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Building Comprehension Skills With Cognitive Training

Mindy Oakley
Hamline University

IMPACT OF EXPLICIT INSTRUCTION IN EXECUTIVE FUNCTIONING ON STUDENTS' ABILITY TO COMPREHEND TEXT

by

Mindy Jo Oakley

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Hamline University

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Primary Advisor: Susan L. Manikowski
Secondary Advisor: Joel Carlovsky
Peer Advisor: Laura Johnston

TABLE OF CONTENTS

CHAPTER ONE

Introduction

There is a growing deficit among students that lack executive functioning skills and struggle with comprehension in reading (Meltzer, 2007; Kaufman, 2010). It is this growing deficit and its impact on students that is the focus of my capstone question, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* Chapter one first explains the personal journey that I took in determining a capstone question. Following this description, a brief overview of the current literacy instructional practices in my school will be discussed. Next, the connection between my capstone question and the current literacy practices in my school will be analyzed. Finally, the stakeholders involved in this research question will be identified.

The Journey

During my grade school experience, it was expected that students take their time to complete work. We had to complete the work in an organized format, using our best handwriting. If our teachers could not read our work, then we had to complete it again so that it was legible. In addition to taking our time to do our best, we were expected to have basic skills that assisted in our comprehension of texts. We knew how to take one thing at a time, stay focused, and remember important details. If we happened to lack these skills, our teachers focused on those skills, whether within the classroom or with a specialist outside of the classroom. These foundational skills are also known as executive functioning skills. Executive functioning skills are skills that are necessary for

completing different goals and navigating different situations (Meltzer, 2007). By the end of grade school, all students seemed to have these basic, executive skills, or at least it seemed that way from the limited perspective of a grade school student.

As an undergraduate student I had four years of practicum and student teaching experience in preparation for a career in teaching. Throughout that experience, I noticed a shortage of these executive functioning skills in my students, such as the inability to control one's impulses, to problem solve and manage time, and to keep what has been learned previously in one's working memory. This observed lack of skills was present in fifth grade suburban classrooms, among second grade Hmong English Language Learners in an inner-city school, kindergarten students in a Spanish immersion school, and ninth graders in a small town middle school. Four years later, with three years of teaching experience in a third grade Spanish immersion elementary school classroom, I see a continually increasing deficit of these skills in my students. This growing deficit has me concerned for the future of my students. How are they supposed to succeed in their future when they lack these basic skills needed to succeed? How do I teach these executive skills to help my students? And more specifically, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?*

Throughout my four years as a classroom teacher, and specifically during my three years in a third grade classroom teacher, I have seen a decreasing presence of executive functioning skills in my students. Throughout this capstone study, executive functioning skills will be referred to as the set of cognitive skills and processes required

to help individuals complete different ongoing and goal-centered behaviors (Meltzer, 2007; Jacob & Parkinson, 2015). In addition to the lack of executive functioning skills, I have also seen an increased level of struggle among my students to be able to read and comprehend text at a deeper level. The depletion of these skills among my students is alarming to me as an individual who entered her career as a teacher to work for the success of her students in their future and education. From my limited perspective as a student in grade school, I saw the presence of these skills in almost all of my classmates. Yet throughout the last eight years of undergraduate programs and teaching experience, I have noticed a continually declining presence of these skills amongst the children with whom I work.

Developing The Research Question

During the summer of 2017, I had the opportunity to work as a teacher for the summer school program at the elementary school where I am currently employed. That year, leaders in our school worked to develop an innovative program, *Power Up!*, that would help to develop confidence and essential executive functioning skills in the students who participated in summer school. Most of these students struggled with these skills and lacked confidence in their ability to succeed in school. Throughout the four-week summer school program, I watched students begin to gain confidence in their ability to do well and the teaching of executive functioning skills seemed to be playing a part in this as well. It was this change amongst my students that sparked me to wonder what the connection might be between the development of executive functioning skills and the ability of my students to succeed in school.

The wonderings that began to develop during my experience with the summer school program, continued to mitigate in my mind throughout the start of the 2017 school year. The third grade classes were created based on student needs and academic success. There are four classes in the third grade cohort. Two of the classes are filled with a majority of the gifted and talented, or high achieving students of the cohort. One class has mostly English language learners and students with disabilities. My class is filled with students who are not labeled as high achieving and those that are working well below grade level in academic areas.

While only four weeks into the school year when it came time to determine a capstone topic, I had noticed a huge discrepancy amongst my students in the presence of executive functioning skills and the ability to deeply read and comprehend text during the literacy block. I used formative assessments, in the form of graphic organizers and one-on-one conferencing with my students to gain this information. Most of my students were able to implement the skills needed to comprehend text, however a few of the children lacked the skills needed to succeed in school. These few struggled to stay focused during a literacy lesson, they often seemed incapable of completing a task, such as filling in a graphic organizer or completing another assignment, and they lacked the motivation to learn how to read well enough to comprehend text. After seemingly endless ponderings of the needs of my students, I began to wonder if what was implemented in the summer school program might have an impact on the students in my class. These ponderings began to seep into my considerations as to what I would do my capstone project on. I began to feel passionately about needing to know more on the subject of

executive functioning skills and their ability to help students academically. It was this passion that led me to development my research topic on executive functioning skills and literacy, as well as my question: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?*

My Current Literacy Instruction

Current literacy instruction focuses on oral reading fluency, vocabulary, and comprehension. The instructional block at a district level is designed to last 120 minutes each day in the homeroom classroom. Sixty minutes are designed for core instruction. At the third grade level, ten minutes are to focus on phonics development and the remaining time is dedicated to a focus lesson that works with vocabulary and comprehension skills through direct instruction and a teacher read-aloud. There are also sixty minutes dedicated to targeted instruction that is focused to meet each individual student's literacy needs.

The current reality of literacy instruction in our Spanish immersion elementary school varies slightly from the vision of the district. Students receive sixty minutes of direct instruction in the English classroom each day. In addition to their time with the English specialist, they also receive sixty minutes of literacy instruction in their Spanish language homeroom. This hour of literacy instruction includes a focus lesson as a whole group mini-lesson, followed by targeted instruction to meet student needs. The reality of this literacy instructional framework limits the amount of time that can be dedicated to targeted instruction and is currently not meeting the needs of struggling learners in my third grade classroom.

Connection Between Current Literacy Instruction and Capstone Question

As discussed above, the current literacy practices in the third grade classroom provide limited time for targeted instruction. Students receive regular mini-lessons that focus on a specific literacy skill as a whole group, as well as focused lessons during their English class each day. The remaining time allotted for targeted instruction provides limited focus on meeting the needs of struggling learners. In addition to limited time for targeted instruction, students are only receiving instruction on literacy skills that they struggle with. How can students develop these literacy skills that are lacking if they do not have the executive functioning skills needed to execute these skills? There is a growing rate of children who have been labeled with learning disabilities, such as ADHD (Kaufman, 2010), which makes this question of even higher importance for educators to study if we are to benefit our students to our greatest ability. The question, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* seeks to develop a means to meet the needs of students who struggle with literacy skills through the development of executive functioning skills. It will be the question posed above that will be the focus of my research during the capstone project.

Stakeholders

The research question will play a significant role in the future success of students, and will have a lasting impact on families and colleagues who work with these students. The research question will lead to the creation of curriculum that seeks to develop executive functioning skills in students who lack these skills. The created curriculum will

also focus directly on the building of skills to deeply comprehend text. Lessons will seek to incorporate self-regulated learning and executive functioning skills which may prove to be effective for struggling readers due to their focus on comprehension, rather than isolated word reading (Hannon, 2012). The curriculum will seek to blend these two needs and skill sets. The designed curriculum will also intentionally bring into play ideas for what parents can do to help their child at home. Students will build executive functioning skills at home and in school and learn to apply those skills between the two environments. The development of executive functioning skills will seek to lead to increased student confidence and success in the classroom and at home. This increased sense of confidence could potentially help future colleagues who work with these students, as students would possess executive functioning skills as well as have increased comprehension skills in reading. Research has shown that learners with executive dysfunction can develop the executive skills needed to combat their struggles in reading (Kaufman, 2010). Reinforcing such strategic reading skills can help students to improve their reading comprehension and build confidence in students. The lasting impact of increased confidence and comprehension skills will help increase the chances of success of students and the colleagues who work with them.

Summary

The growing deficit among students that lack executive functioning skills and struggle with comprehension in reading is alarming (Meltzer, 2007; Kaufman, 2010). It is this growing deficit that is the basis for my capstone question, *how does explicit instruction in executive functioning skills impact students' ability to read and*

comprehend text at a deeper level? Throughout the introduction, the process of determining a capstone question was discussed, followed by a brief overview of what the current literacy instructional practices look like in my school. The connection between my capstone question and the current literacy practices was analyzed and finally, the stakeholders involved with this question were identified.

