

The Effects of Higher-Order Thinking and Reading Comprehension

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Abstract

The purpose of this study was to determine if higher-order thinking improved reading comprehension in Kindergarten students. The study used a quasi-experimental design. There were fifteen students in the treatment group, and eighteen students in the control group. Students in the treatment group were taught three higher-order thinking strategies: making connections, writing after reading, and asked different types of questions. All students in the study were given the Fountas and Pinnell Benchmark Assessment System to determine reading levels. The study showed that the students who received the higher-order thinking skills had higher reading comprehension than the students who did not receive these skills.

CHAPTER I

INTRODUCTION

Reading comprehension is defined as a strategic and active move to understand a text. This means that readers must use metacognition, or thinking about their thinking, while reading. Types of comprehension include activating background knowledge, inferencing, summarizing, predicting, clarifying, questioning, visualizing, monitoring, synthesizing, evaluating, and connecting (Fisher, Frey, & Lapp, 2008). According to Honig, Diamond, and Gutlohn (2008), reading comprehension consists of three key elements: the reader, the text, and the activity. Teachers are required to show students how these three elements affect their understanding during reading. This means that teachers need to explicitly teach how to be a reader and how to respond as a reader. Lastly, reading comprehension builds upon many things that superior readers need: accuracy, fluency, vocabulary, word knowledge, and comprehension strategies. If students are explicitly taught all these things, they will have good reading comprehension.

Having superior reading comprehension is important in many ways. If students have high reading comprehension, they will be more engaged in a text. Engaged readers enjoy learning, work to improve their skills, and find satisfaction in reading (Honig et al., 2008).

When students understand what they read, they will enjoy learning more than students who do not understand what they read. Additionally, comprehension is the most important reason that students read. If they do not understand what they are reading, then they will not internalize the information and be able to apply it in their life.

Consequences of low comprehension in students include low self-confidence, lack of student engagement, low test scores, and an inability to understand and relate to a text (Walsh & Sattes, 2012). These students are less likely to feel successful in school and will not understand

what they are reading. These consequences will make students less engaged in school and yield low understanding of academic tasks.

Higher order thinking is defined as scaffolding students' thinking about both the question posed and their responses to it. This approach is different than students' traditional thinking, and answering questions, in which students attempt to guess the teacher's answer to classroom questions (Walsh & Sattes, 2011). This means that the teachers should question students to prompt their thinking, not to guess the teachers "correct" answer.

Higher order thinking plays an important role in comprehension. Studies have shown that teachers see more growth in their students' reading scores when higher level thinking is stressed to students (Peterson & Taylor, 2012). This means that teachers who encourage their students to utilize higher level thinking strategies do better on tests pertaining to reading.

Examples of higher order thinking include the following: levels of questioning, writing, and making connections. First, there are three types of higher order questions. First, teachers can question students about the theme of a story. This type of higher level questioning will help students understand the underlying message of the story. This type of question would be as follows for the theme of friendship: "How do you know that someone is your friend?". Another example of higher order questions is character interpretation. This is when students think about a character more in-depth. For example, "How did the character change throughout the story?". This makes students think deeply about character motivation. The last type of higher order question is when students make connections (Peterson & Taylor, 2012). To lead into the next topic of higher order thinking, the last type of questioning is when students make connections during reading. There are three types of connections students can make during reading: text-to-text, text-to-self, and text-to-world. If students can make connections, they are using higher-

order thinking strategies. Lastly, writing is a strategy for higher-order thinking. Integrating writing with reading enhances comprehension because the two are reciprocal processes. Writing engages students, extends thinking, and deepens understanding (Knipper & Duggan, 2006). Therefore, if students are writing after they read, they should gain deeper understanding of the text.

Statement of Problem

The purpose of this study is to determine if higher-level thinking increases reading comprehension in Kindergarten. This topic is of interest because many students can read a text, but they have difficulty with the comprehension when asked a question.

