THE EFFECTS OF K-W-L
ON ELL MIDDLE SCHOOL STUDENTS’
LISTENING COMPREHENSION OF SCIENCE CONTENT

THESIS
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ABSTRACT

This study addressed the effect of using a K-W-L strategy on the number of comprehension questions answered correctly on a test administered immediately after a science passage was read aloud to ELL, middle school students. Test accuracy during baseline conditions and during K-W-L conditions was compared. The participants in this study were middle school students in an ELL classroom at a suburban school located in Westerville, OH. The students’ range in age was 11 to 15. All students lived in the United States for less than three years and came from a country in which a language other than English was spoken.

A reversal design demonstrated increased reading comprehension for all six students. Reading comprehension was measured by immediate recall on same day quiz accuracy. Each student was taught the K-W-L procedure before the initial intervention phase. Findings indicated that same day quiz accuracy improved during the initial K-W-L intervention and during the return to intervention phase.
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CHAPTER 1

LITERATURE REVIEW

Science

The National Science Teachers Association (NSTA) states that all students including ELL should have opportunities to succeed in science; a significant percent of students are ELL students- approximately 11% of public school students are English language learners (NCES, 2006). In the 2009 National Assessment of Educational Progress (NAEP) for science, 2% of English language learners performed at or above the Proficient level compared to 32% of their peers who were not ELL. 34% of eighth grade students who were not ELL scored below the Basic level, whereas 86% of eighth grade students who were ELL scored below this level. This means that 86% of English language learners did not yet have the prerequisite skills and knowledge needed for solid academic performance in grade level science work. Considering this, school districts are confronted with addressing the challenge of providing the most effective science instruction to these students.

NSTA states four principles to ensure that all students including English language learners have chances to succeed in science:

- Science lessons, activities and curriculum for students who are English language learners should be based upon science content processes outlined
in the National Science Education Standards (NRC 1996) and state science standards, and anchored to science investigation to promote inquiry (NRC, 2000).

- The use of guided inquiry (beginning with a more structured approach and then gradually developing to a more open-ended approach to learning) that builds on students prior knowledge and science content that provides English language learners with opportunities to learn the practice of science (Amaral, Garrison, & Klentschy, 2002; Fradd & Lee, 1999; Vanosdall et al., 2007; Warren & Rosebery, 2008) through participation in effective science instruction that incorporates literacy in English (Bialystok, 2008; Gee, 2008; Snow, 2008).

- Science instruction should recognize and respect the linguistic and cultural experiences that English language learners bring from their home and community environments, articulate their experiences with science knowledge, and offer sufficient educational resources and funding to support science learning. When this happens, students learn to value their linguistic and cultural identities and develop their identities as science learners (Garcia & Lee, 2008; Warren & Rosebery, 2008).

An ELL teacher can strive to maintain these principles by using effective instructional strategies, incorporating appropriate science content, guided questioning and encouraging students to share their knowledge. Practicing English is particularly
important to students who are familiarizing themselves with new vocabulary and gaining
confidence using this language at school. Literacy in English can be achieved in writing,
reading, listening, and speaking. These principles can be represented through the science
curriculum by allowing ways for students to share their knowledge, even if varied and
providing opportunities to increase proficiency with speaking, listening, reading and
writing in English.

*Cooperative Learning*

Peer interaction is proposed to have a positive effect on language development in
a second language. The interactionist paradigm provides a theoretical basis for L2
classrooms- those in which the native tongue of students is not the one primarily used
during instruction. Interactionist approaches to learning strive to increase peer interaction
to further second language acquisition. Often these approaches have incorporated task-
based practices involving peers in a second language. “Language is best learned and
taught through interaction” (Pica, Kanagy & Falodun, 1993, p. 10). In addition, Vaughn
et al. (2011) proposed that using cooperative learning groups is of significant importance
to enhancing students’ text comprehension when implementing strategies with before,
during, and after reading.

Vaughn et al. administered an experimental study for 18 weeks in which 34
classes used a collaborative strategic reading (CSR) package and 27 classes continued
instruction as usual. The CSR package had four components. The first component was
text previewing which included the teacher introducing the topic and providing direct
instruction in vocabulary, and the students brainstorming on the topic, reviewing
headings and graphics and predicting what they will learn. The second and third component occurred during guided reading of the first section of the text; students read and identified breakdowns in understanding that they could then resolve using a “fix up” strategy. These strategies helped students identify the meaning of unfamiliar words. Then students summarized the main point. The third component was a final review strategy involving question generating and the fourth component was writing in logs to summarize all main points from the passage and to justify why they were the most important ideas to recall. Findings demonstrated significant differences favoring classes implementing the CSR intervention based on the results of the Gates-MacGinitie Reading Comprehension Test.

*Individual Needs*

An ELL teacher must consider the individual needs of each student to before designing curriculum. Every student in the class will have varying proficiency in English as well as their first language, differing cognitive abilities and cultural backgrounds. Continuous assessment and understanding of cultural backgrounds is critical for effective teaching (Peregoy & Boyle, 2001). Two areas that can be assessed to inform instructional decision making are vocabulary knowledge and background knowledge.

Insufficient background knowledge and limited vocabulary are two factors that contribute to an ELL student’s inadequate comprehension of science content. The National Reading Panel (2000) identified vocabulary as critically important in oral reading instruction, and also recognized that oral vocabulary helps students to make sense of newly encountered text vocabulary. Mecartty (2000) explored the connection between
second language knowledge and listening performance. This particular study involved participants learning Spanish and found grammatical knowledge did not contribute to comprehension scores, but Spanish vocabulary knowledge accounted for 15% of success on listening measures. It is important for teachers to activate and understand the nature of students’ background information and prior knowledge before studying a new topic. The Handbook of Research on Improving Student Achievement (1995) says that pre-listening activities can assist students in using background knowledge to predict what they will learn as they read. Teachers should recognize the role of prior knowledge, including misconceptions in shaping students’ understanding (Wong-Fillmore & Snow, 2002).

**Reading Comprehension**

Andreassen and Braten (2010) found that word recognition, working memory, strategy use, and intrinsic motivation were all factors that increased reading comprehension. In this study, fifth grade teachers were trained in The Explicit Reading Comprehension Instruction (ERCI) which included instructional strategies of (a) activating and generating background knowledge; (b) scaffolding and modeling instruction; (c) using small, heterogeneous groups; and (d) relating reading to student interest. The trained teachers, implemented the ERCI strategies for a five month intervention period in their classrooms with a total of 55 girls and 48 boys of mixed ability participating. A control group was used in order to compare performance, as well.