In chapter two, the literature on executive functioning skills and reading comprehension is reviewed. The literature will be analyzed, reflected upon, and connected with what other researchers and research communities are saying. Chapter three will provide a detailed explanation of the capstone project. The concluding chapter of the capstone, chapter four, is a reflective overview of the entire project, and provides my thoughts and realizations learned from the capstone experience.

CHAPTER TWO

Literature Review

Introduction

Chapter two of this paper studies the research that has been written on the topic of executive function in education. The chapter explores the many facets of the research question: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* The chapter first describes what executive functioning skills are, before uncovering to what extent executive skills have a presence in reading skills. The possible ways to teach executive function skills to young readers in a way that will assist comprehension will then be discussed, before finally describing the impact that executive dysfunction can have on comprehension of texts.

This literature review begins by exploring which executive functioning skills are necessary for completing different goals or for navigating different situations. The different theories that exist on executive functioning skills will be discussed within this section of the chapter. It is common to see a lack of different executive functioning skills among individuals who also have different learning disabilities. Several executive functioning skills can be seen in the reading skills needed for individuals to comprehend text. These skills are discussed, along with their presence of executive functioning in different reading skills, following their introduction.

Some methods of teaching executive functioning skills have been shown to be effective with individuals who are lacking different executive functioning skills. In this section, the different effective methods of teaching executive functioning skills and

reading comprehension are discussed. There is a direct correlation between the absence of executive functioning skills among individuals, and an increased struggle with reading comprehension (Cirino & Willcutt, 2017). It is the impact on comprehension from the lack of executive functioning skills that is analyzed in the final section of the chapter.

Executive Functioning Skills

Although defined using slightly varying terminology, Meltzer (2007), Dawson and Guare (2009), Kaufman (2010), and Forgan and Richey (2015), state that executive functioning skills are skills that are necessary for completing different goals and navigating different situations. There are a few different theories regarding executive functions, what they are, how they form, and their impact on individuals. A few of the influential theorists on executive function in education include Meltzer (2007), Kaufman (2010), Cirino (2017), and Willcut (2017). With the presence of varying opinions on the subject, it has been difficult for a single definition of executive functioning to be established. Forgan and Richey (2015) has described executive functioning in general as an overarching term for the cognitive processes that aid in goal-directed behaviors. Despite the differing perspectives by researchers on the subject, Jacob & Parkinson (2015) have determined that executive function can be collectively thought of:

> ...as the set of cognitive skills required to enable an individual to (a) prioritize and sequence behavior (e.g., put on pants before putting on shoes), (b) inhibit dominant or familiar responses (e.g., raise a hand rather than just blurt out the answer), (c) maintain task-relevant information in mind (e.g., remember the teacher's request to wash hands and then put on coats before going outside), (d)

> resist distractions (e.g., listen to the teacher rather than watch other children outside on the playground), (e) switch between task goals (e.g., switch between collecting information for a research report and organizing information into an outline), (f) use information to make decisions (e.g., which history class to take of the four being offered), and (g) create abstract rules and handle novel situations (a skill that is required to solve many math problems). (p. 512)

Meltzer (2007) uses another description of executive functioning skills that seems to be understandable for young learners. She reaches these young learners through the analogy of making a meal. In order to make a meal, a cook not only needs a recipe, but also the ingredients listed on the recipe. The key message provided by Meltzer (2007) is that a meal is not made by the act of just laying out different ingredients, nor by the isolated reading of a recipe. Similarly, the workings of executive function are meaningless if one does not understand the other cognitive workings involved. An even more colloquial way of describing effective executive functioning to individuals is by describing these functions as 'getting your act together' (Meltzer, 2007).

Executive functions are not present immediately at birth, rather they are developed over time as an individual grows. Executive functioning is slowly developing. It begins in infants at approximately nine months and continues until an individual reaches their early forties (Meltzer, 2007). These functioning skills also develop throughout different experiences and are impacted by individual situations that occur. Executive functioning "develops in a constant back-and-forth, up-and-down, interactive, looping fashion involving other cognitive domains" (Meltzer, 2007, p. 7). Just as these

functioning skills develop over time, the way in which they are used also changes throughout the different stages of life. The parts of the brain that are used by children when solving problems differs from that of adults (Meltzer, 2007).

Research has shown that the primary region of the brain that is associated with executive functioning is the prefrontal cortex. However, as Kaufman (2010) makes mention of, this area of the brain, is not the only neurological system that can affect an individual's attention and ability to self-regulate. Various studies on brain scans have shown that the cerebellum plays a key part in the execution of cognitive abilities, such as executive function. The Reticular Activating System arouses the prefrontal lobes to permit attention and executive functioning execution. Kaufman (2010) continues to explain that irregular or insufficient activation of these frontal lobes may contribute to executive dysfunction, while over activation may cause hyperactivity and hypervigilance. One final brain functioning system, the Reticular Activating System, is made mention of by Kaufman (2010) as an important source of the storage of long-term memories. Long-term memories play a role in the executive function of working memory (Forgan & Richey, 2015). The different brain systems that were mentioned above play into the different branches of executive function that are discussed in the following section.

There are two branches of executive function skills, the metacognitive strand and the social/emotional strand. The metacognitive strand of the skills aids comprehension, and task completion (Kaufman, 2010). The social/emotional strand assists in tasks related to its title, the social, emotional, and behavior regulation that is needed to function in society (Kaufman, 2010). When either of the two strands are not functioning properly, an

individual's ability to focus, set goals for themselves, activate prior knowledge, manage their time, set priorities, and be flexible are impacted (Forgan & Richey, 2015). The executive functions related to the social/emotional strand are generated in the frontal lobes of the brain, most commonly in the right hemisphere. Any damage to these areas of the brain can affect an individual's personality, perspectives, and emotions. Planning, organization, and regulation skills can also be affected if damage occurs. As previously stated by Goldberg (2001), it is these same regions of the brain that are involved in executive functioning (Meltzer, 2007).

While educational research has focused on young learners, executive function problems can affect all individuals, including adults with and without disability labels (Kaufman, 2010). Issues with executive functioning can also fluctuate based on the current situations an individual is facing. Executive functions are often "impaired in many disorders, such as ADHD, learning disabilities, autism, and schizophrenia" (Forgan & Richey, 2015, p. 4). Many learning disabilities have identified sources of executive dysfunction (Meltzer, 2007). However, impaired executive functions are IQ dependent, which means that even very intelligent children can deal with executive dysfunction (Forgan & Richey, 2015). Many children that seem to be scattered, but are very intelligent, such as gifted children, simply lack executive functioning skills. According to Dawson & Guare (2009), the lack of these skills make it difficult:

> to *execute* tasks: [such as] getting organized, planning, initiating work, staying on task, controlling impulses, regulating emotions, being adaptable and resilient - just about everything a child needs to negotiate the typical demands of childhood

> in school, at home, and with friends. Some kids lack certain executive skills or [just] lag behind in developing them. (p. 1)

A deficit in executive functioning skills has been linked in various studies to academic achievement. The question of how lacking these skills can affect students in their academics holds more significance to families of children who have been diagnosed with different learning disabilities (Cirino & Willcutt, 2017), specifically those whose learning disability affects comprehension. The process of identifying the impact of executive dysfunction on a child can be difficult as a child that has a language-based learning disability can struggle academically, experience anxiety, and lack self-confidence. Yet, this same child can show strong executive functions in their non-academic activities such as athletic and artist endeavors (Meltzer, 2007).

Meltzer (2017) emphasizes the reality that the increasing amount of high-stakes standardized testing in schools has caused increased levels of anxiety in students. These elevated levels and situations of anxiety have perpetuated more executive dysfunction among students (Meltzer, 2007). The importance of doing well academically has led to the presence of more interventional support for struggling learners. There have been various studies that have sought to clarify the impact that interventions focusing on executive function can have on improving student reading comprehension. Most studies have shown some positive impacts on executive function, however there is still no driving evidence that the impacts on executive function can increase student success in academics (Jacob & Parkinson, 2015). The interventions that have shown positive results on academic achievement were designed to work on executive function and student

achievement at the same time. Therefore, there is no way to verify that isolated impacts on executive function can lead to increased academic achievement (Jacob & Parkinson, 2015).

This section of the literature review sought to explain what executive function is, specifically from an educational standpoint. In addition to defining executive functioning skills, the impact that executive dysfunction can have on a child's academics was also briefly introduced. The source of executive functioning in the brain was also discussed in order to give a clearer description of where executive function and dysfunction originate. The understanding of the origin and function of these skills is essential in order to deeply comprehend the information found in the following sections of this literature review and study.

