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Effectiveness of Semantic Mapping in Increasing Reading Comprehension for English Language Learners

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Effectiveness of Semantic Mapping in Increasing Reading Comprehension for English

Language Learners

Laura M. Maccagno

Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Arts in Education

California State University, Monterey Bay

May 2019

Effectiveness of Semantic Mapping in Increasing Reading Comprehension for English Language

Learners

Laura M. Maccagno

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Abstract

Students must be able to read and process academic texts, construct written documents using academic language, and understand spoken language, specifically in English (Lucas, Villegas, & Freedson-Gonzalez, 2008). In the state of California, nearly half of the students speak a language other than English at home (Edwards, Leichty, & Wilson, 2008). Several different interventions have been studied to address the issue of reading comprehension and English Language Learners. Semantic mapping has been successful because in activating student's prior knowledge and connecting to novel topics (Carrell, Pharis, & Liberto, 1989). This study explored the effects of semantic mapping on ELL students. The study used a quasi-experimental, nonequivalent group, pretest-posttest quantitative research design to compare reading comprehension achievement scores among ELL students. During the six-week intervention period, the control group received an unmodified set of lessons drawn from the Wonders ® curriculum, while the treatment group received the pre-reading intervention, semantic mapping. Reading comprehension was measured using the Scholastic Reading Inventory Test (SRI) and data analyzed using independent and paired t-tests. Although the results were not significantly different, the mean score for the treatment group increased more than the control group. These results are consistent with the current research on semantic mapping. Future recommendations include using a larger sample size and conducting interviews with students prior to taking the SRI to determine what strategies were used during testing.

Keywords: Semantic mapping, English Language Learners, ELL, Reading comprehension, Strategies

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TABLE OF CONTENTS

Effectiveness of Semantic Mapping in Increasing Reading Comprehension for English Language

Learners

Literature Review

Beginning at a very young age, academic language is considered synonymous with

scholarly success in the United States. In order to be considered successful in school, students

must be able to read and process academic texts, construct written documents using academic

language, and understand spoken language, specifically English (Lucas, Villegas, & Freedson-

Gonzalez, 2008). In the state of California, approximately half of all students speak a language

other than English at home, and about a quarter are classified by their school districts as an

English Language Learner (ELL; Edwards, Leichty, & Wilson, 2008). Furthermore, of the

students that are designated as ELLs, 85% are classified as native Spanish speakers (Gandara et

al, 2000). The substantial number of ELLs nationwide is leading to a greater demand for

strategies that mainstream teachers can implement to strengthen language acquisition and

literacy. However, the implementation of evidence-based strategies has been influenced by

numerous factors, including historical and legislative changes.

Historical Factors and California Legislation Affecting ELL Students

ELLs enrollment in public schools has grown more rapidly than any other segment of the

population in the last fifteen years (Van Roekel, 2008). For example, Samson and Collins (2012)

found that between the decades of 1997-98 and 2008-09, the general population enrolled in

public schools grew only seven percent; however, the number of ELLs increased by fifty percent,

over half of which were Hispanic students enrolled in California and Texas schools (Samson &

Collins, 2012). Furthermore, by 2025, it is projected that approximately one in every four public

school students will be an ELL (Van Roekel, 2008). Despite these changing demographic trends,

the pathway to providing access and supports to ELLs has been rather circuitous. These

challenges have been pertinent to California because of the high population of ELLs.

Furthermore, over the past four decades, the education of ELLs has been impacted and informed

by the changes in law and policies. These laws resulted in an inconsistent educational experience

for ELL students. While some of the past legislative action have been positive, others have

compromised the well-being of ELL students and the access they have to adequate instruction

(Johnson & Martinez, 2000).

Each piece of legislation that has contributed to the history of EL students has shaped

how their educational experience is today (Crawford, 2004; Gandara et al., 2000; Goertz, 2009;

Ovando & Combs, 2018). Beginning in 1974, Lau v. Nichols introduced the requirement that

schools take appropriate action to ensure all ELLs have equal access to the curriculum being

taught (Gandara et al., 2000). In 1978, the lawsuit of Castaneda v. Pickard case added to the

requirements that Lau v. Nichols introduced. Stricter regulations under Title VI and the Equal

Opportunity Act of 1974 required schools to evaluate the programs in which ELL students are

taught based on the following criteria: 1) educational theory, 2) ensuring there are sufficient

materials available to teach ELL students, and 3) the discontinuation of a program if it is not

successful (Ragan & Lesaux, 2006). A major issue with this policy was it was not consistently

enforced across states, resulting in a lack of uniformity in results (Crawford, 2004). Despite these

inconsistencies, the changes in policy allowed students to use their native language as an aid in

learning English.

