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A Cross-Curricular, Reading-Focused Learning Program And School Culture

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A CROSS-CURRICULAR, READING-FOCUSED LEARNING PROGRAM AND SCHOOL CULTURE

by

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"And now have I put in here, as thou seest, with ship and crew, while sailing over the wine-dark sea to men of strange speech…"

- Homer, the Iliad

"Language is not simply a reporting device for experience but a defining framework for it."

- Benjamin Lee Whorf

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CHAPTER ONE

Introduction

How does a reading-centered academic program and culture affect achievement throughout content areas? Though this question is fairly direct, its development is complex and nuanced. Years ago, I was introduced to a compelling idea that has continually challenged my preconceptions about how humans think and learn. The pursuit of understanding this question has, in many ways, led to the development my capstone project documented in this paper.

Essentially, the question asked how language and thought depend on one other. Does thought happen and we simply use language to express it, as I had always assumed? Or, does language provide our brains with a tool with which to create thought? Can we even think without language? Or is it something in between where language and thought reinforce each other?

As an educator, these questions have continually influenced my philosophy on teaching and learning. They are the inspiration for the guiding question of this capstone project. The project itself consists of the development and implementation of a school-wide, cross-curricular reading program in a small charter public school serving a population of at-risk students.

In this first chapter I detail my experience as a science educator in public schools and its influences on my teaching philosophy and practice. I go on to describe the specific conditions of my school and the student population that it serves. Finally, I discuss, in detail, the nature of the research question and how it applies to the unique learning program in which I work.

Background of the Researcher

In my career in public education I have worked with students from numerous ethnic backgrounds with various skill levels and vastly different life experiences. I have also taught in schools of different sizes with different styles of curriculum, different leadership structures, and different professional values.

As a science teacher working in these varied learning environments, I have found success in hands-on learning. Factors affecting a student's academic success, such as reading level and life experience, tend to become less relevant once a student is given something tangible with which to interact and experience first hand. A student who cannot read can still understand and show mastery of Newton's laws by manipulating objects and discussing how they move. This was a view that I held consistently for years.

Despite this, or maybe because I held the opinion so strongly, I began to develop a consistent curiosity about the relationship between reading, writing, and language comprehension skills and student success in my science classes. I was always aware of the importance of reading, writing, and language to a developing brain. However, my attempts to bring reading, writing, and language comprehension into a science curriculum always felt haphazard and inadequate. Ultimately, I would revert to my hands-on-centric methods. But the curiosity remained.

A Unique Set of Needs

In 2013, I started working at a small charter public school in a community adjacent to downtown Saint Paul, MN. As of the date that this capstone project was published, I am still working there. It is the toughest job I have ever had. I have been challenged both professionally and personally. The school and its student population are unique and have a very specific set of needs.

As a teacher/advisor at a teacher-powered school, my professional responsibilities are not isolated to classroom teaching. My colleagues and I are responsible for maintaining everything that happens in the school. I manage the school's Internet domain and help maintain the website. I am on several committees that guide the schools learning program and develop curriculum throughout content areas. I serve on the school's board of directors, as do other teachers. But no matter how well we plan and delegate, there are always events and tasks that surprise us and simply don't fit into a defined category for which we have a protocol. In these cases, we have to work together and figure it out. These various responsibilities could necessitate their own position but we all take them on in addition to our responsibilities as educators teaching a diverse student population. I have learned that this is often the norm in successful charter schools in Minnesota. It is not easy and it is not always fun. But we do it together and have created a great, close knit, increasingly effective and efficient team. We are up to the challenge.

At our school, we focus on environmental education and project-based learning. We are a "Teacher-Powered School". We have a small student population, 105 students, and plan to keep it that way. Our pillars, the values that guide our decisions as teacher-

leaders, are: Personal Relationships, Authentic Learning, Environmental Education, and Post-Secondary Readiness. Our pillars represent a promise that we make to our stakeholders which include teachers, employees, parents, guardians, community partners, and, most importantly, our students. When enrolled in our school, students can expect that they will learn-by-doing, that they will become environmental citizens, and that they will be ready for life after high school which does not necessarily mean college. We can hold these expectations because of our commitment to personal relationships.