Observations of implementation strategies showed that the teachers adequately implemented the principles of relevant background knowledge and reading comprehension strategies. However, observations indicated that group work lacked
cooperation between students. The study concluded that explicit teaching of the strategies; predicting, questioning, clarifying, and summarizing can increase the ability to use deep-level comprehension strategies positively.

Other studies have proven reading packages to increase comprehension of text. Reciprocal teaching (Palincsar & Brown, 1984) involves explicit instruction of predicting, clarifying, questioning as well as summarizing and organizes group discussion to scaffold the use of strategies. The teacher and students interact to construct text comprehension together, and then as the process of RT becomes familiar to a class, individual students take on the responsibility of teacher and modeling strategy use in the context of small groups. RT is used with expository texts, most often with social studies or science content. Rosenshine and Meister (1994) evaluated the effect of RT, and found that using this explicit instruction had different results on performance depending on the control group, type of comprehension measure and instructional approach. However, the results of using RT did often have significantly positive results on students’ performance measures.

Activation and construction of background knowledge is an important feature of RT and of the later comprehension strategy package, Concept Oriented Reading Instruction (CORI) (Guthrie et al., 2004). The CORI strategy combined motivational strategies (i.e. providing student choice of reading materials) and collaborative group work to increase comprehension.

Collaborative group work can improve student engagement. Collaborative instruction involving question generating has been shown to affect reading
comprehension positively. Teaching students how to generate questions on reading materials help to increase involvement and activate the process of determining a text’s meaning (Singer & Donlan, 1982; Davey & McBride, 1986). The National Reading Panel (2000) found that generating questions improved students’ abilities to answer text-based questions and also recall text content.

Previewing and pre-reading activities can affect comprehension levels positively (Idol-Maestas, 1985; Ridge A.D. & Skinner C.H., 2011). Ridge and Skinner (2011) examined the effects of the Title, Examine, Look, Look, Setting (TELLS) method developed by Idol-Maestas in 1985, using a multiple-baseline design across participants. Idol-Maestas (1985) evaluated the TELLS procedures using a multiple baseline design with both elementary and secondary students. He found the procedure enhanced reading comprehension, but when the TELLS procedure was removed the gains were not maintained. The TELLS method requires students to carefully look at the title for clues about the passage prior to reading, the passage is then skimmed or examined, next important words in the text are looked for, hard words in the passage are looked for, and finally the readers skim the passage for clues about the setting.

Ridge and Skinner (2011) aimed to further research the TELLS method to add to the findings on this method’s effectiveness and to evaluate generalization of the method. The study used 400 word expository passages and two fiction passages to assess generalization. Baseline consisted of a timed and monitored oral reading by each participant followed by a series of 10 multiple-choice questions. During the TELLS procedure, the experimenter prompted the participant through each step of and the
participant provided verbal responses. Then, the participant read the passage out loud as the experimenter monitored and timed the reading. The results showed that the TELLS procedure increased comprehension measures, but did not provide generalized improvements in reading comprehension skills to the fiction passages.

*Listening Comprehension*

Gibbons (2002) stated that listening skills for the ELL student is critical to language development. Listening to reading passages can help ELL students to understand the language of text which may sometimes involve longer, more complex sentences. Effective comprehension instruction facilitates understanding the language of books (Snow, Burns & Griffin, 1998). Both listening and reading skills for comprehension involve the active construction of meaning by the student who connects prior knowledge to the conveyed information. In research that has the goal of determining the factors that are the most essential to reading comprehension, prior knowledge is found to be an important factor (Alexander & Jetton, 2000; Rapp et al., 2007). Pre-reading activities can help students to both activate and build background knowledge. An introduction to key vocabulary is one pre-reading or listening activity that teachers often implement.

*Vocabulary*

ELL teachers include vocabulary instruction in their lessons across subjects in order to introduce academic vocabulary and facilitate comprehension. The 2006 standards of Teachers of English to Speakers of Other Languages (TESOL) promote academic language proficiency – the language of school – in core content areas. The
National Reading Panel (2000), after an in depth review of 50 articles determined that learning words before reading a text can be helpful and that vocabulary should be taught both indirectly and directly. Direct vocabulary instruction is effective and vocabulary knowledge is critical to comprehension for ELL students (Proctor, Carlo, August & Snow, 2005.)

Direct vocabulary instruction is both effective and efficient (Burns, Hodgson, Parker, & Snow, 2011). Burns et al. (2011) found that both text previewing and keyword pre-teaching were equally effective interventions for eighth grade struggling readers, but keyword pre-teaching was much more efficient than text previewing. Background knowledge can be enhanced by pre-teaching words that are necessary to know in order to comprehend a text; there is a close relationship between vocabulary and comprehension (National Reading Panel, 2000).

In 2000, the National Reading Panel published a report titled Teaching Children to Read. The report reviewed published research on reading, and established five essential components to reading- (a) phonemic awareness; (b) phonics; (c) fluency, (d) reading comprehension; and (e) vocabulary. According to the NRP (2000), vocabulary instruction is most effective when taught in conjunction with reading material containing those words. Students need multiple exposures to vocabulary words in different contexts. Drills in isolation do not suffice, but direct teaching of vocabulary words accompanying a particular text containing those words is a method that works to improve vocabulary acquisition.
Vocabulary instructional is important to all learners but is critical to for ELL students, who have not been exposed to words, even tier 1 or basic vocabulary words that their English as a first language peers do not typically need to be taught formally. Teaching vocabulary across all academic subjects assists comprehension and supports school success. Davis (1942) determined that two main factors contribute to reading comprehension performance; reasoning and vocabulary. Word vocabulary is directly related to comprehension.

**Prior Knowledge**

Comprehension is also influenced by the ability to connect prior knowledge with new knowledge in order to create meaning (Anderson, 1984). A teacher can tap into student’s current knowledge and this will not only support acquisition of new information but also activate interest and motivation (Peregoy & Boyle, 2001.) The K-W-L procedure is a three-step process designed to help connect background information to new information and stimulate individual student engagement with reading. The “K” stands for what do we already know, the “W” stands for what do we want to learn and the “L” stands for what did you learn.

**The K-W-L Procedure**

The K-W-L procedure was created by Donna Ogle (1986). It is based on beliefs in the importance of interactive learning and activating prior knowledge before reading influenced the formation of the K-W-L procedure.

In *Classroom instruction that works with English Language Learners*, Hill and Flynn (2006) devoted a section to the K-W-L procedure and guide ELL teachers on how
to effectively use it in the classroom. They recommended that teachers utilize the chart in
different ways depending on the ability level of their students. Teachers can use explicit
cues to access prior knowledge through the use of the chart with early and pre-
production, speech emergence and intermediate and advanced ELLs. Early and pre-
production ELL students can draw what they know already and answer yes/ no questions.
Speech emergence students can be guided with more complex questions when working
with the chart, and intermediate and advanced students can make inferences when using
this advanced organizer. Schoen and Schoen (2003) recommended using advanced
organizers as they help ELL students understand difficult concepts that they will be
introduced to when reading.