Contrary to prior legislation, Proposition 227 transformed the way Limited English

Proficient (LEP) students were taught. It required instruction of English to be delivered in

English only using English Immersion Programs, which eliminated bilingual education (Ellern,

1999). Students were limited to one year of structured English immersion; however, many were not proficient enough to manage in a mainstream classroom once the year was complete (Stritikus, 2002). In addition to Proposition 227, the No Child Left Behind (NCLB) Act of 2002 also resulted in educational challenges for ELLs. NCLB required states using government funds to develop rigorous assessments to measure student proficiency of reading, language arts, math, and science. In addition, the states then needed to report the percentage of proficient students each year (Abedi, 2004). This federal act did not include accommodations for students that are learning English; these students were still expected to perform at the same level of students who were already proficient (Goertz, 2009). In 2015, congress enacted the Every Student Succeeds Act (ESSA), which nullified provisions required by the NCLB Act.

With the expiration of NCLB, the passage of California's Proposition 58 called for biliteracy and multilingual programs to be developed (Simon-Cereijido, 2018). This law, which voters in California passed in 2016, changed education in a positive manner for ELL students because it considered their needs. It lifted restrictions that were placed on Bilingual programs, required districts to respond to specific demands from parents and required districts to reach out to community members for regular feedback regarding their ELL programs (Ovando & Combs, 2018). Although ELLs today have more opportunity and legal propositions in place to help them academically, this history highlights the volatile, inadequate support and numerous obstacles they have had to navigate around in order to receive resources that help them on their academic journey. When looking at the current expectations that are being placed on ELLs, it is important to consider the numerous factors that are impacting their academic performance.

Factors Affecting ELLs' Academic Performance

With the population of ELLs on the rise, it is important to consider the emphasis that the U.S. places on assessments of all students and the impact that it has on ELLs (Menken, 2008). Most standardized tests are administered in English and include cultural biases, which can provide an unrealistic and often times invalid representation of what students actually know (del Rosario Basterra, Trumbull, & Solano-Flores, 2011). These test scores reflect the student's English language proficiency rather than the knowledge of the actual content (Bailey, 2005). With this in consideration, it does not come as a surprise that ELLs typically have lower performance than English Only (EO) students across all subject areas (Abedi, 2002).

Another difficulty that ELLs face lies in the intensive rigor of Common Core State Standards (CCSS). In comparison to native English speakers, students learning English as a second language have two jobs during learning: 1) accessing the academic content of the curriculum and 2) building their English skills (Wolf, Wang, Blood, & Huang, 2014). There has been an increase in language and literacy demands that are simultaneous with the implementation of the CCSS, which is making it more difficult for ELLs than ever before (Fenner, 2013). Examples of these demands are illustrated in the CCSS for English language arts. Students are expected to 1) closely read intricate informational texts, 2) write information and arguments both analytically and logically, 3) develop research skills, and 4) present effectively and conduct academic discussion to construct knowledge, evaluate information and express opinions (National Governors Association for Best Practices, Council of Chief State School Officers, 2010). In addition to these expected academic abilities, the CCSS has a different set of standards for disciplinary literacy (i.e., literacy in science, social studies, technical subjects) which extends the demands across all subject areas, resulting in challenges across the

board for ELLs (Wolf et al., 2014). Because of this drastic increase, ELLs require extensive support in order to reach similar achievement levels as their English proficient peers; placing a large emphasis on teacher preparedness in order to ensure that ELLs are equipped to master the same standards as EO students (Johnson & Wells, 2017). In addition to the wide range of elements that can have an impact on the academic performance of ELLs, there are many other components that can specifically influence their reading performance.

Factors Influencing Reading Performance of ELLs

Learning to read, speak and write a new language is not an easy task, one that requires the adoption of a whole new phonetic and grapheme system (Davis, 2018). There are multiple factors that influence how ELLs perform in the language in which they are acquiring, specifically reading comprehension. Children that come from homes that do not primarily speak English are at a greater risk of experiencing difficulty with reading comprehension; they also exhibit a gap in reading comprehension achievement when compared to students whose first language is English (Mancilla-Martinez & Lesaux, 2011). For example, students who enter kindergarten with substantial gaps in literacy and language skills can result in a continuous decline in both of these areas as they continue into later grades (Davis, 2018). Another contributing factor to the performance gap in reading comprehension is the role that oral skills and vocabulary play in mastery of reading comprehension.

