almost always raised their hand with authority when a question about the subject matter was asked. The students always had a look on their faces conveyed that they thought that this was easy. I wrote in one of my last days of the study:

[1] Pseudonyms are used for all student names.

> I do not think there has been one question that I have asked where Martin didn't raise his hand. He is not just raising his hand to go along the others; whenever I ask him a question, he knows the answer. Today I thought I would ask a challenging question about the layers of the terrariums we just built. He was the only the only student to raise his hand and he got the question completely right. (Journal, April 30th, 2008)

When asking questions, the pace was slow and the questions involved vocabulary that was just taught. I believe that the change in participation was due to the time taken to ensure that students felt comfortable and confident enough to volunteer their answers.

The students also participated more in group work after the vocabulary only days. I noticed that they took a more active role in group activities then before the study was started. In one assignment, students had to construct a poster of the layers terrarium that they had just built. I wrote in my journal (April 28th, 2008) that I was surprised to see Jesus knew exactly what to do and it seemed like he was delegating responsibilities to others in his group. He was just as certain about what to do as the others in his group.

Jose, who had limited participation before the integrated action took place, said during his final interview that "science seems really easy now" (May 5th, 2008). Was science easier or did it just seem easier because the groundwork and playing field had been leveled for the English Language Learners? I believe the latter. Since they already had an understanding of the vocabulary for the unit, the students were more secure in answering questions and science appeared to be easier. Confidence translates to more participation in science class.

Eagerness. Although first graders usually are ready to learn anything, I noticed that my focus group students were overly excited and eager to learn science once we had started the integrated action. Once we got started, they wanted to learn more and more. Marisol would ask me every single morning: what are we doing today in science? Every new thing I introduced seemed like Christmas morning to the students. During our unit on plants, Silvia could not stop asking questions. I wrote, "In my three months here, I have never seen Silvia so interested to learn something" (Field notes, April 16th, 2008). She later told me in her exit interview: "I can't wait to finish reading so that we can start science because I know we are going to do something I like" (May 5th, 2008).

I also noticed other actions by the students in my focus group that showed a change in their interest and enthusiasm for the subject. During many science lessons, the students would get instruction by sitting in two rows on the carpet, while I was seated in the front of them. Before the study, they would sit in the back rows off to the side. Now, they moved closer to the center and front, especially Marisol. She would also run to the carpet so that she could be front and center.

Another way students showed me that enthusiasm for the science was comments they would make at other times during the day. I was sure to address these in my journal entries:

> During our plant unit, we had a fire drill. Although our school yard had always been filled with dandelions, it seemed like they had just noticed them. Jesus was telling people not to step on these because they would hurt the stems of the plants. (Journal, April 18th, 2008)

Antonia was one student in my focus group that did not really show much change. However, I think she did internally have a more willing mind to science. After we talked about terrariums and woodland plants, she asked me, "You mean we live in a big terrarium?" (Field Notes, April 29, 2008) I observed in my field notes (April 29, 2008) that I could almost see her brain processing the information I was teaching. Even though she did not increase participation, she was learning just as much. In my journal (April 17, 2008), I observed that Antonia was quiet during the memory game, but was able to get all the answers correct. She just was not as willing to share answers and speak in front of the group as the other five students in the focus group.

I found that the students in my focus group were ready to learn as much science as they could. They were always sitting attentively and I never felt like I had to do anything to grasp their attention. Laying the foundation helped the students make a deeper connection to the subject and thus made them excited to learn.

Vocabulary Usage. Since I concentrated on vocabulary to build background knowledge in my students, it was really pleasing to see that students were able to use vocabulary we studied correctly in oral and written language.

During the vocabulary "games" that we played, especially on days two and three, students were able to correctly and identify the vocabulary. The vocabulary games provided a good foundation for using the vocabulary orally, and they were able to use oral vocabulary later on in the unit. When the students were looking at the growth of their seeds, I was so proud when Silvia said, "the roots are starting to grow and next the stem will" (Journal, April 21, 2008). This demonstrated that she knew the correct vocabulary to use in context.

Storybooks also exposed the students to the vocabulary words in another way. They were able to hear the words and make connections to the illustrations of the vocabulary. In field notes (April 16th, 2008) I observed that Jose seemed mesmerized by the pictures in the book *From Seed to Plant*. He did not take his eyes off the pictures once. Jesus is a very visual learner and a very good artist himself, so it the pictures seemed especially important and appropriate in aiding his learning. It was important to note that the book had all six vocabulary words we were concentrating on learning.

When I asked the students in the exit interviews (May 5th, 2008) if they thought that the games we played helped them, four of the students said that they really did. Jose said, "It helped me to know what the words really meant" and Jesus said "It was fun to learn those words" (May 5, 2008) The key to the vocabulary games was that they were relaxed and stimulated science conversation within the students. I noted in my field notes (April 16th, 2008) that, "Marisol and Martin are having a conversation about the difference between roots and leaves during the memory game." The conversation was quite insightful for two first grade English Language Learners.