The K-W-L procedure is not only designed particularly for increasing
comprehension of expository texts, but also informal assessments have shown the K-W-L
procedure helps retention of material and comprehension. Ogle (1986) describes one
principal who was involved in the training of her teachers on this procedure who upon
interviewing various students at the end of the term was amazed at the high level of recall
of all articles. Teachers that used the K-W-L procedure intermittently throughout a school
term, found that with an informal assessment, students recalled information taught
through the K-W-L procedure significantly more than information taught without the
procedure.

The K-W-L procedure consists of three parts; Ogle intends for the first two parts
to be completed while engaging in group discussion prior to reading and the third part to
be completed independently after reading. After the teacher asks students what they know
about the subject of the reading passage, each completes their own worksheet and writes down “what we know” in the “K” column. Students brainstorm on the topic together. Ogle instructs teachers to start with asking students what they know about the particular topic of a reading. For example, if students are going to read an article on sea turtles, the teacher should ask the students “What do you know about sea turtles?” If students do not know anything about sea turtles, the teacher should move on by asking the next most related question – “What do you know about turtles?” In this case, the teacher would need to ask students, as they contribute their thoughts, if what they say is true for all turtles, or true for just some turtles. Brainstorming can serve to highlight information that students are uncertain about, can help develop questions that students want to find answers to, and increase student motivation to read.

The second part of the brainstorming that Ogle discusses is defining categories of information likely to be encountered when reading. Ogle suggests for teachers to first ask students to look at the list, from the first pre-reading activity, that they have just created and ask if some of the information fits together to form a general category of information. The teacher can model with one or two examples. Ogle states that this part of brainstorming can be challenging for students and often requires reading similar articles to build background knowledge that will help students to create relevant categories. After brainstorming, the next step is to address what students want to learn. As students think about what they already know, questions should arise. The teacher highlights disagreements and gaps in information during this phase, and students form their own reasoning for wanting to read the passage. This step is done as a group, but students
individually write down the questions that interest them most in the “L” column. After reading, the teacher directs students to write down what they learned from the reading on the worksheet, and then directs them to their questions and asks them if their questions were answered. Ogle wants readers to take control of their own learning and actively pursue self-directed inquiries.

After the introduction of the K-W-L procedure by Ogle in 1986, informal evaluations addressed the effects of it as an instructional tool. Evaluations compared K-W-L worksheets done by students at the beginning of the year to those done later in order to demonstrate students increased capacity to activate prior knowledge. Other evaluations analyzed videotapes to show student enthusiasm and participation in the K-W-L process. As well, teacher reports that students requested using K-W-L prior to reading indicated that students had a favorable opinion of the procedure.

Since 1986, articles have been published on teachers’ concerns with the K-W-L chart. Sampson (2002) stated concerns from pre-service teachers on the use of K-W-L charts; these teachers felt they had to write what students said in the “K” (what we know) column even when it was incorrect. This could misinform other students and validate incorrect information. Sampson created an extended K-W-L chart by adding two extra columns; a source column and a confirmed column. The source column was placed after the “K” (what we know) column and the confirm column was placed after the “L” (what we learned) column. In the first source column students would need to write two sources to verify the information in the “K” column and then the class would need to confirm that
the sources were valid. After completing the “L” column, students would verify the truth of what they read by finding two current sources for verification.

Shelley (1997) reported the findings from two elementary teachers (third and fourth grade) and two middle school teachers (seventh grade) when they implemented the K-W-L procedure in their classrooms for eight weeks. The third grade teacher stated that her students found it frustrating to write in the columns, so she then provided a horizontal format with lines for subsequent lessons. The fourth grade teacher stated that students found it frustrating to brainstorm for the “K” column when they had very little prior knowledge on a subject, so the teacher then incorporated more specific questioning to help elicit responses. One seventh grade teacher also stated that success with the K-W-L depended on the level of background knowledge that the students had. She requested that her students research the topic before completing the chart, in order to ensure that brainstorming for the “K” column would be successful. The other seventh grade teacher found that large group instruction worked well for her class, because she had difficulty establishing smoothly functioning, cooperative small groups. Both middle school teachers concurred that K-W-L could be helpful to structure an investigation and could provide structure for independent research projects. The teachers reported that a number of students’ motivation and grades improved after using K-W-L regularly in the classroom. However, all teachers in this study believed that the K-W-L procedure needed fine-tuning.

This study investigated the K-W-L procedure. To date, evaluations of this procedure have been informal and unsystematic. Ogle (1986) stated that K-W-L could
use further rigorous evaluation. Using a single-subject research design, I evaluated the K-W-L procedure and its effects on listening comprehension of ELL students.

**Purpose of the Study**

The purpose of this study was to examine the effect of using a K-W-L chart when reading aloud science content on the listening comprehension of middle school ELL students. There are no published studies directly testing the effectiveness of using a K-W-L chart to increase comprehension of science text. K-W-L is a recommended practice for building background knowledge and enhancing comprehension, since 1986. However, there are no data-based studies on K-W-L. If a lot of teachers are using the strategy and a lot of experts are recommending it, then we need data-based research to support its use. No Child Left Behind (2001) and Individuals with Disabilities Education Act (2004) require teachers to use evidence-based practices.

**Research Questions**

1. What is the effect of using a K-W-L strategy on the number of comprehension questions answered correctly on a 10-item test administered immediately after a science passage is read aloud to ELL, middle school students?

2. Can students accurately complete the KWL charts?

3. What are the students’ opinions of using a K-W-L chart procedure?
CHAPTER 2

METHOD

Participants

The participants in this study were six middle school students in an ELL classroom at Walnut Springs Middle School, a suburban school located in Westerville, Ohio. The students’ range in age was 11-15. All students lived in the United States for less than three years and came from countries in which a language other than English was spoken. All students were at the speech emergence stage; during this stage of language development students are able to produce simple sentences and have improved comprehension from earlier stages, but make punctuation and grammar errors frequently. All students received parental consent to participate in the study (Appendix A).

Setting

The study took place in the school library of Walnut Springs. The library provided an environment for research that was free from distractions and noise. The participants and researcher went to the same table in the library for each session to maintain the consistency of the setting. Participants sat at one table together. The table provided enough room for the participants to be able to spread out when taking assessments at the end of each session.
**Experimenter**

The experimenter was a graduate student at The Ohio State University pursuing a master’s degree in special education. The experimenter received a Masters of Art in Teaching in Art Education from Tufts University in conjunction with The School of the Museum of Fine Arts, Boston. She has taught art, art history and social studies in a classroom setting for three years and also has worked in an early intervention classroom for three years.