Hypothesis

There will be no difference in the comprehension of Kindergarten students after using higher-order thinking skills in reading instruction.

Operational Definition

Comprehension will be measured by Fountas and Pinnell (F&P) Benchmark Assessment system, which is a running record used in Anne Arundel County Public schools in Maryland to measure the level at which students are reading. Located on the running record recording form, there is a set of comprehension questions. Students are scored on a 0-7 range, with scoring bands as follows: 6-7 excellent comprehension, 5 satisfactory comprehension, 4 limited comprehension, and 0-3 unsatisfactory comprehension.

The **higher order thinking strategies** to increase comprehension in Kindergarten are: making connections, writing after reading, and types of questions asked to the students.

Reading instruction during the research will be during built-in **small group reading time during the school day**. The office of Early Childhood in Anne Arundel County Public Schools (AACPS), Maryland, expects that teachers are utilizing guided reading strategies during this time so that students learn how to read. According to AACPS, this includes sight word practice, word work (making consonant-vowel-consonant (cvc) words), pre-reading of a text, reading a text, and responding to a text.

CHAPTER II

REVIEW OF THE LITERATURE

According to Hebert, Simpson, and Graham, “Comprehension is a critical component of reading instruction and comprehension of material read is the goal for every reader” (2013, p. 132). Their ideas are evidence of the importance of comprehension during reading. When students are in kindergarten, they learn the basics of how to be a good reader. While phonics, phonemic awareness, vocabulary, and fluency are all critical components of reading, if students lack comprehension, then they have missed the whole point of why they are reading in the first place. Currently in kindergarten, students are to be reading at a level D book on the Fountas and Pinnell Benchmark Assessment by the end of the year. Level D books have complex comprehension questions, asking students to explain how the main character’s feelings in the story have changed why the author chose to write the story that way. It is important that teachers teach these comprehension skills early, so that all students reach level D by the end of the year. The purpose of this literature review is to identify if higher-order thinking increases comprehension in kindergarten. Three different topics will be examined in relation to higher-level thinking: making connections during reading (such as text-to-text, text-to-self, and text-to-world), types of questioning, and writing after reading.

Making Connections During Reading

When examining higher-order thinking, students need to make connections during reading. There are three types of schema-building connections: text-to-text, text-to-world, and text-to-self (Waller & Barrentine, 2015). Making connections is essential for comprehension; according to Peterson and Taylor (2012), “Asking students to make connections between their lives and the text helps them to access their background knowledge, put themselves in the main

character's place, and identify with the characters and events in the story" (p.301). If students can connect with the characters and events in the story, it will create a memorable and unique reading experience that students will be more likely to remember. When students are asked to make text-to-self connections, they are asked to tell how the story is like them and explain why. Students are asked to find evidence from the story and explain why and how they can relate to the story (Peterson & Taylor, 2012).

Waller and Barrentine stipulate that, "Personal meaning is essential to comprehension of text...meaning lies in that shared ground where the reader and text meet" (2015, p.2).

Throughout their study, Barrentine and Waller discovered that the commercial reading curricula for instruction provided limited support when making connections to the readers' backgrounds.

Because it was difficult for the students to make connections while simply using the curriculum provided, the teachers were the main source for guiding students to make these important associations between themselves and the story that they were reading. The study examined the difference between the commercial curriculum and the teacher-facilitated curriculum, which relies on making connection during reading. After the study was complete, it was found that the teachers themselves needed to help facilitate connections for their readers, and the teachers must develop ways to keep the focus on the reader and his or her background knowledge. They recommended that teachers intentionally use their knowledge of their students and commitment to community to drive instruction (Waller & Barrentine, 2015).

Making text-to-text connections is an important skill when helping to enhance comprehension. According to Ward and Young (2008), linking texts allows readers to organize responses in a way that helps them notice patterns, make literary connections, and develop insight across books. As students read multiple related texts, their achievement often increases,

and they often engage in evaluating the importance, credibility, and relevance of the individual texts they have read. Therefore, making connections while reading is a higher-level thinking process, which increases comprehension in the kindergarten classroom.