The vocabulary in the written language of the English Language Learners increased a tremendous amount. The students used the resources that I provided whenever they were doing an assignment in science. In a journal (April 23rd, 2008) I wrote,

> All the students had the word ring out and were flipping thorough to find the words they needed. I was impressed to see that without reminder, they would get out their science word ring and reference the science word wall.

In a terrarium observation assignment (April 30th, 2008), the six students in my focus group used at least three of the six vocabulary words in the sentences that they wrote. Jesus used the most vocabulary as he included all six vocabulary words in his writing. It is important to point out that all vocabulary words were also used in the correct context. Similarly, in an observation of a plant, with the exception of Antonia (who used three correctly); all students correctly wrote using all five vocabulary words (April 22, 2008).

Before the integrated action, when students were expected to write observations similar to the terrarium and the plant observation, they would sit at their desks and stare blankly, not knowing what to write. Now, with the tools provided and extra vocabulary study, the students got right to work. In my journal dated April 24, 2008 I wrote: "I almost feel like something is wrong, they do not need me to help them as much or provide an example on the board. They get know exactly what they want to write." Using the vocabulary in their classroom language and writing was a very big progression from before the integrated action.

New Understandings

I found that increasing students' vocabulary in our unit on plants was greatly impacted students' comprehension of the content. Vocabulary is a key component in science and should be given proper instruction time. Focusing on vocabulary took time and often made science class feel like reading class. However, students could then use their higher order thinking skills once they had the acquired vocabulary studied. This resonates with what Tran (2006) found that in classrooms where students were working on acquiring a second language, interactive instruction in vocabulary was found more effective than less interactive approaches.

Another new understanding that I can take away from this action research project is that resources that are easy to make can go a long way. The students were able to utilize the science-only word wall and their word ring. Although this did require some extra preparation, the difference in the vocabulary acquisition was worth the extra work. This agrees with what the research by Tran and DeCristofano et al.

The storybooks that were read to the students were not hard to find or to read, but allowed the students to make a connection with the subject by looking at the pictures and hearing the vocabulary within a storyline. Hickman, Pollard-Durodola & Vaughn (2004) also found that reading storybooks helps students make connections with vocabulary. I was not sure if the students would utilize these tools and to my surprise, they did. I was impressed with their ability to make the most of these resources. Just like Clark et al (2007) established, ELLs just need to be provided with the proper tools to achieve.

Even at a young age, students can be enthusiastic about science if they are provided the learning experience that fits their needs. I believe that the relaxed environment that provided time for students to acquire vocabulary increased their confidence and thus their participation in class. The increase in participation really helped the students feel like a bigger part of the classroom. Since instruction was catered to the needs of the students, they were more likely to participate and share opinions.

New Question and Directions

Sheltered Instruction is a useful and powerful way of teaching ELLs. As a beginner in this practice, I looked at a very small portion of the approach. I saw only

positive and encouraging results from utilizing the approach. Should this protocol be required in training for teachers? I believe that any teacher teaching ELLs should have this training. ELL students should have instruction that is catered to them. Through several workshops or classes teachers can learn SI, incorporate it into instruction, and thus meet the needs of all learners.

It took more time to teach the units I studied during my action research project. With pacing charts and the push to teach as much as possible before standardized test, it would be hard to concentrate on building background to the extent I did for every unit of study. Is it better to teach more with little comprehension or less with a lot of comprehension? Teachers struggle with this question every day. Unfortunately, most teachers teach more content, disregarding the comprehension. However, with the results from my study, I found that students are more eager, confident and successful when they have background knowledge to apply. Building background knowledge takes time. Once again, is it fair to force students to be on a certain pace if they have no comprehension?

How did the taking the time to concentrate on vocabulary effect the students that already knew the vocabulary? I am also interested in the effects of SIOP on English speakers. Although I did not focus on this, I found in my field notes that English speakers were just as content to learn in this way as the ELLs. I approximate that all of the students learned more vocabulary and it appeared that they were using more vocabulary in their writings. I believe that SIOP strategies are just good pedagogy and can benefit all learners, but I am interested in proving my belief.

I also am very curious about incorporating the other components of SIOP into my teaching. Seeing the students in my focus group feel successful was powerful and fulfilling to me as a teacher. I can only imagine how using the other elements of SIOP will increase their comprehension. I also am interested about the dependency of students on using the simple tools that were given to help with vocabulary acquisition: the word wall and word ring. Although they were wonderful in helping the students, do the ELLs become dependent on using them for all of their work? I would also be interested in investigating this.

Final Thoughts

My action research project supports other research done with ELLs and SI. Instruction was student centered and addressed the needed support students needed with learning vocabulary. To be effective, vocabulary and the subject matter being studied should be very closely related (Echevarria, Vogt, & Short, 2004).

Taking the time to build background knowledge through learning new vocabulary is and always will be so very important. DeCristofano, de Romero & Slater (2006) found that taking time to make sure their students understood vocabulary in science provided great results and my research also supports their findings. Vocabulary is important for all learners to learn, but ELLs particularly need vocabulary.