Executive Skills Connected to Comprehension

There are several different executive functions (Forgan & Richey, 2015), although two of them seem to be present more often in different reading comprehension tasks. These two functions include impulse control and working memory (Berlin & Bohlin, 2002; Blair & Razza, 2007). The other executive functions include flexibility and emotional control, focusing and self-monitoring, organizing, time management, taking action, sustaining effort, and strategizing, or problem solving (Forgan & Richey, 2015). Impulse control can be thought of as a stop sign that prevents individuals from being irrational. Students who lack impulse control continuously run the stop sign because they are not able to see the stop sign (Forgan & Richey, 2015). Inhibition control can help

with inferencing, as it assists in eliminating irrelevant information from decision making (Forgan & Richey, 2015).

Forgan and Richey (2015) defined working memory as the ability to retain information after being learned so that it can help to complete a future task. This working memory combines newly learned information that is held in the short-term memory with previously learned information stored in the long-term memory (Forgan & Richey, 2015). Students who lack working memory often exhibit disorganization in different areas of their life. Their disorganization causes an increased workload on their working memory, which can affect their comprehension of text (Forgan & Richey, 2015).

Forgan and Richey (2015) also emphasized that there are multiple theories that exist on executive functioning skills and the role they play in an individual's life. Their research showed that it is common to see executive dysfunction among individuals who also have different learning disabilities, although it can be seen in any individual. While there are several different executive functions, the two that are areas of focus in this chapter of the literature review are working memory and inhibition control. Executive skills are commonly present in different reading skills, although the researchers used in the literature review are examples of how researchers are still in disagreement as to what extent they may affect reading comprehension. It is the presence of executive reading skills that must be understood, as reading skills are a key element of the study. Just as executive skills and reading skills must be understood in a context separate from one another, their relationship to one another must also be understood. Understanding their

relationship will help to determine the impact of one on the other throughout the course of the study.

Executive Functioning Skills and Reading Skills

Several executive functioning skills are present in the reading skills needed for individuals to comprehend text. Most frequently, inhibition control and working memory are employed by the reader when completing different tasks, as stated by Berlin and Bohlin (2002), and Blair and Razza (2007). Executive functioning skills have been seen in both higher-level and lower-level reading skills. Higher-level reading skills are those that require more complex processing, such as inferences. Lower-level reading skills are more foundational, basic skills, such as reading fluency. From word recognition to the making of inferences, these skills are present in some form. This section of the chapter first discusses the presence of executive functioning in reading comprehension ability. The different higher-level and lower-level reading skills are then touched upon briefly, noting their connections to executive functioning.

There is some disagreement among researchers as to what extent executive functioning skills impact comprehension in readers. According to Berlin and Bohlin (2002), and Blair and Razza (2007), "working memory and inhibitory control have been identified as the major aspects of executive functioning that contribute to young children's early academic achievement" (Chung & McBride-Chang, 2011, p. 910). Strasser and del Río (2013) suggested that when readers are asked to respond in a way that demonstrates their comprehension of a text, they demonstrate their vocabulary, monitoring, inferencing, working memory, inhibition control, and attention skills. The

specific skills of inferencing, vocabulary, and working memory seem to play the greatest role in reading comprehension (Strasser & del Río, 2013). Throughout their research study, Strasser and del Río (2013) defined comprehension as "a group of interrelated skills that allow the person to build a coherent representation of a story" (p. 170). There was also a focus on the executive functions of working memory, inhibitory control, and attention control embedded into the study.

Working memory is employed by a reader in both word reading and general reading comprehension (Kieffer, Vukovic, & Berry, 2013). According to Kieffer, Vukovic, and Berry (2013), "research suggests that working memory is necessary to keep initial phonemes in memory while sounding out the rest of a word, to retrieve new word meanings in memory, and to integrate information across individual word meanings in sentences while holding those word meanings in memory" (p. 335). These same authors further emphasize the role that working memory plays in word reading and reading comprehension. According to Dixon, LeFevre and Twilley (1988), working memory capabilities have been found to be of less importance when compared to the efficiency of working memory during different reading processes. Research has shown that there is a direct correlation between inefficient operations of working memory during reading and the presence of reading disabilities (Chung & McBride-Chang, 2011). Due to the essential importance of effective working memory in reading comprehension, when there is a deficiency of these effective operations, readers often struggle with inference making and self-monitoring of comprehension of texts. While working memory is important for

reading comprehension, it does not seem to play as large of a role in the passive storage of information (Cain, Oakhill, & Bryant, 2004).

As cited in Strasser and del Río (2013) when studying inhibition control, Cain et al. found that upper elementary readers who struggle with comprehension show deficits of this executive function when compared to those who exhibit favorable comprehension skills. As stated by Blaire and Razza (2007), inhibition control has been linked to reading achievement. Children with strong inhibitory control often exhibit higher levels of reading achievement (Chung & McBride-Chang, 2011). Correlations between comprehension and inhibition control lead to the questioning of how this skill is able to affect an individual's reading abilities. Strasser and del Río (2013) suggested that integrating different elements of a story when reading and listening requires focused attention on relevant material, as well as the ability to eliminate irrelevant text. Those who are able to successfully comprehend text must have the ability to inhibit their attention to attractive yet insignificant details and focus on more discrete but important details when reading (Strasser & del Río, 2013). This capability allows readers to have larger amounts of working memory available for comprehension (Strasser & del Río, 2013). Although multiple executive functioning skills such as inhibition control and working memory seem to be employed at the same time when reading, they remain isolated from one another during these processes (Kieffer, Vukovic, & Berry, 2013). Understanding the presence of executive functioning skills in reading skills, as well as their relation to one another is essential in order to be able to make the connection between executive dysfunction and struggles with reading comprehension.

Higher and Lower Level Reading Skills

The combination of solid higher and lower level reading skills are used synonymously by a reader to comprehend a text. As noted by Pressley (2000), and Hannon and Daneman (2001), these skills are categorized as those that occur at different points on the language processing chain. Cain, Oakhill, and Bryant, (2004) place word recognition as a lower level skill and inferencing as a higher level skill. Inferencing is classified as a higher level processing skill because it helps in building meaning-based representation of the text (Cain, Oakhill, & Bryant, 2004). In addition to the different types of reading skills that are employed when comprehending a text, readers also exhibit the use of executive skills when deciphering text. Working memory, for example, can be found in both higher and lower level reading skills. Hamilton, Freed, and Long (2016) found that the more effort a reader puts towards word decoding, the less they are able to apply to higher level comprehension skills, such as inferencing. In other words, the larger the workload on working memory for lower level reading skills, the less available output there is remaining for higher level reading skills. Slower word decoding skills require more use of working memory, which is used among all readers, including those who are proficient (Hamilton, Freed, & Long, 2016). Additionally, word knowledge is a predictor of reading performance (Dixon, LeFevre, & Twilley, 1988). Therefore, it makes sense that smaller reading vocabularies would put a strain on the working memory, which then leads to poorer reading abilities because of the limited availabilities of working memory to fuel higher level reading skills.

Hannon (2012) stated that due to the effect that mastery of lower level reading skills can have on working memory, as students confront more complex and cognitively demanding texts, the need for comprehension increases. Working memory tends to influence an individual's reading performance. This is due to the needed skill of holding information in the working memory while at the same time ciphering and retrieving information previously stored in a reader's long-term memory (Chung & McBride-Chang, 2011).

While working memory seems to present itself in a variety of reading level tasks, inhibition control is generally found in higher level reading skills. One such example is in inferencing. A reader must be able to resist the immediate interests of what they are reading, and try to focus on the larger idea. Readers who struggle with inhibition control may deal with inefficient encoding and retrieval of information because of their inability to ignore irrelevant, but enticing information (Chung & McBride-Chang, 2011). The ability to suppress irrelevant information is a grounding element in the executive function of inhibition control.

Despite the role that working memory and inhibition control, along with other executive functions, play in reading comprehension, it is important to remember that working memory is only one of several elements that play a role in comprehension skills and development (Cain, Oakhill, & Bryant, 2004). One skill alone cannot be responsible for successful reading abilities. Rather, the ability to successfully comprehend texts requires an army of different skills. It is the teaching of these skills that will be analyzed in the following section of this chapter.

Teaching of Executive Functioning Skills

Several methods of teaching executive functioning skills have been shown to be effective with individuals who are lacking such skills (Kaufman, 2010). Those who are teaching these skills should not expect the interventions to be short term, rather they are most effective when implemented slowly, with an end goal in mind (Meltzer, 2007). In this section, the different effective methods of teaching executive functioning skills and reading comprehension will be discussed. The process and effectiveness for individuals learning and employing executive functioning skills will also be an area of focus within this section of chapter two.

Several instructional strategies can help to build strategic reading skills for students who struggle with executive functioning weaknesses. These strategies focus on what a reader should do before, during, and after reading a text (Kaufman, 2010). Interventions that incorporate self-regulated learning and executive functioning skills may prove to be effective for struggling readers due to their focus on comprehension, rather than isolated word reading (Hannon, 2012).