Types of Questioning

Higher-level thinking can be developed by asking questions of varying levels. According to Peterson and Taylor (2012), “Higher order questioning requires students to think at a deeper level and to elaborate on their oral and written responses to literature” (p. 297). This might be difficult for some students at first, because they are forced to give more than a “yes” or “no” answer. It is important that teachers model how to answer this type of questions first, that way students are aware how to answer them. “Modeling is the primary way through which teachers can demonstrate for their students how readers can interact with texts” (Fisher et al., 2008, p.548). The teacher should assist students by asking probing questions to help students elaborate on their answer such as “Please tell me more about that”, or “How do you know that is true?”

Peterson and Taylor (2012) believe that there are two important types of higher order questions. The first level of questions asks the reader about the theme of the story. Many themes of stories are relevant and meaningful to students’ lives, such as friendship, injustice, following your dreams, or perseverance. This makes the story more relatable for students. An example of a theme question could be, “Describe a time when you were persistent like the main character of the story”. When a teacher asks students, questions related to the theme of the story, this leads to higher-level thinking and greater understand of the text. Character interpretation is the second example of a higher-level question. When asked these types of questions, students can compare various characters within the text, compare the characters to themselves or somebody they know, and analyze how the events in the story may have caused a character to

evolve. An example of this would be, “Why do you think the character made the decision she did in the situation? What in the text makes you think that? Would you have done the same in that situation? Why or why not?” These questions will help the students think deeper about the text, and analyze what they would do if they were in the story (Peterson & Taylor, 2012).

McGee and Schickedanz (2007) state that students should have analytic talk that involves making predictions or inferences that help explain a character’s motives during reading. If the students are thinking about the character on a deeper level, they are also using higher-level thinking. Questioning about the theme of a story and interpreting characters are both types of higher-level questioning that can be asked in Kindergarten.

Self-questioning is an important reading comprehension strategy used in Kindergarten. Self-questioning is when a reader consciously asks themselves questions about a text. It can range from questions about the story content, specifically or it can be questions to check if they are reading correctly. Curiosity and questioning are considered natural human traits, which especially needs to be fostered in the primary years. Research has shown that, “...self-questioning is an active strategy that establishes and promotes understanding and enhances independence and self-direction during the course of learning” (Glaubman, Glaubman, & Ofir, 1996, p. 361). This is important because students should be independent when reading and able to question on their own. Glaubman et al. (1996) believe that self-questioning increases reading comprehension. In their study, the structured self-questioning methods in contrast to the conventional teaching methods, contributed to improving story comprehension in the short and long term. When students self-question, it helps them comprehend the story better. Also, the results of the study show that kindergarten students are capable of effectively using

metacognitive thinking and generating high-quality questions. If students can think about what they are reading, while they are reading it, that will yield greater understanding.

Stahl (2004) believes that reciprocal teaching is an important form of higher-level questioning. Reciprocal teaching is "...an instructional activity that takes place during reading with the purpose of gaining meaning from the text and self-monitoring" (Stahl, 2004, p.601). During reciprocal teaching, the teacher first models how to complete the task. There are 4 important strategies during reciprocal teaching: summarizing, questioning, clarifying, and predicting. After the teacher models how to do this, the students try it. There is a student leader which leads the group, and the other students have a conversation about the different strategies mentioned. Stahl (2004) mentions that teachers must model this effectively for it to become a useful tool for higher-level thinking, but if done correctly, it can impact student comprehension.

Smith (2006) discusses the importance of think-aloud mysteries during reading. This is when people ask questions out loud during reading. A teacher should first model think aloud mysteries for students to hear, have students practice think aloud mysteries, and last, have students write think-aloud mysteries. A think-aloud mystery would ask readers to explain an unknown word. For example, if they are reading the following line: *I wanted to see the storm, so I timidly peeked out of my bedroom window.* The think aloud that the student or teacher would use is, "I wonder what the word timid means?" This activity actively engages students in thinking during reading, which is important in the Kindergarten classroom.