Without adequate verbal and vocabulary skills, ELLs will likely struggle with reading comprehension. Reading is a linguistic skill that generally cannot be learned until proficiency in oral language (i.e., phonological, grammatical and vocabulary skills) is mastered (Muter, Hulme, Snowling, & Stevenson, 2004). Oral proficiency in English can take from three to five years to develop, and academic proficiency in English can take four to seven years (Hakuta, Butler &

Witt, 2000). Many ELLs have not had the same exposure to vocabulary and oral skills as their native English-speaking peers (De Jong & Harper, 2005). By first grade, a typical native English speaker has approximately 6,000 words in their vocabulary and have reached mastery in using the present, past, and future tenses (Menyuk, 1999). This knowledge of English is cumulatively built over experiences and thousands of encounters with the language before formal schooling begins. However, ELLs do not have a vast bank of knowledge in the second language. For this reason, educators should implement reading strategies to provide more scaffolded opportunities to develop background knowledge and language (De Jong & Harper, 2005).

Reading Interventions for ELL Students in Mainstream Classrooms

Many reading strategies have been developed and implemented to aid ELLs in mainstream classrooms. Originally coined by Bruner, Wood, and Ross in the mid-1970's, scaffolding is described as a process that allows the learner to reach a goal or accomplish a task with guidance and structure provided by a teacher or expert (Mackiewicz & Thompson, 2014). It is a metaphor for a scaffold that is used in the construction of a building; it temporarily supports the walls as it is being built. The concept of scaffolding can be applied to education and implemented during ELL reading comprehension instruction in numerous ways. Examples include, using visual aids (i.e., photos, videos, maps), supplementing texts to meet the needs of the reader (i.e., graphic organizers, leveled text, highlighted vocabulary), or engaging the students in hands-on activities related to the text by placing them in situations where they will produce oral output (Lucas, Villegas, & Freedson-Gonzalez, 2008). Scaffolding is mentioned by numerous educational experts, specifically when addressing the capacity of comprehension in children (Brown & Broemmel, 2011; Bruner, Wood & Ross, 1970; Krashen, 1981).

Krashen's (1981) Input Hypothesis suggests that students have the capability to comprehend concepts that are slightly beyond their current level of understanding. This is made possible by utilizing existing knowledge of the world, context and extra-linguistic information. The Input Hypothesis theory is applicable if the text the student is trying to comprehend is just slightly above their level of understanding. If the ELL is far below their grade level in terms of their current reading ability, they will find the text to be far too challenging (Brown & Broemmel, 2011). Deep scaffolding is a strategy that is linked directly to Krashen's idea of comprehensible input because it aims to decrease difficulty through higher intensity scaffolding consisting of three stages: priming, navigating, and amplifying (Brown & Broemmel, 2011). Teachers prime and prepare the student for success by explicitly teaching the topic. Next, they navigate students through the process of learning by providing supports for the child. Lastly, when the student is ready to do it on their own, they amplify and expand the topic so they are able to display their knowledge.

Language is packed with semantic breaks in which inferences are often assumed to be made based on knowledge the reader already has (Neuman & Kaefer, 2018). Because of these assumptions, culture and experienced-based knowledge play a large role in understanding literacy. Therefore, if students have not had the chance to build the cultural knowledge necessary in understanding a certain topic of a genre (i.e., fairy tale, myths, legends) a roadblock can be created, causing ELLs to experience more difficulty understanding texts (Haynes, 2004). Erten and Razi (2009) concluded that if readers do not possess the applicable cultural schema, the texts will not be fully comprehended. Most of the information a reader obtains during reading is not from the text itself, rather, it is nested in the background knowledge and schema of the reader that is activated during reading. Furthermore, if a student does not contain the background

information on a certain topic, the result may be difficulty comprehending the material (Carrell, 1984). There are multiple strategies designed to help fill the void of culturally relevant schema, including semantic mapping.