**Materials**

Materials for this study consisted of blank K-W-L charts, multiple choice quizzes and reading passages from a science text book for English language learners, *The ESL Science Book* by John Chabot and Kirk Shriefer, and accompanying pictures and diagrams. The passages that the experimenter read to the participants were slightly above their reading level at the intermediate level for English language learners.

**Definition and Measurement of Dependent Variable**

The dependent variable in this study was multiple-choice quiz accuracy- the number of questions correctly answered out of 10. The quizzes were administered directly after students listened to a passage.

**Quizzes**

All quizzes were based on information presented in the 4 to 5 paragraph reading passage read aloud. The order of questions correlated to the reading passage’s sequence of delivering information. Quizzes (Appendix D) contained 8 to 9 basic recall questions and 1 to 2 inferential questions. The quizzes were on global warming, the internet,
acupuncture, dentistry, dinosaurs, earthquakes, astrology, identical twins, xerography, carnivorous plants, lunar landing, automation, satellites, endangered species, the Hubble telescope, killer bees and sports medicine.

Definition of Independent Variable

The K-W-L procedure is a procedure in which students use a graphic organizer to list in columns what they know and what they want to know about a topic prior to reading or listening and to list what they have learned after reading or listening.
PROCEDURES

Experimental Design

An ABAB reversal design was used to examine the effects of a K-W-L procedure on the listening comprehension of science content. The experimental conditions consisted of an initial baseline phase, a K-W-L intervention phase, a return to baseline and a final phase to verify treatment conditions. After three baseline sessions, the experimenter administered the K-W-L procedure intervention. After conducting seven sessions during intervention, there was a return to baseline, and then a return to intervention. After baseline and prior to implementing the intervention, the experimenter provided training in K-W-L procedures.

Baseline

Specific procedures were followed to collect baseline data. The experimenter reviewed five to seven key vocabulary terms with participants. For each vocabulary word, the experimenter said the word then asked participants to say the word back in choral response. The experimenter defined the word simply and concisely, using picture aids when needed. (Certain words such as rainbow are easier to understand when provided with a visual.) After the experimenter defined the word, she would ask the participants if they had any questions.

Then the experimenter said to each participant:
Today you are going to be listening to a passage from a science text book. Please, pay careful attention to what is being read. When I finish reading, I will provide you with a multiple-choice quiz. Are there any questions? .... I will begin reading now.

The experimenter read the multiple choice quiz directions, questions, and possible responses out loud. Once participants completed the quizzes, the experimenter collected them. The experimenter then provided feedback on the quiz after each participant completed it by telling the correct answers for each question.

K-W-L Procedure Training

The experimenter discussed the importance of listening comprehension with participants. Key vocabulary terms from the reading passage were reviewed by the experimenter and participants, as described in baseline. The experimenter passed a blank K-W-L chart to each participant. The experimenter trained each participant on the purpose for each column in a K-W-L chart. The experimenter told the participants that they will listen to a short science passage on a specific topic. The experimenter asked participants what they knew about the topic. The experimenter and participants filled in the “K” column together. The experimenter read the title and first two lines of the reading passage to the participants. The experimenter asked participants what they now want to know about the topic. The experimenter and participants filled in the “W” column of the chart together. The experimenter read the passage to the participants and then together they filled in the “L” column.

K-W-L Procedure Intervention
The experimenter administered the K-W-L procedure. Key vocabulary terms from the reading passage were reviewed by the experimenter and participants, as described in baseline. The experimenter gave each participant a blank K-W-L chart. Together, the group addressed facts they knew about the current reading. The experimenter and participants wrote down all responses under the column marked “K”. The experimenter read the title of the passage and the first two lines and then asked “What do you now want to learn about the topic. The experimenter and participants wrote down all responses under the “W” column. Then the experimenter read the following script:

Now you will listen to a science passage that I will read to you. Turn over your K-W-L charts so that they are face down. After I finish reading the passage, you can turn your chart over again to fill out the “L” column by yourself. Do your best to remember and list everything you can from the passage you just listened to. Are there any questions?......

After each participant completed the “L” section of their chart, the experimenter provided each participant with a 10 question multiple-choice quiz. The experimenter read the directions, questions and possible answers out loud. Each subject independently completed the quiz. The experimenter collected the quiz from each participant. The experimenter thanked each participant. The experimenter provided feedback on the quiz after each participant completed it; she told the participants the correct answers.

Interobserver Agreement

Interobserver agreement (IOA) data were assessed on 30% of the sessions and collected across all phases for each participant on quiz accuracy. IOA was calculated by
dividing the number of agreements by the number of agreements plus disagreements and multiplied by 100.

Procedural Reliability

All sessions were recorded using a digital audio recorder, and procedural reliability was assessed on 30% of all sessions. A second observer listened to the recordings for accuracy of the experimenter’s implementation of a series of steps for each condition listed on procedural checklists (Appendix B and C). The percentage of procedural reliability was determined by dividing the number of steps completed correctly by the total number of steps completed and then multiplied by 100.

Social Validity

Social validity was assessed through a questionnaire. The students were asked to respond to five questions about the intervention. The questionnaires were given upon completion of the study and were anonymous. Students were instructed not to include their names. Questions required more than yes/ no responses.
CHAPTER 3

RESULTS

This chapter details the results of the participants. The results include data for interobserver agreement (IOA), procedural reliability, and multiple-choice test question accuracy of each participant. Additionally, social validity measures are accounted for.

Interobserver Agreement

To determine IOA, the second observer, a doctoral student in applied behavior analysis, independently scored quizzes that had been copied before the experimenter had placed any marks on them. The second observer used an answer key. Five groups of quizzes were scored by two observers. From the 90 quizzes, 30 were scored for all participants in the study. Disagreement would have been scored if one observer marked an answer as correct and the other observer did not mark it as correct. IOA was 100% for all participants.