Writing After Reading

Writing about a text increases comprehension in kindergarten. Knipper and Duggan (2006) found that, "Mastery of content is demonstrated not only through reading but also through writing. Integrating writing with reading enhances comprehension because the two are

reciprocal processes” (p. 462). When students read, they automatically become better writers, and in addition, when students write, they become better readers. As students read more difficult texts, their writing improves because they are exposed to different genres, and different text structures. When students write to learn, they can record their observations on paper. They begin to discover what they already know and what may be added to their current schema.

Knipper and Duggan (2006) suggest word maps for students from Kindergarten to grade 2, as a critical thinking strategy during writing. Students use word maps to answer three main questions about a new term: What is it? What is it like? What are some examples? The process of answering those questions helps students link the new concept to their previous knowledge. If students are learning about mammals, they will define what it is (a type of animal), what it is like (gives birth to live young, has fur), and give some examples (bears, humans). This strategy helps enhance students’ comprehension during reading, by writing about a specific topic they have read about.

Next, Hebert et al. (2013) explored which writing activities best assisted reading comprehension. Their study found that extended writing enhances reading comprehension better than simply answering questions. If students are reading a story about several types of fruit and are asked to extend the story by writing about a fruit that was not in the story, that would have a greater effect on comprehension than if they were asked to write 3 fruits that were in the story.

Additionally, they found that summary writing enhanced reading comprehension better than simply answering questions about the story. Therefore, if students are either extending beyond the story, and/or summarizing what the story was about via writing, both of those techniques enhance comprehension more than answering simple questions about the story through writing.

Hebert et al. (2013) then discuss implications for teachers to use this information in the

classroom when they state, "...we continue to recommend that teachers use a combination of these writing tasks in their classrooms to fit the needs of their students. This includes using question answering, written summaries, note taking, and extended writing as tools for enhancing students' comprehension of text" (Hebert et al., 2013, p.136). All different types of writing increase comprehension after reading a text. The authors also discussed that the type of writing activity should be used based on the text that is being read. A nonfiction story may lend itself better to having students complete a written summary, while a fictional text may lend itself better to extending the story by writing. Teachers should choose which writing best fits the students' needs and the story they are reading, to help increase understanding of the story.

Summary

Higher-level thinking does yield increased comprehension in Kindergarten, through the following: making connections, higher-level questioning, and writing. Many studies have shown the importance of higher-level thinking, especially at the Kindergarten level. When students make connections to themselves and other texts they read, it helps activate prior knowledge, making reading more meaningful. When students are asked higher level questions they are forced to activate prior knowledge and connect to the story they are reading. They are asked to think critically about the text, which yields higher learning. Finally, when students are asked to write about what they read, it strengthens their reading because the two are shared processes.

When they are asked to write to extend what they read, it makes content more meaningful which is crucial because all Kindergarten students are to be reading at a level D book on the Fountas and Pinnell Benchmark Assessment at the end of the year. If these skills are put into place early, then all students can reach the goal. The main objective when reading is that students understand

and utilize what they have read; this is done most effectively through higher-level thinking in Kindergarten.

CHAPTER III

METHODS

The purpose of this study was to identify if higher-order thinking increases reading comprehension in Kindergarten students. The design of this study is quasi-experimental. The fifteen students in the treatment group were given a pre-test, interventions, and a post-test. The control group had eighteen Kindergarten students.