Semantic Mapping

Semantic mapping is a pre-reading strategy commonly used to help students activate prior knowledge on the text topic and vocabulary. This strategy is implemented through group discussion and organization of thoughts onto a map. Furthermore, the process of semantic mapping activates any prior knowledge the student may have on the subject, preparing for comprehension, and widening their ability to evaluate the text (Carrell, Pharis, & Liberto, 1989). Students who learn mapping skills may have a better understanding of how to independently find connections between ideas in a text (Nesbit & Adesope, 2006). Previewing can be used simultaneously with semantic mapping and is another activity teachers often use prior to reading. The purpose is to provide students with exposure to important topics and subtopics that will be covered in the reading. Having background knowledge on a wide range of topics can help focus the mind on what the reader already knows about the topic, leaving the reader prepared to receive new information regarding the topic (Shih, 1992). Semantic mapping directly supports the schema theory, which states that comprehending a text is a process that requires the reader to use both background knowledge and the text (Carrell, 1984).

Based on the literature, there are many factors that are contributing to the underperformance of ELL students. The expectations placed on student learning outcomes are incredibly high for native speakers of English; learning the language in addition to learning the content can present itself as a massive challenge (Mancilla-Martinez & Lesaux, 2011). Furthermore, it is important to consider the challenges ELLs are facing and determine strategies

educators can use to support the students' learning. The theoretical framework of the scaffolding theory, coupled with Krashen's concept of conceptual input, and the schema theory highlight the importance of providing ELLs with extra scaffolds as they learn (Brown & Broemmel, 2011).

Method

The purpose of this study was to determine the effectiveness of an English as a Second Language (ESL) intervention, such as semantic mapping, in raising reading comprehension scores as measured by the Scholastic Reading Inventory Test (SRI; Scholastic, 2011). With the number of ELLs on the rise, effective strategies needed to be determined in order to increase performance in reading comprehension.

Research Question

Does building background knowledge as a pre-reading activity (i.e., semantic mapping) increase reading comprehension scores on the Scholastic Reading Inventory in 4th grade English Language Learners at a school in Central California?

Hypothesis

According to Adescope and Nesbit (2006), pre-reading activities provide the reader with the background needed to organize and understand the material. These activities prepare students for linguistic difficulty that may arise, as well as activating any prior knowledge the student may have regarding the topic (Ajideh, 2003). Based on these findings, the hypothesis of this study is that enacting semantic mapping as a pre-reading strategy will lead to improvement in reading comprehension scores in ELLs.

Research Design

This study used a quasi-experimental, nonequivalent group, pretest-posttest quantitative research design. It consisted of two groups: the control group received the lesson as intended by

the curriculum (i.e., Wonders ®), and the treatment group received the pre-reading intervention, semantic mapping. The SRI was administered to both the treatment and the control group at the beginning and the end of the experiment, serving as a pre and posttest. Several t-tests were used to compare the mean of both the treatment and control group at the beginning and the end, using the mean of each group on the pretest and posttest to evaluate changes in reading comprehension scores on the SRI.

Independent variable. The independent variable in this study was a pre-reading strategy called semantic mapping. Pre-reading strategies are activities designed to increase understanding and create bridges between prior knowledge and the current text (Ajideh, 2003). For the purposes of this study, semantic mapping took place before reading; it included placing the topic in the center of the map and surrounding it with associated items. Students then followed up with their original semantic maps both during and prior to reading, adding additional thoughts that they developed during the reading process. The purpose of semantic mapping was to activate prior knowledge that the student may have had on the topic and focus on the content schema, which helped prepare the student to have a better understanding of the text (Carrell et al., 1989). The intention of implementing this particular strategy was to increase understanding of unknown words and concepts prior to reading the text to build background knowledge.

Dependent variable. The dependent variable in this study was the students' score on reading comprehension. Reading comprehension is defined as the process of concurrently withdrawing and constructing an understanding of a written language through interaction and involvement (RAND Reading Study Group & Snow, 2002). Reading comprehension was measured by the SRI, a computerized reading test that adjusted difficulty based on the ability of the student using an embedded completion item format.

Setting & Participants

The study was conducted at a Central California Elementary School with students ranging from grades kindergarten through sixth. Approximately 90% of students at the school are English Language Learners (EdData, n.d.). Participants were sampled using convenience and purposeful sampling methods as the classes were already formed by the school and they contained English Language Learners. Two groups were selected to participate in the study. One was the treatment group and one was the control group. The treatment group had 26 students while the control group had 25 students. These were already split into groups based on their fourth-grade homeroom class. There were 51 total participants. The treatment group was the researcher's fourth grade homeroom class and the control was another teacher's fourth grade homeroom class. Both teachers met bi-weekly to determine exactly what was going to be taught and how it was going to be delivered to students. This ensured that the control group teacher did not implement additional strategies that may have impacted interpretations made of the final results.