Some approaches that could potentially help struggling readers who deal with executive dysfunction include before, during and after reading strategies. One before reading strategy includes the teaching and modeling of the importance of thought gathering, such as having students think of what they know already about a subject. This is also known as activating prior knowledge in readers (Kaufman, 2010). Teaching students to develop a plan for comprehension goes along well with teaching students how to activate prior knowledge. Kaufman (2010) advised teachers to explicitly teach students

how to develop their own plan for comprehension of text and then provide them with an abundance of guiding practice in the use of the pre-reading strategy. One effective method of teaching students to create a comprehension plan is through the use of a KWLS (What I **K**now, What I **W**ant to Know, What I **L**earned, What I **S**till Want to Learn) chart, as it helps to activate prior knowledge, monitor comprehension during reading, and plan for potential future learning. Additional before reading strategies include the use of book walks and text surveys in the classroom (Kaufman, 2010).

Just as there are several before-reading strategies that help to develop working memory in young readers, there are also many strategies that can help with comprehension while reading. Students need to be taught that good readers are also cognitively active readers. Kaufman (2010) acknowledged that many children, specifically those with ADHD, find video games to be appealing because of the constant provision of new, interesting content without the requirement of active processing. Many of these same children find reading to be less appealing because, contrary to the constant provision of information found in video games, reading requires the active construction of meaning and finding enjoyment in the words they are reading (Kaufman, 2010). Teaching students to think about what they are reading, while they are reading, can help those who struggle with executive dysfunction to comprehend text (Kaufman, 2010).

Other during-reading strategies include teaching students how to visualize, monitor their comprehension, and keep their thoughts and confusions in their minds while reading by jotting down notes in the margins of a text (Kaufman, 2010). As cited in Cain, Oakhill, and Bryant (2004), Yuill and Joscelyne (1988) found that “Children’s

inference making improves when they are trained to focus on keywords in the text" (p. 33). Training kids to focus on keywords while reading can also aid in their comprehension of texts. Peer-led discussion groups are one way to assist students in developing their comprehension strategies if designed in a way that supports comprehension skill development (Berne & Clark, 2008). In sharing the strategies they are using to comprehend text, students are able to increase their ability to think about their comprehension processes, as well as model these processes for other peers (Berne & Clark, 2008). Berne and Clark (2008) emphasized the importance of providing scaffolding and practice over time with a variety of texts when helping build strategic reading skills among students.

Finally, just as there are before and during reading strategies for improving comprehension in those with executive function weaknesses, there are also after-reading strategies. One very important strategy is teaching students how to summarize what they read. Not only does this strategy teach readers how to organize their thoughts, it can also "help to crystallize children's comprehension of key elements, while also requiring them to flex some important executive function muscles" (Kaufman, 2010, p. 114). Using structured reading response logs can also help students to comprehend the text that they read. However, these reading response logs tend to be vague and poorly suited for those dealing with executive dysfunction. Those who face executive function weaknesses that make reading comprehension a struggle, "respond more effectively and productively to a highly structured reading-response format that limits a lot of the guesswork, decision making, and thought organization elements of the response process" (Kaufman, 2010, p.

115). Finally, the use of dramatic role play can also help to get the concepts from a text into a child's memory in an efficient, and long-lasting manner (Kaufman, 2010).

This section of the paper sought to provide several strategies that assist students who struggle with executive dysfunction in their reading comprehension. As Kaufman (2010) advised, teachers need to explicitly teach and provide guiding practice in the use of reading strategies that aid in comprehension of text. The strategies listed in this section are a small sampling of the many reading strategies that teachers can implement when teaching and providing guiding practice with comprehension. These strategies are also one method that educators can use to aid in the process of effectively teaching executive functioning skills, which is one of the end goals of this study.

Cognitive Training The process and effectiveness for individuals learning and employing executive functioning skills is important to consider before implementing an intervention plan. Any direct cognitive training will most likely yield more robust results when executive functions are blended with explicit reading instruction (Hannon, 2012). Despite the research on the importance of including executive function principles in intervention instruction, there is still dissenting evidence as to what extent executive functions can be molded and changed as the result of intervention (Jacob & Parkinson, 2015).

There are a few studies that have focused on closely evaluating interventions that were implemented with the intent to positively impact executive dysfunction. These studies have shown evidence of executive functioning skills being influenced by intervention, but have not provided convincing evidence that these impacts increase

academic achievement (Jacob & Parkinson, 2015). While many interventions have shown positive impacts on student achievement, executive function "studies all involve interventions designed to influence executive function and achievement simultaneously, and as a result there is no way to determine if changes in executive function led to observed increases in achievement" (Jacob & Parkinson, 2015, p. 541). Due to the divided results of the impact on executive functions, educators must consider the possibility of implementing executive function training amid other academic skill interventions.

Ericsson and Kintsch (1995) found that helping students retrieve their previous knowledge on a given subject is one way to help combat the limitations of executive dysfunction. Having extensive knowledge in a given area can help to contest limitations of working memory assisting comprehension skills (Chung & McBride-Chang, 2011). Another approach to consider for interventions is the use of intrinsic motivation for the reader (Schwabe, McElvany, & Trendtel, 2014). Meltzer (2007) noted that a student who exhibits executive function difficulties will often begin a task as the result of an impulsive idea, without having developed a future plan of action. Without an unclear end goal, students struggling with executive dysfunction will get stuck and become lost as to how to complete the given task. Having a student set their own goal will result in a greater sense of commitment to a task and an increased motivation to reach their goal (Meltzer, 2007).

One final, but essential step in ensuring cognitive training success, is to practice before beginning an intervention. Additionally, extensive amounts of praise and positive

feedback can also aid in the success of an intervention. Practicing or role-playing a procedure that helps to build a conscious response to inhibition control is key to reaching desired results. In everyday experiences, opportunities can arise that could potentially challenge inhibition control. Therefore, practicing a procedure or response when emotions are not involved, can help an individual with executive dysfunction prepare to follow a given plan in an unexpected moment (Dawson & Guare, 2009).

Several methods of teaching executive functioning skills have been shown to be effective with individuals who are lacking such skills (Kaufman, 2010). This section of the chapter described some of the many methods of teaching executive functioning skills in connection with reading comprehension that have proven to be effective. The learnings gained from studying the methods of teaching executive functioning skills in connection with reading comprehension are vital for the future development of this study and aid in answering the question: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* These findings are also impactful in the future development of curriculum that is based on this study. Understanding the importance of teaching executive skills to young readers is vital, as executive dysfunction can have a significant impact on an individual's reading comprehension skills.

Impact on Comprehension with the Absence of Executive Functioning Skills

Research has shown that there is a direct correlation between the absence of executive functioning skills among individuals, and an increased struggle with reading comprehension. Kaufman (2010) and Meltzer (2007) have completed extensive research

on the impact of executive functioning weaknesses in education, such as its involvement with comprehension. It is the impact on reading comprehension from executive dysfunction that will be analyzed in this section of the chapter. First, the connection between the absence of executive functioning skills and struggling readers will be discussed. This will be followed by the important possibility of future development of executive functioning skills as children mature.

Struggling readers often deal with executive dysfunction. Oftentimes, children who struggle with a developmental disability, such as attention-deficit/hyperactivity disorder, or ADHD, that lead to academic struggles, also struggle with executive function difficulties (Kaufman, 2010). Individuals labeled with a learning disability often receive lower scores on standardized tests and classroom assessments of reading comprehension, and productivity (Friedman, Rapport, Raiker, Orban, & Eckrich, 2017). However, despite the increased presence of executive dysfunction among individuals with attention-deficit/hyperactivity disorder, the traits of this dysfunction are also visible among other struggling readers.

When children enter elementary school, they are learning how to read. This is an essential skill that helps them to transition into reading to learn in their future educational experience (Friedman, Rapport, Raiker, Orban, & Eckrich, 2017). If they are unable to develop foundational reading skills, they are more likely to struggle with weaker comprehension skills in the future (Lepola, Lynch, Kiuru, Laakkonen, & Niemi, 2016). As Levine (1998) has stated in previous research, in order to decode multisyllabic words, readers must be able to keep the initial sounds of the word in their working memory

while trying to decode the remaining portions of the word. Children who struggle with impulse control can often be found guessing as to what the word is based on their decoding of the beginning parts of the word, and the words similarity to other known words. Additionally, students who have a limited working memory might forget what they learned at the beginning of a paragraph by the time they get to the end of the paragraph (Kaufman, 2010).