Subjects

The study took place at an elementary school with high transience, in Fort Meade, Maryland. The school is one of two early education centers in Anne Arundel County, Maryland, with approximately 270 students. Since the school is located on a military base with lots of transiency, the population of students fluctuates often. The center has eleven Kindergarten classrooms, two Pre-Kindergarten classrooms, and one Early Childhood Intervention (ECI) classroom. The school is part of the DODeA (Department of Defense education activity) grant, which allows funding for AVID (Advancement Via Individual Determination). AVID is a college readiness program, which helps students acquire important skills for writing, inquiry, collaboration, organization, and reading. Therefore, many students at the school already have the advantage of being taught using strategies to help increase comprehension and higher-order thinking skills.

The fifteen students who participated in the study are in a certified kindergarten teacher's classroom and will be a part of the treatment group. The makeup of the classroom consists of three special education students and twelve general education students. There is also a special educator in the classroom, along with an additional adult support for three of the special education students. There are three multi-racial students, two Hispanic students, three African

American students, and seven Caucasian students. Four students in the treatment group also qualify for free and reduced meal plans. Additionally, the 18 students in another kindergarten classroom were utilized as the control group. These students are all general education students and there are no students who receive special education in the classroom. In the control group, there are two African American students, there multi-racial students, four Hispanic students, and 9 Caucasian students. Four students also qualify for free and reduced meal plans. These students did not utilize the same three interventions as the students in the treatment group.

Instrument

The post-test and pre-test scores were determined by the Fountas and Pinnell (F&P) Benchmark Assessment System (BAS). The F&P Benchmark Assessment System is an accurate and reliable tool to identify the instructional, frustration, and independent reading levels of all students and documents student progress through one-on-one formative and summative assessments (Fountas & Pinnell, 2011). This is the leveling system that Anne Arundel County Public schools uses to assess what level a student is instructionally reading on. Within the assessment, there are two areas that will determine what level a student reads at. The first is a section of the assessment to take notes on how accurate the reader reads the passage. A reader must get a 95% or higher to continue reading. If a student gets lower than a 95%, the reader stops reading and the text is determined “frustration” for the student, or “too hard”. If the reader reads 95% or more of the text correctly, the student is then asked several comprehension questions to ensure they understood the text. The comprehension questions are rated on a scale of 0-7 with the following bands: 0-3 unsatisfactory, 4 limited, 5 satisfactory, and 6-7 excellent. Even if a student has perfect accuracy, they also need at least a score of 4 to move on to the next level text.

The scores on the comprehension piece of the assessment for both the pre-test and post-test for the study were used for both groups.

Procedures

The students in the treatment group used three interventions to identify if higher-order thinking increases comprehension: *Thinking Through Quality Questioning*, by Walsh and Sattes (2012); AVID making connections during reading anchor chart; and written reflections after reading from *Revisit, Reflect, Retell*, by Hoyt (2009).

First, students were asked various questions after reading a text, with strategies from the book *Thinking Through Quality Questioning*. This book contains many ways to strengthen thinking and increase learning including the following: expecting thoughtful responses from students, giving extra think time, scaffold thinking and responding, and making thinking visible. Students also answered a variety of question types by answering different questions based the Revised Bloom's Taxonomy. There are six question types from "remembering" where students find the answer within the text, to "creating" where students must use what they have read to produce something new. The six strands of Bloom's Taxonomy include remember, understand, apply, analyze, evaluate, and create. In the remembering stage, students must retrieve relevant knowledge from long-term memory. A type of question from this stage could be, "Name all of the fruits that were discussed in the story". In the understanding stage, students must construct meaning from instructional messages, including oral, written, and graphic communication. An example of this question type could be, "Give an example of another type of fruit that is not found in the story". When being asked the applying stage of questioning, students must carry out or use a procedure in a given situation. An example of this type of question could be, "Use what you know about fruit to explain how to make fruit salad". In the analysis section of Bloom's,

students must break material into parts and determine how the parts relate to one another and to an overall purpose. In this type of questioning, students could be asked the different parts of a plant and how the plant makes its own fruit. During the evaluating stage, students could answer, “Which type of fruit is your favorite and why?” Last, in the creating stage, students put elements together to form a coherent whole. An example of this could be that the students must draw and label a habitat that grows fruit the best. If students are answering these six types of questions, they will acquire higher understanding of the text.