Treatment group. The treatment group contained 26 fourth grade students; 13 girls and 13 boys. ELL students accounted for 96% of the group. The reading comprehension ability level, which was calculated using the scores from the SRI pretest, varied in the treatment group. The group consisted of 11.5% of students scoring 700 or higher, which is considered to be above fourth grade reading level and 19.2% of students scoring between 600 and 699, which is considered to be at grade level. Finally, with 69.2% of the class scoring below 600, the largest group represented was students considered to be below grade level in reading comprehension.

Control group. The control group contained 25 fourth grade students; 13 girls, 12 boys. 88% of the group were ELL students. The reading comprehension ability also varied in the

control group. Based on the scores from the SRI pretest, this group consisted of twenty percent of students reading above a fourth-grade level, eight percent of students reading at a fourth-grade level and sixty four percent of students classified as below grade level. Furthermore, eight percent of the class received a score lower than one hundred, which classified them as a beginning reader (BR).

Measures

Reading comprehension was measured using the SRI Test. According to Scholastic (2011), the SRI is a norm-referenced test that measures reading comprehension levels based on the difficulty of questions answered and how students compare to other students (see Appendix A). It is unique to each student and the difficulty of each question is determined by how the student answered the question prior. Students are assigned a Lexile (L) score that ranges from Beginning Reader (BR; below 100L) all the way to graduate level reader (1500L). The Lexile score that is assigned to each student matches the reader with leveled books that have been aligned to the framework (Scholastic, 2011). The SRI was given as a pretest and a posttest. It was a computer-adapted test, meaning questions increased or decreased in difficulty based on each student answer. As a result, the length and time it took to complete the test varied for each student based on their ability. Since it was computer adaptive, it was important to consider the likeliness that students did not see the same test twice for the pretest and posttest. This was considered when interpreting results.

Validity. The SRI test has 3 types of validity: construct, criterion and content. Multiple studies have specified that SRI scores increase with grade level, however, they did not demonstrate growth in a straight progression; growth in lower grades had a steeper growth than in upper grades, which supported the construct validity of the SRI (Scholastic, 2011). The test

was also referenced in multiple State Test Assessments, specifically Florida, California and Ohio (Scholastic, 2011). The Lexile Framework was found to be directly linked to several norm and criterion-referenced tests to measure reading comprehension. Examples included, but were not limited to: Stanford Achievement Tests, Dynamic Indicators of Basic Early Literacy Skills (DIBELS), Test of English as a Foreign Language (TOEFL) and TerraNova, specifically the CAT/6 and CTBS/5 (Scholastic, 2011). Alignment with these distinguished tests strengthened the criterion validity of the SRI and Lexile. Lastly, content validity was supported by the quality of the questions that made up the test; it focused on the skills readers utilize for reading comprehension (i.e., identifying details, drawing conclusions, making comparisons). Passage selection and item format were both taken into consideration when creating questions students would be answering. Passage types were chosen that students have had experience with both in and out of the classroom, and prior knowledge was not necessary to comprehend the passage. Questions were formatted using an embedded completion item format, which accurately measured a student's ability to make connections between ideas and draw conclusions about a text. The test appeared to be sound after considering the three types of validity that were supported.

      Reliability. The SRI was a test that was unique to each student; it adjusted the level of difficulty of the question based on the answer to the previous question. Because of this, the Standard Error of Measurement (SEM) that was linked to each test was also unique to that specific test. When the grade level was specified, the number of questions successfully answered by the student caused the SEM to decrease (Scholastic, 2011). The fact that this test had a low SEM and it is a computer adaptive assessment ensured reliability. Further, as it is scored

electronically and without researcher intervention, scoring was consistent and reliable across participants.

Intervention

The intervention in this study was a pre-reading activity known as semantic mapping. Semantic mapping is a strategy used to build background knowledge and activate schema on a specific topic by linking thoughts and words together visually for the student (Johnson, Pittelman, & Heimlich, 1986). Students were given a reading passage and a blank page for their semantic mapping, with the topic of the passage in the center. The teacher introduced key vocabulary and prepared the readers for what to expect during the reading. This strategy allowed the student to connect vocabulary words to prior knowledge by making associations to their own experiences (Johnson et al., 1986). Semantic mapping was introduced to the treatment group over the course of the first three weeks of the study by the teacher, who modeled how to implement it independently. Students then used the strategy independently during the remaining weeks of the study with reading comprehension passages to see if it had a positive impact on their SRI posttest score. Six weeks was considered an appropriate time frame because it permitted students enough time to properly learn and independently implement the skills. The control group continued reading comprehension lessons as the Wonders® curriculum had intended, without using the intervention. Wonders® was a comprehensive curriculum used to teach reading comprehension and language arts across a wide range of texts (August et al., 2017).