While executive dysfunction can lead to struggles with decoding words and comprehension, some individuals can negotiate their way to strong word reading skills. They do so by relying on their stronger language and memory abilities. However, if students do not possess these skills that can compensate for their executive dysfunction weaknesses, they can find the process of developing decoding skills to be slow and very frustrating. For example, a child that has ADHD may struggle to stay focused long enough to glean phonemic knowledge, despite possessing the phonological awareness skills needed to learn letter-sound associations, and are thus unable to hold this information in their working memory long enough to use it for reading (Kaufman, 2010).

Any child who struggles with executive dysfunction but possesses decoding skills will most likely struggle with reading comprehension, "children with self-awareness and self-monitoring issues are apt to have limited recognition of their levels of comprehension as they read and may therefore be unable to sense when they must pause, go back, and engage in fix-up strategies" (Kaufman, 2010, p. 103). These struggling readers will often exhibit expressionless reading as they continue to remain at the surface level of text processing. Accordingly, "these children are not reading for meaning and are

therefore unable to generate the expression that is characteristic of strong fluency" (Kaufman, 2010, p. 100).

Individuals who have faced years of reading difficulties may "exhibit corresponding deficits in motivation, negative attitudes toward reading, and other [self-regulated learning] related weaknesses" (Cirino et al., 2017, p. 451). Despite the presence of executive dysfunction in struggling readers, there is a possibility that learners may develop executive skills as they mature, and therefore combat reading weaknesses and years of struggle. There are several instructional strategies that can help to build strategic reading skills for students who struggle with executive dysfunction. These strategies focus on what a reader should do before, during, and after reading a text (Kaufman, 2010). Reinforcing such strategic reading skills can help students to improve their reading comprehension despite dealing with executive function weaknesses.

The researching of the material written on executive functioning skills and reading comprehension was useful in determining what possible future action steps are involved in the creation of a curriculum that teaches executive functioning skills in relation to comprehension. While it is important to address these skills when teaching reading, it can difficult to isolate the executive functioning skills from one another. The research also aided in learning how to teach these executive functioning skills, specifically in relation to reading comprehension. The purpose of the curriculum that will be designed in the capstone project will be to help make a positive impact on executive functioning skills in young readers as well as their comprehension, so that executive dysfunction will not have a negative impact on their reading skills. The research included

in this literature review sought to answer the question, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?*

Summary

The purpose of this literature review was to consider the research that has been completed regarding the connection between executive functioning skills and reading comprehension. The guiding question for the research was: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* This literature review began by describing what executive functioning is, followed by a discussion of the relationship between executive functioning skills and reading. Following this discussion, the literature review looked at effective means to teaching executive skills in relation to comprehension. Finally, the impact of executive dysfunction on a student's success in reading was studied.

In conclusion, the research found that the presence of certain executive functioning skills, specifically working memory and inhibition control, directly benefits students who are learning how to read and comprehend text. Additionally, the absence of executive functioning skills directly impacts students who are learning how to read and comprehend text. The more strain placed on the working memory, the less is available to aid in comprehension. Lacking in inhibition control can make it difficult for a reader to ignore irrelevant details and create inferences. Both higher and lower level reading skills can be affected by executive dysfunction. Future action steps regarding the capstone project are to continue researching the impact of executive functioning skills on reading

comprehension. Following the process of researching the connection will be the study of how to teach executive functioning skills in an effective way that also leads to increased comprehension levels in struggling readers. The information gained in these studies will then be joined together to create a curriculum that benefits struggling readers and builds executive functioning skills.

In chapter three, a detailed explanation of the capstone project will be provided. The chapter will seek to answer essential sub questions to the guiding research question of *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* A general overview of the project will be identified, as well as identify the intended audience of the project. A detailed explanation of how this audience was chosen will also be included in the chapter. The context of where the project takes place will be given, followed by the describing of any frameworks and theories used, and finally providing a timetable for the project. Chapter three will also describe the rationale behind choosing to create a curriculum as the medium for presenting the culminating capstone project.

Chapter 3

Project Description

Introduction

The following project sought to answer the current research question of, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* The project involved the creation of curriculum that provided options for how a school could implement the teaching of executive functioning skills into curriculum to increase reading comprehension among their students. Research for the literature review of chapter two revealed that the two most frequently accessed executive functioning skills among students when comprehending texts are working memory and inhibition control. These two skills were implemented into the curriculum in ways that may continue to help students develop stronger comprehension of texts.

In this chapter, a detailed explanation of the capstone project is provided. The chapter seeks to answer essential sub questions to the guiding research question of *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* A general overview of the project is identified, as well as the identification of the intended audience of the project. A detailed explanation of how this audience was chosen is also included. The context of where the project takes place is given, followed by the description of any frameworks and theories used, and finally a timetable for the project. Finally, this chapter describes the rationale behind choosing to create a curriculum as the medium for presenting the culminating capstone project.

Description of the Final Product

The curriculum was designed to cover a period of five weeks, or twenty-five academic days. The duration of each lesson is sixty minutes, the time frame allotted for the language arts block in the school where the curriculum designer teaches. Lessons sought to teach skills that assist in improving reading comprehension, specifically for those who struggle in reading. These skills focus on pre-reading, during reading, and after reading strategies. Lessons also sought to use these pre-reading, during reading, and after reading strategies to help improve the working memory and inhibition control in students who struggle with executive dysfunction.

Each of the lessons designed for the curriculum followed the structure used during the current language arts block in the school where the designer teaches. The lessons began with a mini-lesson before providing students with the opportunity for guided practice. The class then divided into two separate groups that were run simultaneously. The teacher worked with small groups while the remaining students completed their independent work. Small groups were to be determined by the current reading levels of each of the students and were meant to be flexibly changed during the course of the unit due to student progression to higher reading levels. Each of the lessons came to an end with a short time of closure that allowed both the students and the teacher to review the strategy that was the focus of the lesson, and to vocalize how the reading strategy might be applied to the students' reading comprehension skills.

Recognizing Student Needs

In order to know what student needs are, the curriculum included two different needs assessments. One of the needs assessments focused on comprehension skills while the other assessment focused on identifying each student's current reading level. The comprehension skills assessment was taken from an assessment previously developed by Jan Richardson, which was then modified to fit the designed curriculum (see Appendix A). Using a grade level text, or a current reading level text, the instructor uses a modified version of Jan Richardson's Comprehension Interview, taken from her book, *The Next Step in Guided Reading* (2009). Upon conclusion of the interview, the instructor then reviews each of the students' comprehension interview results and determines what the appropriate next steps are for instruction.

The second assessment included in the curriculum focused on identifying each student's current reading level before beginning the five-week unit. The results from the given assessment were to be used with the formation of small groups during the curriculum unit. Each grouping of students was determined using the students' current reading level. The reading level assessment was taken from the online database of reading resources, Raz-Plus (2018). The Raz-Plus (2018) database provided assessments for every reading level which allowed for accurate identification of student reading levels during the creation and use of the curriculum (see Appendix B). Each of the assessments listed in this section were administered at the end of the curriculum unit as a summative assessment. Their use as a summative assessment provides the instructor with accurate

data points to monitor student growth in reading fluency and comprehension as a result of the instructional unit.

Unit Design Framework

The design for the unit was developed using a model that the project author had previous experience using. It is the model and framework that was frequently used in the past in her district when developing science curriculum. The author chose to use this framework because of its thoroughness and applicability. The unit design framework guides the creator of curriculum through the process of backwards design to develop curriculum (see Appendix C).

After determining the time frame, grade level, and date of implementation, the framework seeks to have the user identify the enduring understandings, essential questions, and learning targets that are to be present throughout the unit. Following the identification of these desired results, the user develops assessment evidence for the unit, including formative and summative assessments of learning. The document also seeks to identify what the user has learned thus far through the use of the framework, as well as the 'how might we?' questions that are used throughout the district. The curriculum designer then goes through the process of ideation with the guidance of the framework, before finally creating a customized learning plan, or unit sequencing prototype.

The unit design framework was developed by the author's school district using Wiggins and McTighe's work, *Understanding by Design* (1998), as well as the website *Design Thinking for Educators*. The descriptors within the framework were adapted from McTighe's website, *Jay McTighe & Associates Educational Consulting*, the *Schlechty*

Center on Engagement, and the school district's innovation configurations. The district's innovation configurations are used as a planning tool for initiatives within individual schools as well as at the district level ("Innovation Configurations," n.d.). They are used to guide reflective practice and plan for professional learning among educators, as well as to promote reflection of progress towards a given vision ("Innovation Configurations," n.d.). While the innovation configurations look like a rubric, they are not used for evaluation, but rather as a guide for district employees ("Innovation Configurations," n.d.).