Next, students used a strategy from the AVID resource book *AVID Elementary Foundations: A Schoolwide Implementation Resource*, which requires that students make three different connections during or after reading a story: text-to-text, text-to-self, and text-to-world (for an example, see Appendix A). For example, if students are reading *The Three Little Pigs*, they could identify a time they felt afraid like the pigs (text-to-self), they could remember that they also read about a pig in the book *Charlotte’s Web* (text-to-text), and lastly, they could recall that they learned in science that pigs give us bacon (text-to-world).

Last, after reading a text, students completed written reflections from *Revisit, Reflect, Retell* by Linda Hoyt. Each written reflection in this text includes the level of thinking students will need (for example, organizing, generating, integrating, evaluating, analyzing, etc.). Written reflections in Hoyt’s text that the treatment group used include the following: Book Rating, Making Inferences About characters, Book Review, and Story Reflections. When students utilize the book rating for a written reflection, they rate the book as follows: “so good I couldn’t put it down”, “pretty interesting”, “ok”, and “not great” (for an example, see Appendix B).

After, they defend their answer by stating why they rated the book the way they did. Next, students used “Making inferences about Characters” after reading (for an example, see Appendix

C). During this strategy, students make inferences on one or two characters from the book by choosing from a word-bank of character traits. The character traits include bold, cowardly, modest, confused, shy, bossy, dangerous, audacious, clever, tentative, brave, dashing, fearless, timid, oblivious, sneaky, timid, courageous, daring, afraid, nervous, and kind. After they choose a word to describe the character, they must support their answer by stating why they feel this way. When using the book review strategy with a fictional text, students must give their opinion of a story and illustrations and decide if they would recommend the book to others (for an example, see Appendix D). If the text is nonfiction, students must also state their opinion of the book, but they must also decide what techniques of informational writing they can use in their own writing (for an example, see Appendix E). Last, when using Story Reflections as a written reflection, students must draw a picture about the story, write one word about the main character, write two words describing the setting, write three words telling the problem, write four words about an event, and write five words about the solution (for an example, see Appendix F). Students in the treatment group will utilize a variety of these resources from *Revisit, Reflect, Retell* to better enhance higher-order thinking after reading.

The students in the control group used *Instructional Implications for Reading Levels* guide from the Early Childhood Office, which advises teachers what skills to focus on in accordance to the level book the students are reading. The guide focuses on before, during, and after reading guidelines, but does not give any resources for the teacher.

CHAPTER IV

RESULTS

The purpose of this study was to determine if higher-level thinking increases reading comprehension in kindergarten.

The kindergarten pre and post reading comprehension scores for a class receiving higher order thinking skills instruction and a class not receiving the instruction were analyzed using a t-test for independent subjects. The results are presented in Table 1 below.

Table 1
Reading Comprehension Scores for Kindergarten Students with and Without Higher-Order Thinking Skills Instruction

Test	Higher Order Thinking?	Mean	N	Standard Deviation	t	Significance
Pre-Test	Yes	4.7	15	0.59	4.30	0.000*
	No	3.3	18	1.14		
Post-Test	Yes	5.6	14	0.85	2.85	0.008**
	No	4.7	18	0.83		

*p. = 0.000 **p = 0.008

The hypothesis that there will be no difference in the comprehension of Kindergarten students after using higher-order thinking skills in reading instruction is rejected.