It is a teacher's job to make science comprehensible for all students. Using SI, the needs of ELLs are specifically addressed. Science and language are interdependent and to make science comprehensible for all students, strategies to teach ELLs must be employed. As a teacher conducting this action research study, I found that I truly believe that ELLs can and should be taught in ways that best suit them. Although I have always

had this conviction, it now is stronger than ever before. ELLs have the desire and ability to learn and we should do everything we can to help them learn content while also teaching them language. I have seen how small, but significant changes in teaching approach can create a better learning environment. The ELLs learn valuable content and work towards acquiring a second language. At the same time, English speakers have concepts reinforced. The changes made in my teaching approach were simple. However, this change made a difference.

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APPENDIX A

Consent Letter

February 12, 2008
Dear Partners in Learning,
As part of my student teaching process, I will be researching the effectiveness of instruction strategies. I am asking for your permission for your child to participate in this research.

There will be no extra work for your child during this process. I will be examining my teaching methods through the work they are already doing in class. I will be using samples of their work, video taping lessons, talking with them about instruction and taking photographs.

Your decision whether or not to allow your child to participate in this study will have no effect on your child's standing in his/her class. If you have any questions, you may contact me at 856-455-8030, Ext. 3000. Thank you so much in advance for your help.

Sincerely,
Laura B. Freitag

Please discuss with your child and complete the following to have your child participate in this research

_____ I grant permission for my child, _____ to participate in this research.

(Parent/Guardian signature/ Date)

I, _____ will help Miss Freitag with her research project.

(Student Signature/Date)

APPENDIX B

Interview Guiding Questions

Initial Interview

1. What do you like about science?
2. Why don't you participate in science class?
3. What kinds of activities do you like to do in science?
4. Is science hard?

Exit Interview

1. Did you like the games we played in science?
2. Do you like to participate?
3. Do you think science is hard?
4. What is your favorite subject?

APPENDIX C

Science Survey

Science Survey

Name:_____

1. Do you like it when we read books about what we are learning about in science?

   Yes No It's OK

2. What was your favorite part of the science kit?

   Aquarium Terrarium Growing Seeds

3. Do the posters and the words around the room help you when we do observations?

   Yes No Maybe

4. Did you like it when you got to do "hands on things"

   Yes No Maybe

5. Is science hard?

   Yes No Maybe

6. Is science fun?

Yes No Maybe

APPENDIX D

Data Table

Theme	Data
Confidence (C)	II- 4/1/08 "Sometimes I am not sure I want to answer questions because I don't think I am right"- Marisol II-4/1/08 "I can't think that fast when we ask questions on the carpet." - Jose FN- 4/14/08- 5 of 6 students raise hand to answer question on carpet FN- 4/16/08- Students working well in group together, equally sharing role with partner FN- 4/16/08- all 6 FG students raise hand to answer question. FN- 4/17/08- Jesus and Jose finish vocab. Game first, say it was easy and they know the words FN- 4/28/08- Antonia raises hand during carpet, vocab time- one of the first times she ever raised her hand FN- 4/28/08- Marisol, Martin, Jesus and Jose have raise their hands with assurance when having class discussion FN- 4/29/08- Jose takes leadership role during vocab guess who. FN-4/29/08- Antonia smiling all the time during game/lesson FN- 4/30/08- Jesus tells me. This is easy during game. I know this. J- 4/21/08- The students were participating more then ever before. Very happy J- 4/24/08- "Silvia and Antonia were more seemed self-assured" J- 5/5/08- Martin does only student to raise had, knows the answer to very difficult ? EE- 5/5/08- all students say science is easy now SS- 5/7/08- All students with the exception of Antonia say they are good at science
Eagerness (E)	FN- 4/16/08- Silvia so ready and eager to learn FN- 4/17/08- Student fight to get good seat on carpet; FN- 4/18/08- Students sitting attentively ready to learn; all appear happy FN- 4/29/08- Silvia asks insightful question with so much enthusiasm J- 4/17/08- Students rushed in and asked what we were doing in science J- 4/18/08- Students talking about not stepping on dandelions during fire drill J- 4/26/08- Everyday students are so ready to start science, never and discipline problems EE- 5/5/08- Silvia cant wait until reading is over so that science can be started SS- 5/7/08- All students say science is their favorite subject; they love doing the activities
Vocabulary Usage (VU)	FN- 4/16/08- Marisol and Martin having a convo about subject using vobab FN- 4/16/08- Jose correctly uses vocabulary word J- 4/18/08- students using vocab words correctly during games J- 4/21/08- Students using word wall and ring a lot to help with work J- 4/23/08 Students really making good use of resources J- 4/24/08- Students do not need any help with word usage; something is wrong! SW- 4/22/08 Students use all five vocab words correctly, not Antonia she used 3 SW- 4/30/08- Students almost all of the vocab words correctly in observation SW- 4/24/08- Students using vocabulary correct. They used words were in the correct context EE- 5/5/08- Students say vocab games helped them to understand the vocab so they can use them in work

Type of Data Key: FN- Field Notes, J- Journal, II- Initial Interview, EI- Exit Interview, SW- Student Work, SS- Student Survey