Evaluation

The unit was designed for use in a third grade classroom. The ideal classroom for future implementation would be a class with several students who are struggling readers and deal with executive dysfunction. The curriculum should be implemented with the entire third grade class. Students who are struggling readers or who lack certain executive function skills will receive more small group, intervention-style instruction with the implementation of the curriculum. The effectiveness of the curriculum would be evaluated based on qualitative evidence, as well as the results from the reassessment of the students' comprehension skills and reading fluency levels. In order to assess the progress of students' skills, the same assessments would be given as those which were used at the start of the curriculum.

The project sought to answer the current research question of, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* The project involved the creation of curriculum that

implemented the use of cognitive training to aid in strengthening the executive functioning skills of working memory and inhibition control to increase reading comprehension among students. The curriculum provided lessons for five weeks of instruction. The creation of a curriculum that assists in building reading comprehension and executive skills was supported by research completed in the literature review of chapter two that focused on the topic of executive functioning skills.

In order to determine if students benefited from the implementation of the curriculum designed during the capstone process, both the comprehension skills assessment and the reading fluency leveling assessment were given both at the start and end of the unit. When given as a pre-assessment, the instructor was able to identify each student's current reading level and their comprehension skills. Administering the assessments at the end of the curriculum unit provided the instructor with accurate data points to monitor student growth in reading fluency and comprehension as a result of the instructional unit. Student improvement in the comprehension skills assessment, as well as a student's progression in their reading fluency level would allow the instructor to determine that students benefited from the implementation of the project designed during the capstone process.

Supporting Research

There were several examples of supporting research that correlated with the project approach of writing curriculum. Research has shown that upper elementary readers who struggle with comprehension show deficits of executive function when compared to those who exhibit favorable comprehension skills (Strasser & del Río,

2013). Due to the impact on executive functions, educators must consider the possibility of implementing executive function training through the use of cognitive training amid other academic skill interventions (Chung & McBride-Chang, 2011).

The use of interventions that incorporate self-regulated learning may prove to be effective for struggling readers due to their focus on comprehension, rather than isolated word reading. Any direct cognitive training will most likely yield more robust results when the foundations of executive function are combined with direct reading instruction (Hannon, 2012). The curriculum implemented strategies that focus on what a reader should do before, during, and after reading a text. These strategies have been shown to help build strategic reading skills for students who struggle with executive functioning weaknesses (Kaufman, 2010). The implementation of before, during, and after reading strategies is an area of focus in the district where the project author works.

Setting

The project took place in a Spanish immersion elementary school that is located in a suburb of Minneapolis. The school works with students from kindergarten to fifth grade. Each grade level has between three and five classrooms with approximately 25 students per class. Staff members come from several different Spanish speaking countries, as well as from different parts of the United States. All staff members have a range of Spanish speaking skills and previous experiences. There are a total of forty-one teachers that work directly with students in the school.

The elementary school serves students from both low-income and middle class families. Approximately 85% of the students are either White or Black, and 15% of the

students are of Hispanic background. The majority of the students speak English at home and are learning Spanish at school. This situation is very similar to that of English Language Learners in their language learning context. Many of the learners are reading below grade level in English. Students in the school do not receive daily, explicit English reading instruction until the third grade. The reading level of the learners is directly impacted by the fact that students are learning in their second or third language during the day, rather than in their native language. The diversity of the participants in the project can have strong impacts on their reading skills.

Timeline

The following timeline provides information on the process of developing the curriculum for executive functions and comprehension skills. Over the course of eight weeks, beginning in the first week of February 2018, a draft of each lesson plan was developed. Approximately one week of lesson plans was developed during each two-week span over the course of two months. All lesson plans and curriculum materials were developed by the start of April 2018. Any revisions to the drafted curriculum were made by the end of April. The project was completed in its entirety by the end of April 2018. Beginning in February 2018 and ending in May 2018, the project was developed and evaluated over the course of four consecutive months. The above timeline was proposed using pacing guides and timeline proposals used in Hamline University's Master's of Literacy Education program.

Summary

In chapter 3, a detailed explanation of the development of curriculum was provided. The chapter sought to answer essential sub questions to the guiding research question of *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* These questions were answered in a general overview of the project, as well as in the identification of the intended audience of the project. A detailed explanation of how this audience was chosen was also included in the chapter. The context of where the project takes place was given, followed by the description of any frameworks and theories used to design the curriculum. Finally, a timetable for the project was provided. Chapter 3 also described the rationale behind choosing to create a curriculum as the medium for presenting the culminating capstone project.

Chapter 4 will provide an overall reflection of the project in its entirety. The chapter revisits the research question, *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* The chapter reflects on the learnings of the project creator, as well as any of the surprising and unexpected learnings that occurred throughout the writing, creation, and implementation of the project. The research will then be revisited, analyzing which parts of the literature proved to be the most important in the creation of the curriculum. The limitations of the project are discussed, as well as how the project may influence future research regarding the subject. Finally, recommendations based on research findings will

be communicated, as well as the implications these findings may have on the education profession.

Chapter 4

Conclusions

Introduction

The first three chapters of this capstone paper discussed the formation of the research question, the review of pertinent literature that sought to answer the research question and finally, the development of a literacy curriculum that responded to the research that was found regarding the research question. The question that founded each of the previous three chapters was: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* The fourth, and final chapter of this paper will discuss the learning that resulted from the research and capstone process, the potential future implications of the capstone project and curriculum development, and finally, the limitations of the project.

Context

As the Science Curriculum Lead for my building, I have had the experience of designing science curriculum with the help of science curriculum leads from the other two elementary schools in the district. While challenging and lengthy, the designing of curriculum has always proven to be professionally rewarding in the end. Knowing that I have helped to create something that will impact hundreds of third grade students around the district always leads to feelings of accomplishment and pride for my work. After completing the literature review, the clearest form of applying all that was learned into one culminating project seemed to be that of creating curriculum. As a peer leader in my

school and district, as well as with my previous experience creating curriculum, I felt that teachers would be responsive to this curriculum, as its design was backed with both experience and research. The purpose of the capstone project is to create a final product that could have future use and impact in the school or district where it was created. After completing the curriculum, I believe that its implementation in the elementary schools of our district will fulfill the purpose of the project. The curriculum was designed to be a resource for third grade teachers in the school where I currently teach. However, upon its completion, I believe that the curriculum could also be modified and adapted to fit second, fourth, and fifth grade classrooms as well. This would help to fit the needs of the professionals who teach these grade levels in any setting.

Learnings

Throughout the capstone processes, I have learned a great deal as a researcher, writer, and learner. In completing all of the necessary research needed for the literature review, I developed skills needed in order to be a successful and efficient researcher. Before beginning the capstone process, I was like a developing reader who can read the words on the page but is still learning how to transfer those words into something meaningful. I knew the basics of how to complete a solid research essay, but I was always operating at a surface level. I never delved deeper into my research. Being passionate about finding an answer to the research question allowed me to counter my previous habits of surface level research to delve deep into the literature surrounding executive functioning skills, their impact on reading comprehension, and their impact on the general well being of the students throughout the school day. As I continued to read

the literature on executive functioning skills, I was amazed at the way in which I seemed to be on a never ending trail of information. Despite the continuous discovery of new information, none of the research work that I was doing seemed laborious. My interest in the topic only grew with the more information I learned. It was the passion behind the research question that drove my interest in learning more and helped me to develop as a researcher.

Just as I grew as a researcher, I also developed as a writer and learner over the course of the capstone process. Being given the opportunity to share the information that was learned throughout the research process in the form of a literature review provided me with the opportunity to grow as a writer. The literature review also provided me with the opportunity to reflect on all that I had learned throughout my research. While the length of the literature review was daunting when starting out in the writing process, in the end it was relatively simple to complete. As a learner, I was unaware of how much information I had acquired and being able to transfer that knowledge to paper provided me with the realization that all of the research I had completed was worth the time and energy that was invested in the process. Creating the literature review also allowed me the opportunity to synthesize the learning and determine its possible implications in the classroom. Compiling the information into a literature review that was informative and concise challenged me as a writer. I learned that I am not only able to write a solid literature review, but that I am also far more developed as a writer than I had ever realized. I learned not only to have confidence in myself as a writer but that I am also able to contribute to the field of education through my research and writing.

Literature Review

The content of the literature review was a key resource for the development of the curriculum for the capstone project. The information presented in the sections *Executive Skills and Reading Skills, Teaching of Executive Functioning Skills,* and *Cognitive Training* of chapter two proved to be the most important for the development of the capstone curriculum. The section *Executive Functioning Skills and Reading Skills* provided information on how executive functioning skills are connected to reading skills. Inhibition control and working memory were the two executive functioning skills focused on throughout this section of the literature review. Authors Berlin and Bohlin (2002), Blair and Razza (2007), Cain, Oakhill, & Bryant (2004), Chung and McBride-Chang (2011), and Strasser and del Río (2013) were influential in the writing of this section of the literature review. However, several other sources were also used in this section of the literature review as well.