CHAPTER V

DISCUSSION

The purpose of this study was to determine if higher-level thinking increases reading comprehension in kindergarten. The hypothesis that there would be no difference in the comprehension of kindergarten students after using higher-order thinking skills in reading instruction was rejected. The students in the treatment group had a mean comprehension score of 4.7 on the pre-test, while the students in the control group had a mean comprehension score of 3.3 on the pre-test. Because the pretest scores were also significantly different, an Analysis of Covariance was completed to adjust the pretest scores and examine the difference of the post-test scores. According to the findings, the students who received the higher-order thinking skills strategies had a higher mean comprehension score than the students in the control group. The students in the treatment group had a mean comprehension score of 5.6, while the students in the control group had a mean comprehension score of 4.7. The higher-order thinking skills group scored significantly higher than the control group, $F=4.75$, $p=0.016$.

Implications

The results are important when teaching students because it shows the importance of explicitly teaching higher-order thinking skills. For students to be successful in their reading, they must use metacognition when they read. This simply means that when students read, they should be thinking about their thinking. The higher-order thinking strategies help students use metacognition when they read. For example, if it is routine that a teacher is going to have students make connections after they read, as they are reading, they will be more alert to situations in the text to make a connection to. It is also important to note that writing and reading are very closely linked. Using writing after reading not only increases comprehension but

increases students' ability to write; the two acts have a positive relationship. As reading levels increase, writing should increase as well, to match the students' reading levels. It was shown through this study how important writing is to the reading process. Lastly, exposing students to all types of questioning is key to increasing comprehension. During the study, if students did not understand one of the higher-level questions they were asked, a teaching point was created to help them comprehend the question.

Threats to Validity

At the elementary school where the study was conducted, there is high student transiency because it is on a military base. This affects all assessments. During testing, one student from the treatment group moved, giving one less score to consider when looking at comprehension growth.

Another threat to validity is that the Fountas and Pinnell Benchmark Assessment System (F&P BAS) may not be an accurate measure of comprehension. The comprehension scores on the F&P BAS range from 0-7. F&P BAS is designed to make instructional decisions about students; it is not used for research analysis because it uses an ordinal scale, not an interval scale. Additionally, in the "beyond the text" questions, many of the answers do not have an "in the text" answer, so it is up to the test examiner's discretion.

Student growth regardless of higher-order thinking instruction is another threat to validity. Students in the treatment group could have increased their comprehension score simply because of exposure to more instruction over several months of school. Students are taught comprehension skills throughout many parts of the day including interactive read aloud, shared reading, and writing.

Links to Previous Literature/Studies

This study is like numerous other studies. In 2015, Waller and Barrentine noted that personal meaning is important when comprehending a text, and that meaning happens when a reader and text meet. This is shown through this study because when the students in the treatment group were making explicit connections to a text, their comprehension deepened. Also, McGee and Schickedanz (2007) found that students should make predictions during reading. During this study, one of the different types of questioning that students were asked was to make predictions while reading. This strategy also helped increase comprehension in the treatment group. This study also verified Hebert, Gillespie and Graham's 2013 study. They stated that students who engaged in writing activities also showed an increase in reading comprehension. The students in the treatment group always completed a follow-up writing activity. This increased their reading comprehension and increased their writing skills. They were able to answer a prompt about a text, increasing comprehension.

Implications for Future Research

If this study was completed again, there are many more strategies that could be explicitly taught to students to increase their comprehension. Strategies such as coding the text, questioning the author, and making inferences using an inference equation are all strong strategies that could be used in future research. Additionally, this study could be completed using different grade levels. All the students who completed this study were in Kindergarten. Future research could be done with a higher-grade level to see if comprehension increases even more. Also, kindergarten teachers only assess a student's reading in Winter and Spring. If teachers choose a higher-grade level, they assess in Fall, Winter, and Spring. This is important

because the study could use data from just the Fall and Spring, giving a larger window of time to gather data. This would be more statistically relevant than data only collected over three months.

Conclusion

In conclusion, the treatment group who had higher-order thinking strategies had a higher mean score in the post-test than the control group, who had no higher-order thinking strategies. While there are some factors that threaten the validity of the study, the averages of the two groups were significantly different due to the strategies presented to the treatment groups. Therefore, students should be explicitly taught higher-order thinking skills such as making connections, writing after reading, and asked different types of questions during reading. If students are taught these three extra strategies, their comprehension will increase.