A large percentage of our student population is considered "at risk". There are many variables that determine this designation. In Minnesota, the Minnesota Department of Health defines "at-risk" in reference to five key areas in which an individual could struggle: communication, medical, independence, supervision, and transportation. Individuals who struggle in these areas could be considered "at-risk". For students specifically, struggling in these areas can have a major affect on achievement in school. Having no access to transportation can prevent students from getting to school at all. Unfortunately, to a large extent, these are variables that our school has little control over.

Many of our students would fall under the definition of "at-risk" defined by the Minnesota Department of Health. However, some students who would not fall under this official definition still face major obstacles to their success in school. I tend to think that we serve students who, for whatever set of reasons, are simply bad at "doing school" in the traditional way. Maybe they have trouble sitting in a classroom and learning via lecture. Maybe simply being in a building with thousands of people can trigger specific issues with social anxiety. Maybe they have experienced bullying or are questioning their gender and/or sexuality and do not feel safe in their current educational

environment. Or maybe they just don't have strong relationships with their teachers or other adults in their lives as mentors. Whatever the reason a student is not finding success they often find an alternative in our school. For many, it is a better alternative. It is a place where they can feel safe, accepted, and free to be themselves. It is also a place where they can feel part of and are accountable to a community with strong values.

We know that our students benefit emotionally, socially, and personally form being part of our community. They tell us. Their parents and guardians tell us. We have data that verifies this. And this is a good thing. However, we also know that these benefits do not always translate to academic success for many of our students. Though we are proud of the community we have developed, we know that we are a school. It is our responsibility to ensure that students find academic success regardless of their background. Acknowledging and being fully accountable for this great responsibility compels me, along with my colleagues, to continually seek out and try new ways to help students succeed. We have not yet found a way to get all students to find academic success. I doubt we ever will. Despite this realization, I am eager to keep working with my apt team toward meeting such a unique challenge.

Language and Thought

Before discussing the goals that my colleagues and I have defined for our school's reading program it is important for me to more fully explain my fascination with the question of how language and thought are related. I have been continually curious of this concept for years. I was introduced to this idea twice, from independent sources. This made the idea seem even more intriguing. The first instance was when a friend insisted that I listen to an episode of a podcast, RadioLab, in which a question was explored. The

second instance was when a colleague, a language arts teacher, posed a question to a student and myself. In both instances, the question was the same and focused on the distinction between language and thought.

The Wine Dark Sea

An interesting anomaly in some famous classical literature, explored in an episode of the podcast Radiolab (2017), works well to outline the basic factors of this compelling idea. Throughout both of Homer's epic poems *The Iliad* and *The Odyssey*, the word for the color blue is never referenced (Radiolab, 2017). Initially, this fact may not seem worthy of a second thought. But if we look a little closer we can see that it is significant for two reasons. First, given the immense length of the poems, one would expect the word for blue to show up at least once. Second, things that a modern reader would associate with the color blue are referenced in both works but are described with different language. Likely the most referenced example of this is the use of the term "wine-dark" to describe the color of the Aegean Sea. As shown in Figure 1, a modern viewer would generally consider the Aegean Sea to have a blue color.

Figure 1: The Aegean Sea as viewed from the Lindos ruins on the island of Rhodes. The image shows the objectively blue color of the Aegean Sea.

Why would Homer use wine, which typically described has having a red color, to describe a thing that is so universally thought of as blue? Similar instances occur throughout both texts with things that are generally considered blue, as well as other colors, being described with convoluted, sometimes bazar lingual gymnastics. Why doesn't Homer just describe things the colors they are?

One explanation could be that this was simply an interesting artistic choice and that Homer was using language to add color (pun intended) to the prose. Writers do this all of time. The writing styles of the time could have been a factor in the decision to not use the word for blue. But another more baffling explanation could be that the *Odyssey* and *Iliad* didn't use the word for the color blue because Homer, Greek people, and other cultures of the time literally couldn't see, or at least perceive, the color blue *because* they didn't have a word for it in their language.