The section of the literature review titled, *Teaching of Executive Functioning Skills*, was fundamental in determining which types of instructional strategies should be implemented into the curriculum. The information presented in this section was a compilation of several different sources' understandings of what has proven to be effective in reading interventions when working with students who struggle with executive dysfunction. The authors that were most influential in this section of the literature review and capstone project development were Berne and Clark (2008), Hannon (2012), Kaufman (2007), and Meltzer (2007). Their published works provided strategies that assist students who struggle with executive dysfunction in their reading

comprehension. These strategies were then used as the basis upon which the curriculum designed during the capstone project was developed. While the section *Cognitive Training* did not provide specific interventions or strategies that have proven effective when working with students who struggle with executive dysfunction, it did provide research and guidance on how to implement an intervention program that may prove effective when working with students who struggle with executive dysfunction. The influential sources in this section of the literature review were Dawson & Guare (2009), Ericsson and Kintsch (1995), Hannon (2012), Jacob & Parkinson (2015), and Meltzer (2007). However other sources were also used in the writing of this portion of the literature review. As previously mentioned, these three sections were referenced frequently during the development of the curriculum designed in fulfillment of the capstone project requirements. The thoroughness and applicability of their research to an elementary classroom made these sources an ideal foundation from which to base the curriculum designed to assist students who struggle with reading comprehension in part because of their struggles with executive dysfunction.

Throughout the development of the curriculum for the capstone project, I began to make connections to the literature review and the importance that the information presented in the literature review could play in my classroom. While executive functioning skills were something new and intriguing to me when I first started the capstone process, they are now something that I feel passionately about and and want to share with other teachers. While the curriculum was designed to closely connect with the information presented in the literature review, at the completion of the curriculum, the

curriculum demonstrated the importance of implementing strategies in the classroom to support students who are struggling with executive dysfunction. The idea of implementing such strategies to assist students as were presented in the literature review was daunting to me as I wondered how I would manage to implement new instruction into an already packed literacy hour. However, as I began to write the curriculum, I began to realize that these strategies can be implemented as additional ways for practicing the other literacy learning targets that are already being taught. I now understand the importance of assisting students who struggle with executive dysfunction with their reading comprehension. Through the development of the curriculum and the writing of the literature review, I understand how the ideas presented in the literature review can be implemented into the regular literacy curriculum. As a classroom teacher, I can connect to the information presented in the literature review and now feel as though I have a better understanding of the material presented and what it means for classroom teachers.

Potential Implications

The development of a curriculum presents the potential for future change in the instruction that is occurring currently in a classroom. The project was designed in a way that it might be implemented during the literacy hour without uprooting the existing curriculum that is used throughout the district. Each of the strategies provided can be used with outside texts that teachers select. Additionally, each of the strategies would prove to be the most effective if repeatedly practiced over the course of several days. Based on the information provided in the literature review, students who struggle with executive dysfunction benefit the most from intervention style strategies when they have

repeated exposure to the strategy being taught. Therefore, the curriculum could potentially be implemented for a longer period of time, such as ten or fifteen weeks instead of the five as were designed for the project.

Potential Limitations

Throughout the development of the curriculum, with the help of Jennifer Sarravallo's (2015) work, I realized that there are hundreds of other strategies that could be implemented to further assist students who struggle with executive dysfunction and reading comprehension. Therefore, a potential limitation of the project is the possibility of continued development of the curriculum by district teachers until it encompasses the entire school year rather than a just over a month of school. Additionally, just as is practiced with other curriculum after its implantation, modifications may need to be made to the project so that it is better suited to meet the needs of teachers and students who are using the curriculum.

The curriculum was developed using suggested strategies that have proven to be effective according to the sources used in the literature review. As mentioned above, the work of Jennifer Sarravallo (2015) was a vital resource in the development of the curriculum. The ideas presented in her book, *The reading strategies book: Your everything guide to developing strategic readers,* were ideal for teaching strategies that assisted in improving reading comprehension. However, while other strategies were presented, Sarravallo (2015) was the main resource used in the creation of the curriculum. Thus, this could be another potential limitation of the project. Including

additional sources of strategies could have been one way to counter the limitations of the current project.

Future Research Projects

With the development of a curriculum that focuses on meeting the needs of learners who struggle with executive dysfunction and reading comprehension comes the potential for additional writing of future curriculum. Research could be completed on the impact that executive functioning skills have on other academic areas, such as mathematics. Based on the results of the research, a curriculum could be developed that would help to meet the needs of learners who struggle with executive dysfunction and mathematics. Based on the findings from my research, I would recommend using sources such as Dawson and Guare (2009), Forgan and Richey (2015), Kaufman (2010), and Meltzer (2007). Each of these sources provided evidence based research on how executive functioning skills can affect a student in the classroom. Therefore, they may prove to be not only reliable sources for connecting executive functioning skills to reading comprehension, but also to mathematics skills.

Communication of Results and Benefits to the Profession

The results from the literature review proved to be effective in assisting the development of a curriculum that can support and strengthen reading comprehension for students who struggle with executive functioning skills. Upon completion of the capstone process, these results and the aligned curriculum will be shared with the other teachers with whom I work. After making any necessary adjustments that come with the

implementation of a new curriculum, I will then share the curriculum with other teachers who work in the other three elementary schools in the district. Providing teachers with a curriculum that meets the needs of their learners is a benefit to the teaching profession, as a curriculum that meets the needs of students with executive dysfunction can be hard to find. Future development of additional curriculum for other content areas would also be of benefit to the teaching profession and could potentially lead to changes in the way reading comprehension skills are taught.

Summary

This chapter sought to provide a reflection to the first three chapters of the capstone paper, as well as the curriculum developed for the capstone project. The first three chapters discussed the formation of the research question, the literature review that sought to answer the research question, and finally, the development of a literacy curriculum that responded to the research that was found regarding the research question. The question upon which each of the previous three chapters were developed was: *how does explicit instruction in executive functioning skills impact students' ability to read and comprehend text at a deeper level?* In this fourth, and final, chapter of the paper, the learning that occurred as a researcher, writer, and learner was discussed before revisiting the literature review and the new connections and understandings that have developed since the writing of the literature review. Next, the potential future implications of the capstone project and curriculum development were discussed, as well as potential limitations of the project. Finally, future research possibilities related to the literature

review and research question were explored before acknowledging the plans for use of the results and how the capstone project could be a benefit to the teaching profession.

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Appendix A

Modified Comprehension Interview

Entrevista de comprensión en español

Adaptado de: Richardson, J. (2009). *The next step in guided reading: Focused assessments and targeted lessons for helping every student become a better reader.* New York: Scholastic Inc.

Nombre del estudiante: _____
Fecha: _____ Texto (pág.): _____

Recontar (ficción): ¿Qué pasó hasta este momento en el cuento?

- ☐ Lugar
- ☐ Eventos
- ☐ Personajes
- ☐ Soluciones
- ☐ Problema(s)

Recontar (no ficción): ¿De qué estás aprendiendo?

_____
_____
_____

El maestro dice: *Empieza de leer en el punto donde paraste antes. Escucho a ti.* (El estudiante lee cuando el maestro anota los errores y correcciones en el otro lado de esta hoja.)

Nivel del texto:

- ☐ Fácil (95-100%)
- ☐ Instructivo (90-94%)
- ☐ Frustración (<90%)

El maestro dice: *Sigue leyendo. Cuando leyes, yo voy a preguntarte algunas preguntas sobre el texto.*

Estrategia	Preguntas	Respuesta del estudiante	Rúbrica
Monitorizar de ti mismo El estudiante usa estrategias que ayuda la comprensión cuando no entiende la lectura	¿Qué puedes hacer para ayudarte entender la oración? ¿Qué más puedes hacer para ayudarte a ti mismo?		1. "Yo no sé." 2. Las estrategias no sirven para clarificar el entendimiento. 3. Las estrategias sirven para clarificar el entendimiento.
Conectar El estudiante conecta sus experiencias personales, conocimiento previo, u otros textos que ha leído.	¿De qué pensaste cuando leíste esta parte de la historia? ¿Podrías conectarlo a un conocimiento previo, una experiencia que tuviste u otro libro que has leído? Dime.		1. "Yo no sé." 2. La respuesta no relaciona al texto. 3. La respuesta relaciona al conocimiento y experiencias previos al texto y aumenta la comprensión.