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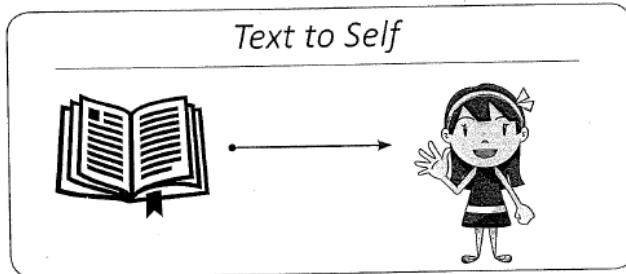
APPENDIX A

Student Handout 5.8c



Connecting Ideas When Writing in the Margins

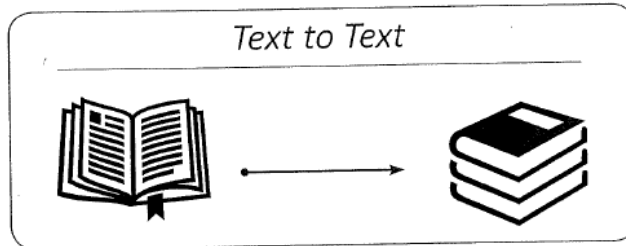
Name: _____ Date: _____



Text-to-Self = TS

Connect what you are reading to something from your life.

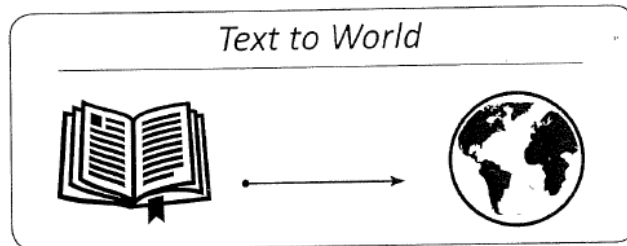
- "This reminds me of something that happened to me because..."
- "I felt like this character when..."



Text-to-Text = TT

Connect what you are reading to another story or text that you have read.

- "This book reminds me of _____ because they both _____."
- "This character makes me think of _____ from _____ because _____."
- "This theme reminds me of _____ because they both _____."
- "This author reminds me of _____ because they both _____."



Text-to-World = TW

Connect what you are reading to something in the world.

- "This reminds me of something that I heard on _____ because _____."
- "This reminds me of something that my _____ talked about because _____."

APPENDIX B

Book Rating

Student _____ Date _____

The Book _____ Author _____

This book was:

So good I couldn't put it down

Pretty interesting

OK

Not great

I rated the book this way because:

If I were to pass this book along to a friend, I would say:

APPENDIX C

Making Inferences About Characters

Select words that describe characters in a story, a biography, or a historical event.

Name of reader _____ Date _____

Reading selection _____

Character _____

I think this character is _____ because _____

Character Descriptions to Consider

bold	bossy	brave	courageous
cowardly	dangerous	dashing	daring
modest	audacious	fearless	afraid
confused	clever	timid	nervous
shy	tentative	oblivious	sneaky kind

APPENDIX D

Book Review: Narrative

Name _____ Date _____

Title of book _____ Author _____

Illustrator _____

My opinion of the story:

My opinion of the illustrations:

My recommendations to others about this book:

APPENDIX E

SELF-ASSESSMENT

Book Review: Nonfiction

Name _____ Date _____

Title of Book _____ Author _____

What was your opinion of this book?

What did you learn that was especially interesting?

How did the author use visuals such as graphs, photographs, or charts to explain the topic?

What techniques can you apply in your own writing?

APPENDIX F

Story Reflections

Draw a picture about the story.



One word about the main character

_____, _____

Two words describing the setting

_____, _____, _____

Three words telling the problem

_____, _____, _____, _____

Four words about an event

_____, _____, _____, _____, _____

Five words about the solution