Procedural Reliability

The second observer randomly selected recordings from a digital recorder to assess procedural reliability. At least one session from each phase was assessed. Procedural reliability checklists were used so that the second observer could mark whether each step from the procedural checklists occurred while listening. The observer
used different checklists for baseline and intervention conditions (see appendixes B and C). The experimenter performed all tasks in correct sequence for 4 out 5 sessions. For one of the two sessions from the initial intervention phase that was assessed the experimenter missed one of the steps—reading the first two lines of the passage out loud prior to filling in the “W” column. Procedural reliability for all phases after dividing the number of steps completed correctly by the total number of steps completed and then multiplied by 100 was 98%. Table 3.1 shows procedural reliability for baseline, intervention, return to baseline and return to intervention.
Table 3.1. Procedural Integrity for steps correctly administered across phases

<table>
<thead>
<tr>
<th></th>
<th>K-W-L</th>
<th>Return to Baseline</th>
<th>Return to K-W-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>93%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Korfa</th>
<th>Taban</th>
<th>Nadif</th>
<th>Amina</th>
<th>Sabah</th>
<th>Ayanna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1:</td>
<td>4.7</td>
<td>3</td>
<td>3</td>
<td>5.3</td>
<td>4.3</td>
<td>4.67</td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 2:</td>
<td>6.5</td>
<td>4.8</td>
<td>5</td>
<td>6.4</td>
<td>6</td>
<td>7.16</td>
</tr>
<tr>
<td>K-W-L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 3:</td>
<td>3.7</td>
<td>4.3</td>
<td>4</td>
<td>4.5</td>
<td>5</td>
<td>3.33</td>
</tr>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 4:</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>6.75</td>
<td>6.5</td>
<td>5.75</td>
</tr>
<tr>
<td>K-W-L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.2. Mean number of quiz questions answered correctly out of 10
Student 1: Korfa, age 11, 6th grade, 11 months in the United States

Data were collected for Korfa on 16 out 17 sessions. Korfa had an initial baseline that had a range of correct quiz responses between 3 and 6 with moderate variability. An increase in the number of correct answers on quizzes occurred on Korfa’s second and fourth K-W-L session. At the end of the first intervention phase, a slight downward trend occurred. In return to baseline, the data were stable and lower. In return to K-W-L intervention, there was initially a significant increase in correct quiz answers followed by a steep downward trend. This was followed by a steep upward trend. During initial baseline, the number of correct quiz answers ranged from 3 to 6 with a mean of 4.7. During initial K-W-L intervention phase, the number of correct answers ranged from 5 to 9 with a mean of 6.5. Return to baseline demonstrated a range between 3 and 4 and a mean of 3.7, and in the return to K-W-L intervention phase there was a range between 3 and 8 and a mean of 6 correct.

Student 2: Taban, age 15, 8th grade, 8 months in the United States

Data were collected for Taban on 16 out of 17 sessions. Taban had a variable initial baseline with an upward trend followed by a downward trend. During the second phase, K-W-L intervention, Taban showed an initial increase in correct quiz answers. This was followed by a downward trend for two data points and then an upward trend. The data were stable for the second half of the phase. Return to baseline showed an initial upward trend and then stable responding. Return to K-W-L intervention demonstrated increased correct quiz answers, followed by a downward trend and then an upward trend. During initial baseline, correct quiz answers ranged from 1 to 6 and the mean was 3. The
K-W-L intervention phase demonstrated a range of 2 to 7 on correct response and a mean of 4.8. Return to baseline had a range of 3 to 5 and a mean of 4.3, and return to intervention had a range of 2 to 7 and a mean of 5.

Student 3: Nadif, age 13, 8th grade, 3 months in the United States

Data were collected for Nadif for 14 out of 17 sessions. Initial baseline had a slight downward trend. Number of correct answers on quiz questions increased upon initiating the first K-W-L intervention phase. The data were variable; a slight downward trend followed by an upward trend and then another downward trend. The return to baseline phase was less variable with only a slight downward trend followed by an upward trend. The return to K-W-L phase also had slight variability, showing a minimal increase on number of correct quiz questions answered correctly. During initial baseline, correct quiz answers ranged from 2 to 4 with a mean of 3. The first K-W-L intervention phase had a range of 3 to 8 correct quiz answers and a mean of 5. Return to baseline demonstrated a range of 3 to 5 and a mean of 4, and the return to intervention phase had a range of 4 to 6 and a mean of 5.

Student 4: Amina, age 15, 8th grade, 2 years and 6 months in the United States

Data were collected for Amina on 14 out of 17 of the sessions. The initial baseline phase showed mid-level and stable responding ending with a very slight upward trend. The initial K-W-L intervention phase had variability followed by two stable data points. Amina’s second, fourth and fifth K-W-L session showed responding higher than that in initial baseline. During return to baseline, data demonstrated an upward trend and an initial decrease of correct quiz answers. Upon return to intervention, there was an
increase in number of correct quiz answers, followed by a downward trend and then high level, stable responding. Initial baseline had a range between of 5 and 6 and a mean of 5.3. The initial intervention phase demonstrated a range between 4 and 8 and a mean of 6.4 for correct answers. Return to baseline showed a range between 3 and 6 with a mean of 4.5, and return to intervention showed a range between 5 and 8 and a mean of 6.75.

**Student 5: Sabah: age 15, 8th grade, 11 months in the United States**

Data were collected for Sabah on 16 out of 17 sessions. Initial baseline has an upward trend followed by stable responding. The second phase, K-W-L intervention, was variable with a slight upward trend. Two sessions showed significantly higher levels of responding than baseline. Return to baseline demonstrated an upward trend followed by a downward trend with overall lower states of responding. Return to intervention started with an upward trend and then had stable and high states of responding for two data points. During the first baseline phase, the range for correct quiz answers was between 3 and 5 with a mean of 4.3. The K-W-L intervention phase had a range of 4 to 9 with a mean of 6. Return to baseline demonstrated a range of 4 to 7 and a mean of 5, and return to intervention showed a range of 4 to 8 and a mean of 6.5.

**Student 6: Ayanna, age 13, 7th grade, 2 years in the United States**

Data were collected for Ayanna for 16 out 17 sessions. During baseline, Stable and mid-level responding was demonstrated. A significant increase in level occurs upon introduction of the intervention phase. This phase is variable with higher states of responding; five out of six data were higher than those of baseline. Return to baseline showed lower levels of number of correct quiz answers with initial steady state
responding that ended in a downward trend. Upon return to intervention, higher number
of correct answers on quizzes was demonstrated. During this phase, a high, stable level of
responding was followed by a moderate, downward trend. During initial baseline, there
was a range of correct answers on quizzes between 4 and 5 with a mean of 4.67. K-W-L
intervention demonstrated a range between 5 and 9 with a mean of 7.16. Return to
baseline had a range of 2 to 4 with a mean of 3.33, and return to intervention had a range
of 4 to 7 with a mean of 5.75.