Resumir El estudiante provea un resumen sucinto que demuestra la idea principal y los detalles importantes.	¿Cuál es la idea principal de esta parte? ¿Puedes decirme en una o dos oraciones de que aprendiste en esta parte?		1. Ninguna respuesta o una respuesta incorrecta. 2. Puede recordar algunos eventos en un orden aleatorio. 3. Sintetiza concisamente, recuerda la idea principal y los detalles en secuencia.
Predecir El estudiante hace predicciones lógicas basados en los eventos.	¿Qué piensas va a pasar próximo? ¿Qué piensas que vas a aprender próximo? ¿Cuál parte del texto te ayudó a hacer esta predicción?		1. Ninguna respuesta o "Yo no sé." 2. La predicción no está conectado al texto. 3. La predicción es congruente y lógica con el texto. Es una predicción creíble.
Preguntar El estudiante forma preguntas cuando lee para clarificar la significa de algunas partes del texto.	¿De que preguntaste cuando estuviste leyendo? ¿Cuáles fueron algunas confusiones que tuviste?		4. Ninguna respuesta o una pregunta que no es relacionada al texto. 5. Una pregunta literal con una respuesta corta. 6. Una pregunta superior que representa pensamiento complejo del texto.
Inferir El estudiante puede leer entre las líneas para grabar la información implícita.	¿Qué significa el autor cuando dice _____? ¿De que estás pensando sobre el personaje? ¿Qué estabas pensando cuando el texto dice ____?		1. Ninguna respuesta o "Yo no sé." 2. Puede encontrar la respuesta en el texto o la respuesta no es lógica. 3. La respuesta es lógica y muestra pensamiento ilativo.
Visualizar El estudiante puede crear imágenes mentales de los personajes, eventos, e ideas.	¿Qué imaginaste en tu mente? ¿Cómo parecen los personajes en tu mente? ¿Qué podrías dibujar para ilustrar esta idea?		1. Ninguna respuesta. 2. La imagen no es relacionada al texto. 3. La imagen es conectada al texto y clarifica ideas complejas.

Appendix B

Reading Level Assessment Example

Reading A-Z

NIVEL M

Pasaje estándar

Feliz como una lombriz

Nombre _____

Conteo de palabras: 164

Feliz como una lombriz

Mi prima Luisa y yo fuimos a recoger zanahorias de la huerta de mi abuela. Como anoche hubo una gran tormenta, la tierra todavía estaba húmeda y de las hojas caían gotitas. Cuando yo iba a sacar la primera zanahoria, una lombriz rosada asomó la cabeza.

—¡Mira, mira! —le grité a Luisa mientras me ponía la lombriz en la palma de la mano.

—¿Qué vas a hacer con ella, Marcos? —me preguntó Luisa con la voz temblorosa. Ella le teme a los animales y una lombriz le produce el mismo temor que una serpiente.

—Voy a meterla en un frasco de vidrio para observarla.

La observamos. No pudimos encontrarle los ojos, ni la nariz, ni las orejas, pero se movía con desespero como un pez fuera del agua. Parecía estar sufriendo.

—Esa lombriz no se ve feliz —dijo Luisa.

—Tal vez deberíamos llevarla a la huerta —dije.

Devolvimos la lombriz a la tierra de la huerta. Ahora sí podemos decir: ¡Feliz como una lombriz!

Reading A-Z

NIVEL M

Registro del Pasaje estándar

Feliz como una lombriz

Nombre _____ Fecha _____ Conteo de palabras: 164

Los estudiantes deben leer en voz alta mientras usted los evalúa.

Evaluado por _____

Conteo de palabras	**ER** = Errores **A-C** = Auto-corrección **S** = Significado **ES** = Estructura **V** = Visual	ER	A-C	ER S ES V	A-C S ES V
12	Mi prima Luisa y yo fuimos a recoger zanahorias de la huerta				
23	de mi abuela. Como anoche hubo una gran tormenta, la tierra				
34	todavía estaba húmeda y de las hojas caían gotitas. Cuando yo				
44	iba a sacar la primera zanahoria, una lombriz rosada asomó				
46	la cabeza.				
55	—¡Mira, mira! —le grité a Luisa mientras me ponía				
63	la lombriz en la palma de la mano.				
73	—¿Qué vas a hacer con ella, Marcos? —me preguntó Luisa				
85	con la voz temblorosa. Ella le teme a los animales y una				
94	lombriz le produce el mismo temor que una serpiente.				
104	—Voy a meterla en un frasco de vidrio para observarla.				
111	La observamos. No pudimos encontrarle los ojos,				
122	ni la nariz, ni las orejas, pero se movía con desespero				
131	como un pez fuera del agua. Parecía estar sufriendo.				
139	—Esa lombriz no se ve feliz —dijo Luisa.				
147	—Tal vez deberíamos llevarla a la huerta —dije.				
156	Devolvimos la lombriz a la tierra de la huerta.				
164	Ahora sí podemos decir: ¡Feliz como una lombriz!				
	Totales:				

CPPM: _____ **Frecuencia de error:** _____

Frecuencia de exactitud: _____ **Frecuencia de auto-corrección:** _____

Reading A–Z

NIVEL M

Evaluación rápida del Pasaje estándar

Feliz como una lombriz

Nombre _____ Fecha _____

Instrucciones: Lee cada pregunta cuidadosamente y elige la mejor respuesta.

1. ¿Qué fue lo primero que hizo Marcos cuando vio la lombriz de tierra?
   - Ⓐ La metió en un frasco de vidrio.
   - Ⓑ Gritó para que su prima Luisa fuera a verla también.
   - Ⓒ La devolvió a su madriguera.
   - Ⓓ Se la puso a Luisa en su mano.

2. Luisa y Marcos fueron a recoger zanahorias _____.
   - Ⓐ a la casa de un amigo
   - Ⓑ a la tienda del abuelo
   - Ⓒ a la escuela
   - Ⓓ a la huerta de la abuela

3. ¿Cuál de las siguientes oraciones es una opinión?
   - Ⓐ Las lombrices dan miedo.
   - Ⓑ Las lombrices viven en la tierra.
   - Ⓒ Luisa le teme a las lombrices.
   - Ⓓ Luisa y Marcos no recogieron zanahorias de la huerta.

4. Lee la siguiente oración: *La tierra todavía estaba* ***húmeda***.
   La palabra **húmeda** significa:
   - Ⓐ movediza
   - Ⓑ mojada
   - Ⓒ seca
   - Ⓓ hermosa

La Evaluación rápida continúa en la página siguiente

Reading A-Z

NIVEL M

Evaluación rápida del Pasaje estándar

Feliz como una lombriz

Nombre _____ Fecha _____

Instrucciones: Lee cada pregunta cuidadosamente y elige la mejor respuesta.

5. Cuando Marcos encontró la lombriz, a Luisa le tembló la voz cuando preguntó qué hacer con ella. Ella tenía miedo, en cambio Marcos _____.

Ⓐ imaginó que la lombriz se convertiría en una serpiente

Ⓑ pensó que Luisa nunca sería capaz de tocar la lombriz

Ⓒ se rio de Luisa

Ⓓ fue valiente y fue capaz de sacar la lombriz de la tierra

APPENDIX C

Customized Learning by Design

Unit Design Framework

Title of Unit		**Grade/Course**	
Developed By		**Time Frame**	
		Date of Implementation	
Desired Results **What are the Essential Learning Outcomes?**			
Enduring Understandings		**State standards**	
Learning Targets			
Assessment Evidence			
Assessment for Learning (Formative) How will you measure progress toward targets throughout the unit, including before, during, and after the learning?		**Assessment of Learning (Summative)** End of Trimester Assessment, Common Summative Assessments	

Synthesis of Insights (what did you learn?)	
HMW?	
● How might we create lesson plans, which include writing opportunities, formative/summative assessments, informational readings, and engaging activities for students, that support teachers in their implementation? ● How might we provide enough learning opportunities so that students can show teachers their progress?	
Customized Learning Plan - Ideation	
Learning Activities (Could be multiple per unit) What will we design to address our HMW question and ultimately support students' understanding of the Essential Learning Outcomes? How might we leverage digital learning to support, enhance, or transform the way we do it?	
Building Background Ensuring that students see the big picture and can answer "why?," and prior knowledge is activated.	
Authentic Instruction Incorporating higher order thinking, substantive conversation, and personal or outside connections beyond the classroom.	
Student Work Customizing the work we ask students to complete to ensure they find it personally	

meaningful and worthy of persisting with through difficulty. Work ultimately leads to students learning what we want them to learn.	
Student Experiences Developing learning experiences that lead to authentic engagement and ultimately equip students with the tools, resources, skill, and information needed to achieve desired results.	
Differentiation Varying instructional strategies and personalizing learning through scaffolded instruction, assignments, and assessments without sacrificing validity or rigor.	
Customized Learning Plan - Unit Sequencing Prototype	
***This is a suggested scope/sequence for the unit. Some lessons may take more than one day to complete and/or some may be completed in a different order.**	
Preparing for Deliver Space - Implementation Plan	
Tasks to Complete	
Resources Needed	
Assign Tasks	
Timeline and Dates	
Approximate Date of Implementation	