Procedures

Both the treatment and the control group took a pretest (SRI) to determine their baseline Lexile score, which was compared to their posttest score to see if any changes occurred. This

study took place over the course of six weeks, at the beginning of a new Wonders® unit. The control group received instruction as the Wonders® curriculum is designed from their teacher, which did not include semantic mapping (August et al., 2017). The treatment group received instruction on the same reading passages as the control group from their homeroom teacher, but they received instruction using Semantic Mapping as a support before and during the reading. They were introduced to and trained on how to use Semantic Mapping with the intent of students using the strategy independently after the first week. The control group used the reading passages from the standard curriculum (i.e., Wonders®) and received instruction as the curriculum had intended. Both groups were assessed using the SRI at the end of the six weeks to measure growth.

Data collection. Both groups (i.e., treatment and control) took the SRI as a pretest and posttest at the beginning and end of the study to measure for growth in Lexile scores. No other data was collected at any point during the study.

Fidelity. In order to ensure fidelity, which confirms that the treatment was only being given to the treatment group, an independent observer visited the instruction for six days, which was 20% of the 30 day intervention. The independent observer also visited the control class to ensure that no intervention is being given. The external party observations ensured that each classroom teacher was delivering the lessons based on the intended approaches. By doing this, it established fidelity and strengthened the reliability of the study. A fidelity checklist was created (see Appendix B) which ensured both teachers understood what was being taught and made certain that no additional pedagogies were introduced to students during instruction that impacted the results of the SRI posttest scores. The observer observed all of the appropriate

behaviors in each visit, and their were no discrepancies noted in the report, and there was 100%

fidelity to the treatment.

Ethical Considerations

One ethical consideration that was accounted for was anonymity. Names of students,

school and district were not disclosed in this study to ensure respect for the anonymity and

privacy of all participants. If success was experienced in the experimental group, then the

intervention will be given to the control group, but they will be at a disadvantage because the

instructional time of new material that was lost as a result.

Validity threats. There were a few potential extraneous variables that had the potential

to threaten the validity of this study. The first example was the researcher's own bias. The

researcher needed to be sure not to impact the outcome of the study based on the directional

hypothesis that semantic mapping will increase the reading comprehension skills of ELL

students. Basing results solely on the Lexile scores eliminated any biases that the researcher may

have had. Another way the researcher ensured their own bias did not impact the outcome was

reviewing findings with the research team to make certain that the results were what they

appeared to be.

A participant variable to consider was the teacher that instructed the control group.

Lessons were delivered as usual with the Wonders® curriculum, but there were many factors to

be considered because one teacher taught the control group and the other instructed the treatment

group. The teacher that instructed the control group could have had different styles and modes of

delivery than the teacher that instructed the treatment group. In order to ensure that the outcome

of the study was not altered in any way, an observer visited both groups to ensure that instruction

was being delivered in a fair, similar manner. In addition to observations, a fidelity checklist was

developed and used to inform the observer and both teachers what to include in each lesson. This

confirmed the delivery of the lessons were as similar as possible and the students were exposed

to the same curriculum material, with the exception of the semantic mapping for the intervention

group.

Data Analyses

All data was entered into the Statistical Package for the Social Sciences® (SPSS®) for

Windows, version 24.0.0 (IBM SPSS, 2016). No names or identifying information will be

included in the data analysis. Before analysis was conducted all data was cleaned to ensure no

outliers are present (Dimitrov, 2012). After cleaning the data, Independent samples (control and

treatment groups) and dependent samples t-tests (pretest and posttest) were conducted to

determine the significant difference in reading comprehension between the two means scores on

the SRI. Further, before interpreting the analytical output, Levene's Homogeneity of Variance

was examined to see if the assumption of equivalence had been violated (Levene, 1960). If

Levene's Homogeneity of Variance is not violated (i.e., the variances were equal across groups),

data will be interpreted for the assumption of equivalence; however, if the variances are not

equal across groups the corrected output will be used for interpretation.