Initially, this explanation may seem ridiculous and stupid. I certainly thought this when the idea was first proposed to me. But, if one were add up the entire instance that different colors were used in the *Odyssey* and *Iliad*, they would reveal an interesting fact. Direct reference to the colors "black" and "white" are used hundreds of times. Direct reference to the other colors like "violet" and "red" are used fewer times. But, ultimately, the reviewer would find that, indeed, there is not a single reference to the color "blue". This could be explained away by concluding that Homer was colorblind and just couldn't see the color blue. However, if one were to review the entirety of Greek literature at this time, they would find the same results. The term for the color blue simply isn't used. This perplexing phenomenon could be explained away by concluding, with a stretch of the imagination, that all Greeks at this time were somehow colorblind. However, if one were to review the literature of other cultures at this time they would, again, find the same results. It is only later in the history of these cultures that references to and use of words for the color blue are used, as if its use were dependent on actually experiencing and perceiving the color itself. There are even modern cultures that do not have a word for the color blue and respond, from the perspective of a culture that has a word for the

color blue, in bizarre and baffling ways when shown the color blue and asked to describe it.

Realization Identifies Obligation

The rabbit hole that this realization opens could accommodate content for an entire capstone project of its own. I credit the compelling nature of this idea with my consistent interest in the topic. However, the point that I will take away for this capstone project is that language and thought simply seem to be more interrelated than I had originally thought. If language does, indeed, influence cognition and thought then, as a science instructor that does not directly teach reading, writimg, and language comprehension skills in his curriculum, I am neglecting a vital tool that I have at my disposal that could be used to help students succeed. If I want to develop high-level critical thinking skills in my students, then I need to make sure that reading, writing, and language comprehension skills are a part of my science curriculum. Thus, I am driven find a way to make reading, writimg, and language comprehension more of a focus in my school's content area classes. Now that I realize that I can, I feel an obligation to take action and change my teaching practices to better help my students.

Reading As A Focus

One initiative I have consistently wanted to make a priority in our school is reading, writing, and language comprehension. Specifically: reading, writing, and language comprehension across content areas. I have discussed this with various colleagues and we have always been in agreement: reading, writing, and language comprehension is important and we need to develop and implement a focused and deliberate program where students see actively developing their reading, writing, and

language comprehension skills as more of a norm than a chore. In a school with such a demanding set of professional responsibilities and expectations, great ideas like this often take a back seat to the more pressing and immediate issues that we address on a daily basis. Fortunately, through years of hard work, we have built a solid learning program and leadership model from which to continue to grow. I am now ready to focus efforts with a team of my colleagues to integrate reading-centered tools and strategies into our school's learning program.

This reading program is being developed with the goal of improving reading and language comprehension skills for all students. The simplest metric, and the one that is most easy to understand for the broadest set of stakeholders, is standardized tests. If standardized tests show that students in a school are learning then, for stakeholders like parents and authorizers, that school is doing well. Of course, as a professional educator, I have many strong opinions about standardized tests and how their data is used in schools and in politics. This capstone is not about standardized tests. They are a reality and a major factor that largely determines, rightly or wrongly, how schools are rated. For charter schools, especially, metrics from these types of tests can even be key to decisions about whether or not a school keeps its charter authorized and is allowed to stay open.

Developing a program with the sole goal of improving standardized test scores is not what I am doing. I could provide a detailed list of reasons why, but the main reason is that I think it would be boring. There are already proven methods to improve tests scores. "Teaching to the test" is a method that is often criticized, rightly or wrongly, as a way to get better scores on standardized test without providing the deep learning that goes behind the topics and skills that the tests are measuring. I don't want to teach

students how to take tests. Our world doesn't need people with that skill. I want to teach people how to think and do things that matter. This is why this reading program must have more than improved test scores in mind. I must focus on the fundamental way students read, write, and use language and how they think about these tools as they navigate their world.

The Challenge for Content Area Teachers

As a science teacher this idea, that language influences thought, was compelling and daunting. It still is. On one hand, I want to foster high-level thinking in my students. Our world needs more people with better scientific literacy so that we can work together and fix the very real, very serious, and very complicated problems that we face as a society and as a species. High-level thinking is required for this to happen. If language influences and facilitates thinking, specifically higher-level thinking, then I want to infuse my science curriculum with as much reading and language comprehension content as I can. On the other hand, well … I am a science teacher. Implementing tools and strategies to improve reading and language comprehension is not my expertise. As I have already explained, I am very good at teaching through hands-on, experiential means. The very nature of science and the standards associated with most science curriculum make hands-on learning relevant and effective. I simply was not, and am currently not, equipped to implement effective reading and language comprehension tools and strategies into my science curriculum in an effective way.