Social Validity

*What are the students’ opinions of using a K-W-L chart procedure?*

Each student was given a six-question social validity questionnaire after all
participants had completed the study. The students were encouraged to address each
question honestly and elaborate on their responses. Table 3.4 addresses the results of
student responses to each question. The answers were placed into one of three sections:
positive, neutral and negative statements, and a number of 1 was provided for each
recorded response. A 0 was given for no response and was counted as a neutral comment.
A total for each category of response was tallied by adding the points. Each question was
included and scored.
Table 3.3. Student responses for social validity questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Student Statements</th>
<th># of Negative Statements</th>
<th># of Positive Statements</th>
<th># of Neutral Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was the K-W-L chart easy to use?</td>
<td>“Yes” “Yes” “Yes” “K-W-L is really good”</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Was the K-W-L chart helpful? If so in what ways?</td>
<td>“Yes is helpful because it help you to know after when you know the questions”</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Yes The K-W-L helps. That is good.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Yes”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Yes”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“I can remember what I wrote so I can get right on the test.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Yes they were helpful. To understand or know what we want to explore what we know and write what we’ve learned.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think that other students would benefit from using the K-W-L strategy?</td>
<td>“Yes.” “No” “No” “No” “Yes I think they feel the same thing about it and K-W-L is a helpful chart.” “Of course. I think so.”</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Do you think that teachers could help other students by teaching this strategy to other students?</td>
<td>“Yes I think that because the K-W-L is really helpful.” “Yes” “Yes” “Yes” “Yes the teacher help us when she read and she will help them too.”</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think that you will use the K-W-L strategy in the future?</td>
<td>“Maybe!” “No” “Yes” “Yes” “Yes it will be really nice that if I have like a project if someone can give me the K-W-L chart.” “Yes. For me and for many people.”</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Would you recommend this strategy to other students?</td>
<td>“Yes I would like to.” “Yes” “Yes” “Of course” “Yes. That will be a great thing for me and them.”</td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>28</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.1. Quiz accuracy for Korfa during baseline, K-W-L intervention, return to baseline and return to intervention.
Correct Answers across Phases on Comprehension Quizzes

Figure 3.2. Quiz accuracy for Taban during baseline, K-W-L intervention, return to baseline and return to intervention.
Figure 3.3. Quiz accuracy for Nadif during baseline, K-W-L intervention, return to baseline and return to intervention.
Correct Answers across Phases on Comprehension Quizzes

Figure 3.4. Quiz accuracy for Amina during baseline, K-W-L intervention, return to baseline and return to intervention.
Correct Answers across Phases on Comprehension Quizzes

![Diagram showing correct answers across phases on comprehension quizzes.]

Figure 3.5. Quiz accuracy for Sabah during baseline, K-W-L intervention, return to baseline and return to intervention.
Figure 3.6. Quiz accuracy for Ayanna during baseline, K-W-L intervention, return to baseline and return to intervention.
CHAPTER 4

DISCUSSION

This chapter addresses each research question in relation to the results of the study. After each question is addressed, limitations of the study and recommendations for future research are discussed. Then, implications for practitioners are presented.

Research Question 1:

What Is the Effect of using a K-W-L Procedure on the Number of Comprehension Questions Answered Correctly on a 10-item Test Administered Immediately After a Science Passage Is Read Aloud to ELL, Middle School Students?

Four out of the six ELL middle school students who were a part of the study showed a clear increase in performance during the K-W-L procedure intervention. All showed an average increase in accurate quiz responses between initial baseline and K-W-L intervention phases and between return to baseline and return to intervention phases of more than 1. These four participants are discussed first. Then, the participants who showed only a slight increase in performance during intervention will be discussed. Although the results vary between students, the K-W-L procedure, which added approximately 10 minutes to the baseline procedure’s duration, increased performance to
a degree that changed quiz accuracy considerably regarding the time taken to implement the intervention.

Korfa demonstrated a significant increase in quiz questions answered correctly between both initial baseline and initial K-W-L intervention phases and between return to baseline and return to intervention phases. During baseline, Korfa answered a mean of 4.7 comprehension quiz questions correctly, and during the first intervention phase, she answered a mean of 6.5 quiz questions accurately. Between these two phases, the mean number of correct quiz responses increased by 1.8. During return to baseline, Korfa answered a mean of 3.7 quiz questions accurately. During return to intervention the number of correct quiz responses increased to 6. When the last intervention phase was administered, Korfa answered, on average, 2.3 more quiz questions correctly than in return to baseline.

Amina showed an increase between the first baseline and K-W-L intervention phase in regards to questions answered accurately on comprehension quizzes and then an even greater increase on quiz accuracy between return to baseline and return to intervention phases. The mean number of correct answers on quizzes, during initial baseline conditions, was 5.3 for Amina. Her correct number of responses increased to 6.4 when the K-W-L intervention procedure was implemented. Her mean number of correct responses increased by 1.1 when the K-W-L procedure was first implemented. Amina’s mean number of quiz questions answered correctly during return to baseline and return to intervention were 4.5 and 6.75 respectively. When the last intervention phase was
administered, the mean number of correct answers on comprehension quizzes increased from baseline by 2.25.

Sabah showed a significant increase in quiz questions answered correctly between both initial baseline and initial K-W-L intervention phases and between return to baseline and return to intervention phases. During baseline, she answered a mean of 4.3 comprehension quiz questions accurately, and during the first intervention phase, she answered a mean of 6 quiz questions correctly. Between these two phases, the mean number of correct, quiz responses increased by 1.7. During return to baseline, Sabah answered a mean of 5 quiz questions accurately, and during return to intervention the number of correct quiz responses increased to 6.5. When the last intervention phase was administered, Sabah answered, on average, 1.5 more quiz questions correctly than in return to baseline.

Ayanna’s mean score for correct, quiz answers for initial baseline was 4.67 and for initial K-W-L intervention phase was 7.16. The increase in mean number of correct, quiz answers of 2.49 between these two phases is significant. If looked at from the perspective of academic grades, during intervention phase she would receive a C- or 72% on her quiz and an F or 47% without intervention. The return to baseline phase showed a mean number of accurate responses of 3.33, and the return to intervention phase showed a mean number of accurate responses of 5.75. The increase from return to baseline for mean correct answers was 2.42.

Nadif and Taban showed less improvement on quiz performance than their peers. These two students have resided in the United States for a shorter amount of time relative
to the other participants. Nadif has been in this country for three months and Taban has been in the United States for eight months. Background knowledge, receptive speech in their second language and lower rates of participation due to lack of confidence in expressive speech could all be factors in the lowered increase in quiz questions answered correctly during K-W-L intervention phases.

Taban showed a slight increase in quiz questions answered correctly between both initial baseline and initial K-W-L intervention phases and between return to baseline and return to intervention phases. During baseline, he answered a mean of 3 comprehension quiz questions accurately, and during the first intervention phase, he answered a mean of 4.8 quiz questions correctly. Between these two phases, the mean number of correct quiz responses increased by 1.8. During return to baseline, Taban answered a mean of 4.3 quiz questions correctly, and during return to intervention the number of accurate quiz responses increased to 5. When the last intervention phase was administered, Taban answered, on average, 0.7 more quiz questions correctly than in return to baseline.