Results

Two independent samples t-test were conducted on the whole sample ($n = 51$) for both

the pre and post assessment scores. Results for the pre-test were: Levene's Homogeneity of

Variance was not violated ($p > .05$), meaning the variance between groups was not statistically

different and no correction was needed and the t-test showed non-significant differences between

the mean scores on the pre-tests between the two groups $t(47) = -1.169$, $p > .05$. This means that

there was not a significant difference between the means of the pretest scores for both the control

and the intervention group. Both groups were statistically similar. (see Table 1). Results for the

post-test were: Levene's Homogeneity of Variance was not violated ($p > .05$), meaning the

variance between groups was not statistically different and no correction was needed. The t-test

showed non-significant differences between the mean scores on the post-tests between the two

groups $t (47) = -.651, p > .05$. This means there was no significant difference between the means

on the post-test for both the treatment and control group. Thus, even though the mean scores

improved from the pre-test, the intervention was not impactful enough to provide statistically

significant improvement in student scores (see Table 1).

Table 1
Results of Independent Samples T-Tests

	Mean	SD
Pre Test		
Treatment	473.12	186.55
Control	537.13	196.55
Post Test		
Treatment	518.58	177.86
Control	531.79	225.23

Note. SD = Standard Deviation.

After determining the differences between pre and post assessment scores between

groups, two paired t-tests were run for both groups (i.e., treatment and control) to determine if

participants mean scores from pre to post were significantly different within each group (see

Table 2). Results for each group were as follows: treatment group, $t (25) = -4.146, p < .001$

control group, $t (22) = -1.708, p > .05$. This indicates that while the treatment group had a

significant difference in mean scores between the pre-test and the posttest, there was no

significant difference in mean scores between the pretest and posttest scores for the control

group. Additionally, the negative t-value for each group indicates an increase in scores from pre

to post assessment. However, the average mean score for the treatment group increased by 45.46

points, compared to an average increase of 16.78 for the control group. In comparison to the

proposed hypothesis, the results show that the treatment group increased by a bigger margin than

the control group.

Table 2
Results of Paired T-Tests

	Mean	SD
Treatment Group*		
Pre	473.12	186.549
Post	518.58	177.863
Control Group		
Pre	537.13	196.545
Post	553.91	201.881

Note. SD = Standard Deviation. * = $p < .001$

Discussion

Students learning English benefit from having multiple supports to help them excel in an

academic setting where English is the primary language being taught. Developing reading

comprehension requires students to rely on background knowledge and experiences (Neuman &

Kaefer, 2018). If students do not possess the cultural schema that certain texts require, then they

will not understand the text to its maximum potential (Erten & Razi, 2009). This is specifically

applicable to students learning a language because they often lack opportunities to develop

culturally relevant experiences that they can apply when they are reading in order to help them

understand the text (Carrell, 1984). Semantic mapping is a strategy that directly addresses this

issue because it helps bridge the gap between a child's previous experiences and knowledge and

the text that is being read.

The purpose of this study was to determine whether or not semantic mapping gave students a tool that would help increase their reading comprehension abilities. The study hypothesized that semantic mapping would have a positive impact on student reading comprehension scores. The study consisted of two groups with 51 students total, a treatment group made up of 26 students and a control group of 25 students. Both groups consisted of 80% of more students that were classified as ELLs. Over the course of six weeks, the control group received a traditional English language arts lesson as the Wonders® curriculum prompts teachers to follow. The treatment group concurrently received the same Wonders® curriculum with semantic mapping as a supplementary scaffold to introduce vocabulary and build background knowledge on the weekly topic.

Based on the results of the paired samples t-test (Table 2), it is clear that both the treatment and the control group increased their overall mean score between the time that the pretest was given and the time that the posttest was given. However, the mean score for the treatment group was statistically significant with an increase by 45.46 points. In comparison, the control group increased by 16.78 points, which was not statistically significant. The primary factor that was different in these two class environments was the semantic mapping that was implemented with the treatment group. Based on this knowledge, the argument could be made that semantic mapping had a significant impact on student reading comprehension scores, which is similar to previous research (Carrell, 1984; Carrell, Pharis, & Liberto, 1989; Nesbit & Adesope, 2006; Shih, 1992). These results support the argument that the use of semantic mapping to teach students how to connect ideas from a current text to prior knowledge or experiences can be effective in increasing reading comprehension (Shih, 1992).

However, it would be prudent to urge caution in interpreting the results given the fact that the control group also improved; this raises the question of what factors contributed to that improvement rate and how it differed from that of the treatment group. For example, when looking at the outcomes of this study, it is important to deliberate whether the semantic mapping actually had an impact on the scores. There are many factors that could have influenced student success, not just the intervention that one group received. To illustrate, students could have progressed naturally between the pre and posttest based on daily instruction alone. Other studies that also intercepted this shortcoming have purported to address it by conducting interviews and gathering insight from students in the treatment group and the control group (Ajideh, 2003). This will give researchers a better understanding of student perspective and understanding.