I have colleagues that feel the same way about their curriculum. The math teacher at my school struggles with implementing reading into his curriculum for similar reasons. The standards associated with math curriculum are extensive, rigorous, and

content-specific. Taking class time away from directly helping students work through the complex logical and reasoning skills needed to master the content always seems daunting. Hesitation to bring reading into science and math classes is confounded by that fact that science and math teachers like us simply don't have the background and experience in teaching reading and language comprehension skills effectively to bring it into our curriculum in a way that can get results. Implementing tools and strategies to improve reading and language comprehension skills in science and math classes is difficult. This project will focus on a learning program that will make easier for all teachers, regardless of content area, to integrate reading and language comprehension into the curriculum.

Summary

The student population that I teach faces many challenges. As a team, my colleagues and I have identified reading, writing, and language comprehension as an area of specific deficiency in our students. We have decided to focus on improving our students' reading, writing, and language comprehension skills so that we can help more students succeed academically. As a science educator I do not have extensive training in teaching reading and language skills in my classes. More importantly, I am not confident in teaching these specific skills, the result of which is that I simply do not teach these skills in my classes in a direct, planful, or effective way. This condition is especially problematic when I consider the fundamental relationship between language and thought. If language and thought are, indeed, linked in a fundamental way then, as a science educator who aims to help students develop high-level critical thinking skills, it seems logical that I should be incorporating language skills in my science curriculum.

This project will consist of the development and implementation of a school-wide, cross-curricular reading program in a small charter public school serving an at-risk student population. The ultimate goal of this capstone project is to assist content area teachers like me with the training, skills, resources, and support structure needed to incorporate the teaching of reading and language comprehension skills in their curriculum.

Introduction to Chapter Two

In Chapter Two I provide an exhaustive overview of literature pertaining to the research question. The first section is an overview of past and modern theories on the relationship between language and thought. In the next section I provide a survey of effective classroom reading and language comprehension strategies. In the third section I discuss teaching reading and language comprehension in content area classes. I end chapter two with an analysis of the factors that affect school-wide learning programs.

CHAPTER TWO

Review of Literature

Introduction

How does a reading-centered academic program and culture affect achievement throughout content areas? This is the question that guides this capstone project. To answer this question, the proposed final product is a school-wide, cross-curricular reading program for a small charter public school. The goals of this reading program concern both curriculum and school culture. It is assumed that students generally need improved reading and language comprehension skills. Thus, the reading program must incorporate research-based tools and strategies into a curriculum that can directly improve the skills of students at different levels of proficiency in all content areas. The program must also address the perception of reading in students who have developed negative connotations with reading through their past experiences in public education. Students need to be able to see reading as a norm in all of their courses. Ideally, this reading program will help students develop a love of and appreciation for reading, writing, and language as invaluable tools for understanding the world and not just a chore to endure in a language arts class or as a one-off addition to a science or math curriculum. Furthermore, the program should empower educators in content areas such as science, and especially math, where there is less emphasis on developing reading, writing, and language

comprehension skills to make reading a more integrated part of their classroom curriculum and teaching.

With these goals in mind, this chapter reviews four core areas of the literature: Theories of Language and Cognition, Teaching Reading and Language Skills, Reading in Content Area Classes, and Tools and Strategies for Developing Program Curriculum. The first section explores the current understanding of how reading affects thought and vice versa. This section is inspired from the curiosity of the idea detailed in chapter one; that reading ability could intrinsically influence the ability of a student to perceive an idea. The second section details what content experts know about how students learn to read and understand language within the context of a reading and language arts curriculum. It also explores strategies to help change negative connotations that students may have with reading and language comprehension skills. This section provides a baseline from which to build on reading and language comprehension in the following section. Section three focuses on reading and language comprehension in content area (i.e. science, math, and social studies) classes specifically. The goal of this section is to inform best practices for teaching reading within the context of classes that typically involve less reading, writing, and language comprehension and more content-specific curriculum. Science and math classes are the "cross-curricular" classes most heavily emphasized in the school's reading program, as these are simply the classes in which students experience the least amount of reading, writing, and language comprehension practice in the school. Finally, section four surveys the tools and strategies that prove to help reading and language comprehension skill across content areas. This section details

specific strategies that can be included in the curriculum of the school's learning program.