Nadif’s mean score for correct quiz answers for initial baseline was 3 and for initial K-W-L intervention phase was 5. This showed an increase in mean number of correct, quiz answers of 2 between these phases. The return to baseline phase showed a mean number of accurate responses of 4, and the return to intervention phase showed a mean number of accurate responses of 5. The increase from return to baseline for mean correct answers was 1.

Research Question 2:

Can Students Accurately Complete the K-W-L Chart?
All students learned how to appropriately use a K-W-L chart during training. The first two parts were completed while engaging in group discussion, and the third part was completed independently. The experimenter used a white board to help participants spell unfamiliar words during the pre-reading discussion component that involved filling in the first two columns together. The “K” columns and “W” columns are very similar when comparing charts across different sessions. However, the “L” columns, which were completed by each individual after listening to the reading passage, differed greatly both in accuracy of information and amount of information written. All of the participants had varying capacities in expressive, written language. Three examples of charts to clarify the types of differences are shown in Figure 4.1.

Research Question 3

What are the Students’ Opinions of Using a K-W-L Chart Procedure?

The questionnaires completed by the students indicated that the students felt positively about using a K-W-L chart procedure. All of the students said that they found the K-W-L chart helpful, and five out of six students expressed that teachers could help other students by teaching them how to use the strategy. Five out of six students also said that they thought the K-W-L strategy was easy to use, and they would recommend the use of it to other students.

Limitations

This study involved testing the use of a K-W-L procedure, when reading a science passage out loud to ELL middle school students. The varying ability of the students in the group was a limitation of the study, as students who were at the level of early speech
emergence struggled with filling in the L section on their own. More advanced students
with greater English proficiency could write more in the L section than those who were
newer to the country, and subsequently had less background knowledge on topics and
were not as confident with writing in English.
K-W-L Charts on the Topic of Identical Twins for Sabah, Korfa and Taban

### Sabah:

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you think you know?</td>
<td>What do you want to know?</td>
<td>What did you learn?</td>
</tr>
<tr>
<td>look the same</td>
<td>Why are they twins?</td>
<td>Some of the twins feel alike.</td>
</tr>
<tr>
<td>same age</td>
<td>How do they arrive?</td>
<td>One twins was sisters</td>
</tr>
<tr>
<td>same mother</td>
<td></td>
<td>They married the same day and they went to same school.</td>
</tr>
<tr>
<td>same dad</td>
<td></td>
<td>The twins look alike. And some of them think alike each other.</td>
</tr>
<tr>
<td>born on the same day</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Korfa:

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you think you know?</td>
<td>What do you want to know?</td>
<td>What did you learn?</td>
</tr>
<tr>
<td>look the same</td>
<td>Why exactly are they twins?</td>
<td>They look like and They are sister and Brother.</td>
</tr>
<tr>
<td>same mother</td>
<td>How do they arrive?</td>
<td></td>
</tr>
<tr>
<td>same dad</td>
<td>How does a mother carry both?</td>
<td></td>
</tr>
<tr>
<td>born on the same day</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Taban:

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you think you know?</td>
<td>What do you want to know?</td>
<td>What did you learn?</td>
</tr>
<tr>
<td>look the same</td>
<td>Why exactly are they twins?</td>
<td>They both have same mind.</td>
</tr>
<tr>
<td>same mother</td>
<td>How do they arrive?</td>
<td></td>
</tr>
<tr>
<td>same dad</td>
<td>How does a mom carry both?</td>
<td></td>
</tr>
<tr>
<td>born on same day</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.1 shows three example K-W-L charts from three different students on the subject of identical twins.
The experimenter could not control for background knowledge of participants or exposure to various subject matter outside of the classroom. Every session covered a different topic. During the first K-W-L phase, the participants had a mean percentage score of 83% on the quiz on Dinosaurs. During the second K-W-L phase, the participants had a mean percentage score of 45% on the quiz on Hubble. It is highly probable that the participants had encountered information on dinosaurs and had significant prior knowledge on the subject. However, it is unlikely that participants had learned about the Hubble telescope or regularly encountered information on it in books, the media or the internet.

Another limitation of the study was time. Due to time constraints, the experimenter did not assess for generalization and maintenance. Ogle (1986) mentions the amazement of teachers upon asking students what they remembered from the term, as an overwhelmingly large amount of information that students remembered was taught with a K-W-L procedure. If more time was available for the study, an end of study maintenance check could have confirmed these claims. As well, only the area of science was covered in the reading material, and the effects of using a K-W-L chart could not be assessed when applied to other passages containing content from other academic areas.

Future Research

Listening comprehension is of particular importance to students who are learning a new language and is related to reading comprehension. However, in future research on the effects of K-W-L procedures, studies could directly focus on the chart’s use in relation to reading comprehension; Ogle’s intent was for the K-W-L chart to assist in
increasing engagement and enhancing learning before and after reading. Researchers could work further with middle school, English language learners or could work with different student populations- students that are of a different age group, typical students in general education classrooms or students who struggle with reading.

As well, K-W-L is often fine-tuned or modified by teachers; Shelley (1997) asked two elementary and two middle school teachers to implement K-W-L procedures in their instruction. All teachers fine-tuned or modified the procedure to better meet their teaching objectives and implement effective instruction that met the needs of their students. A seventh grade teacher involved in the study found that success with the K-W-L depended on the level of background knowledge that the students had. She requested that her students research the topic before, in order to ensure that brainstorming for the “K” column would be successful. Research in the future could address the effects on comprehension when implementing the original K-W-L method versus an altered method.

In this study, the researcher chose to do a pre-listening vocabulary primer in baseline conditions and intervention conditions. In future research, studies could exclude the vocabulary component from the procedures for both conditions or for baseline conditions only. Studies could address whether the package of pre-teaching vocabulary and K-W-L procedures had a stronger impact on increasing comprehension than implementing only one of these isolated components.

Also, future research could include checks for generalization and maintenance. This study had time constraints, as it occurred at the end of the school year, so
generalization and maintenance were not checked for. One way to check for
generalization is by implementing the K-W-L procedure with a social studies passage.
One way to check for maintenance is by administering an end of study delayed test with
quiz questions from baseline and intervention sessions to determine which procedure
helped in retention of the material read aloud.

**Implications for practitioners**

The research presented provides evidence for the positive effects of using a K-W-L chart procedure to increase listening comprehension for ELL students. Since teachers
are using this procedure and experts are recommending it, we need data-based research to
support it. No Child Left Behind (2001) and Individuals with Disabilities Education Act
(2004) require teachers to use evidence-based practices. In the future, more studies will
need to be conducted in order to build a body of support for the K-W-L method.

Considering the results of this study, I would recommend the continued use of K-W-L
cart procedures in classroom instruction.