The traditional Wonders® curriculum that was implemented with both groups (i.e., treatment and control) is designed to integrate language arts material. Because a majority of the students in the sample were ELLs, semantic mapping was chosen as an intervention because it benefits students that need additional support in comprehending a text by guiding the student to make connections between their own experiences and the text. According to Nesbit and Adesope (2006), students that learn mapping skills are more likely to be able to make these associations independently. The results of this study favor of this statement because the students in the treatment group were able to apply these skills on the SRI test independently.

Numerous research studies found that semantic mapping to be a consistent scaffold in developing a deep understanding of new concepts with students learning English (Carrell, 1984; Carrell, Pharis, & Liberto, 1989; Nesbit & Adescope, 2006; Shih, 1992). The findings of this current study contribute to the larger conversation regarding the positive effects of semantic mapping. Although the results were based on a relatively small sample size, the difference in the

increase of the mean scores between the control and treatment group were significant enough to understand that there was an impact from the intervention. While this study creates dialogue for the larger conversation in the literature, it is important to consider different limitations for forthcoming studies.

Limitations and Future Studies

There are specific limitations that should be considered when looking at the outcomes of this study. The first limitation is the scheduling of teacher professional development meetings, which is out of the control of school staff. There were two professional meetings that caused both teachers (i.e., control and treatment) to be removed from the classroom, causing students to miss time that was supposed to be dedicated to receiving their language arts instruction.

An additional limitation to consider is the appropriateness of the measure that was selected for this particular intervention. Over the span of the six weeks, it became clear that the semantic mapping was benefiting students, not only for reading comprehension, but helping students structure their writing about a specific text. The texts that were selected from Wonders® were lengthy and required the use of semantic mapping in order for students to process the meaning of the story. While students demonstrating positive results with using mapping to understand the text, the SRI measure that was used as a pretest and posttest did not require students to read long bodies of text in order to understand what they were reading. This raised questions to the researcher as to whether or not the measure chosen was relevant in measuring how effective semantic mapping actually was. Other studies have measures that differ from the SRI to gage the effectiveness of semantic mapping. For example, in a study conducted by Nesbit and Adesope (2006), part of the measure consisted of a trained evaluator monitoring the student as the semantic map was being constructed. This offered a high treatment fidelity rating because

they were able to witness the students' level of engagement in the activity and the thought process behind the map.

Although one could argue that while the student might not have used semantic mapping in a written form while taking the post test, they could have utilized the skills learned from semantic mapping and applied them to the specific questions that were being asked on the SRI. It is important to question whether or not students scored higher simply based on maturation that occurred during the six weeks from instruction. It is impossible to be certain whether or not the growth distinction is directly related to semantic mapping.

Finally, researchers that decide to replicate this study should consider interviewing students prior to taking the SRI to gain a better understanding of different techniques and skill sets that were used to solve test questions. This would give the researcher a better idea of whether or not it was specifically semantic mapping that helped them increase their Lexile score. Additionally, the replication of this study with a larger sample size would allow the researcher to see the effects of semantic mapping on a larger scale, making the results more significant.

In conclusion, semantic mapping provides students, specifically ones learning English, with an opportunity to make connections between new ideas in a text and experiences and knowledge that they already have. Teachers can use this method as a scaffold to eventually be implemented independently by students; it is both a visual and written tool that can offer support to them in a classroom and testing setting. ELL students are given the opportunity to bridge the gap between reading comprehension skills and developing cultural schema.

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Appendix A

Scholastic Reading Inventory (SRI)

Appendix B

Fidelity Checklist

Fidelity Checklist

Instruction using Wonders Curriculum

- Use pre-selected vocabulary words <u>only</u> to focus on for the week
- Define words, assign a movement for students to associate word with.
- Introduce the genre and the characteristics of that genre
- Introduce the weekly strategy/skills
- Talk about the essential question for the week
- Read short text
- Write about short text using the essential question for the week as your guide
- Read long text
- Do final comparison of long text and short text

Intervention

Check to make sure semantic mapping **is** taking place.

Control

Check to make sure semantic mapping **is not** taking place

Week	Date Observed	Initials
1 Treatment		
2 Control		
3 Treatment		
4 Control		
5 Treatment		
6 Control		