A close relationship exists between vocabulary and comprehension (National
Reading Panel, 2000). Including a pre-reading vocabulary component before using a K-
W-L chart and reading a text can strengthen comprehension of students. Understanding
vocabulary is fundamental to deciphering meaning.

The K-W-L procedure can be fine-tuned by teachers. Practitioners find it helpful
to modify the procedure for using the chart to enhance instruction. A teacher might
decide that asking students to independently research a topic before filling in the “K”
column as a class assists in the generation of information for that column, especially if
the topic to be read on is unfamiliar (Gibbons, 1997). When using K-W-L charts with ELL students at different levels of language development, the procedure for using K-W-L charts should be adjusted. Early and pre-production ELL students can draw what they know already and answer yes/no questions. Speech emergence students can be guided with more complex questions when working with the chart, and intermediate and advanced students can make inferences when using this advanced organizer (Hill & Flynn, 2006).

Practitioners need to consider the possibility of working in small groups when implementing K-W-L chart procedures, as engagement and participation of all students is more likely when done in a small group setting. Another way to increase motivation and engagement with a subject is by allowing students to choose the material that they will read (Guthrie et al., 2004). Teachers could provide a selection of topics for students to choose from before instruction.

Conclusion

This study was designed to study the effects of a K-W-L procedure on ELL students’ listening comprehension of science content. The results indicated that its use increased comprehension in this subject area for these students. Same day comprehension quiz accuracy improved when the procedure had been implemented. More data-based studies need to determine whether gains made by students instructed with a K-W-L procedure are actually socially significant.
REFERENCES


APPENDIX A

PARENTAL CONSENT
The Ohio State University Parental Permission
For Child's Participation in Research

Study Title: The comparative effects of KWL and self-questioning on middle school students' reading comprehension of science content

Researcher: Dr. Sheila Morgan

Sponsor: n/a

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate. Your child’s participation is voluntary. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose: The purpose of this study is to determine how effective two different reading strategies are for learning information from reading a science passage. The study will teach participants reading strategies that they can use in the future.

Procedures/Tasks: Your child will read science passages, either checking their learning as they read or using a chart to organize their ideas before and after reading. After reading the passage, each student will take a short multiple-choice quiz on what they read.

Duration: The study will take place during the school day for approximately 12-14 weeks. Your child will participate 3 days per week and each session will last no more than 30 minutes.

Risks and Benefits: The risks associated with this project are no greater than those experienced during normal classroom reading activities. It is possible that a student may become frustrated when completing the reading assignments. This risk will be minimized by using appropriately
leveled reading materials. Additionally, the researcher will provide guided support, feedback, and encouragement if a student begins to struggle. If a participant becomes frustrated and is not receptive to the guided support and encouragement, the experimental session will end and the student will be directed to another activity.

Confidentiality:

Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

Incentives:

No incentives will be provided.

Participant Rights:

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status. Deciding whether to take part in the research project or not will have no effect on your relationship or your child’s relationship to the teacher in the classroom.

If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Contacts and Questions:

For questions, concerns, or complaints about the study you may contact Alice Deck at 614-354-9860.
For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is harmed as a result of participating in this study or for questions about a study-related harm, you may contact Alice Deck (614-354-9860; deck.24@osu.edu) or Dr. Sheila Morgan (614-247-8714; morgan.651@osu.edu).
Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Printed name of person authorized to provide permission for subject

Signature of person authorized to provide permission for subject

Relationship to the subject

Date and time

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent

Signature of person obtaining consent

Date and time
APPENDIX B

PROCEDURAL INTEGRITY CHECKLIST

FOR BASELINE
Procedural Integrity Form for Baseline

Observer_________________________________ Date________________________________

<table>
<thead>
<tr>
<th>Action</th>
<th>Yes, it occurred</th>
<th>No, it did not occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>The experimenter reviews vocabulary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads script with directions to participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads the passage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter hands each participant a quiz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads the quiz questions and possible responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter observes participants take quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter collects quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter thanks participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reviews answers to quizzes with participants</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX C

PROCEDURAL INTEGRITY CHECKLIST

FOR INTERVENTION
Procedural Integrity Form for K-W-L Procedure

Observer________________________________ Date________________________________

<table>
<thead>
<tr>
<th>Action</th>
<th>Yes, it occurred</th>
<th>No, it did not occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>The experimenter reviews vocabulary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter hands each participant a blank K-W-L chart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter and participants collaboratively fill in the “K” column</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads the first two lines of reading passage to participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter and participants collaboratively fill in the “W” column</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads script with directions to participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads passage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reminds participants to fill in the “L” column</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter collects the K-W-L charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter passes out quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reads quiz questions and possible responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter observes participants take quiz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter collects quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter thanks participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The experimenter reviews answers to quiz questions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

QUIZ EXAMPLE
Quiz 13: Acupuncture

Please circle the correct answer.

1. **Chinese doctors discovered that they could**
   a) Use medicine to treat patients  
   b) Use needles to treat patients  
   c) Not use needles to treat patients  
   d) Use art to treat patients

2. **Acupuncture was discovered**
   a) Almost 200 years ago  
   b) Almost 2000 years ago  
   c) Almost 10 years ago  
   d) Almost 100 years ago

3. **Acupuncture involves**
   a) Needles being put everywhere on the body  
   b) Needles being put into the body at carefully chosen sites  
   c) Taking pills  
   d) Getting shots

4. **Acupuncture has earned the respect of**
   a) Doctors only in the east  
   b) Doctors only in the west  
   c) Doctors in the east and west  
   d) People only in China

5. **Ancient Chinese doctors knew**
   a) Very little about anatomy  
   b) A lot about anatomy  
   c) Could not draw the human body well  
   d) That acupuncture did not work
6. **Acupuncture needles are inserted to**
   a) Make energy flow smoothly again and reduce pressure
   b) To reduce pressure and to increase muscle size
   c) To make us strong and beautiful
   d) To decrease energy flow and help people relax

7. **According to traditional Chinese acupuncture**
   a) Good health depends on eating the right food
   b) Good health depends on getting enough exercise
   c) Good health depends on only a little energy circulating in the body
   d) Good health depends on a good balance of energy circulating through the body

8. **Originally acupuncture was used to**
   a) Only used to treat a few health problems with medicine
   b) Only used to treat various health problems by restoring flow of energy
   c) Only help children
   d) Help people using a variety of different methods

9. **In What year did surgeons discover that acupuncture could be used to prevent pain during operations?**
   a) 1986
   b) 1946
   c) 1966
   d) 1960

10. **Overall, acupuncture is**
    a) Useful to only a few people
    b) Not very useful
    c) Useful for different reasons
    d) Is not used much anymore