Language And Cognition

The idea discussed in Chapter One that explores the relationship among and between language and thought can be well informed by the work of scholars that contribute to long-known theories of language and cognition. Scholars often associated with this topic include Jean Piaget, Lev Vygotsky, and Benjamin Lee Whorf. This section outlines a spectrum of theories about language and cognition that range from a belief that language functions primarily as a means by which thought is expressed to the claims of linguistic determinism and linguistic relativism which suggest that language actually facilitates thought and without language there are thoughts that humans would not be able to have. The section ends with a brief survey of current thoughts on this topic by scholars including Pinker, Cassanto, Lupyan, and Thierry.

Language as a Tool for Expressing Thought

The French developmental psychologist Jean Piaget is well known in the field of education and child development (Powell, 2009). Piaget's theory of language development purports that language derives from thought (Piaget, 1959). He claims that humans construct their own knowledge from experience and use language to express this knowledge. Vygotsky built on the work of Piaget and suggested that language and thought should be seen as independent of each other (Powell 2009). The difference in how Piaget and Vygotsky think about language and thought derives from their respective focus on how children learn (Powell, 2009). Piaget's focus was on the individual experience of a child as they develop whereas Vygotsky emphasized socialization as a

major factor in how a child develops and utilizes language (Powell, 2009). It is advised that educators understand the work of each scholar, as both views on language and thought are helpful when developing curriculum (Powell, 2009).

As Michael Tomasello (1996) explains, the work of both of these scholars becomes more relevant as modern researchers verify their claims. Though their work emphasized the close connection between socialization, language, and cognition, neither acknowledged the extent to which cognition is dependent on socialization and how this relationship supports the development of language.

Scholarly interest in Vygotsky's work has made a resurgence in recent decades. His claims about the dependence of the evolution of human consciousness on social interactions are consistent with modern theories, such as collective learning as described by David Christian (2011), that identify human knowledge as being distributed among individuals within a social context. This is an important distinction from Piaget's idea that knowledge is largely internal and centered with the individual. Furthermore, his views on how children learn within the social contexts of a school are consistent with modern views that children learn in different ways (Emihovich, 1995).

Vygotsky's emphasis on the importance of socialization in development of human cognition has implications beyond language. James Wertsch (2008) interprets Vygotsky's work on the development of self-regulation in children and emphasizes the importance of the adult-child interaction. In adult-child interaction, the adult provides the child with the "other-regulation" that the child needs, and does not yet posses, in order to complete a task. Wertsch (2008) argues that self-regulation in children develops as the "other-regulation" provided by adults is learned by and transferred to the child.

Language as a Causal Force for Facilitating Thought

As explained by Daniel Casasanto (2016), the work of Benjamin Whorf and Edward Sapir provides a more extreme view of the relationship between language and cognition. The Sapir-Whorf Hypothesis proposes two theories: linguistic determinism and linguistic relativism. *Linguistic determinism* says that the categories defined in the language that a person speaks actually determines the type of thoughts that a person who speaks that language can have. A weaker version of this theory, *linguistic relativism*, suggests that people who speak different languages have different kinds of thoughts due to the structural variables of their respective languages.

Modern Views on Language and Cognition

These claims are direct and extreme. The idea that language dictates thought can be difficult to accept. Casasanto (2016) recognizes modern scholars such as Pinker who reject these ideas outright. Other scholars like Carnes (2014) do not go as for to reject the ideas but claim that their very nature makes them impossible to study with empirical evidence. Testing the Sapir-Whorf Hypothesis, Carnes (2014) claims, would require a researcher to have knowledge of only one language yet be able to understand what is also lost in translation between languages. Such a scenario is categorically impossible.

Casasanto (2016) acknowledges these views but advocates for a less binary line of questioning on the topic. The scholars Orwell and Whorf raised independent ideas about language and thought which are *"Do we think in language?"* and *"Does language shape thought?"* respectively. Casasanto (2026) suggests that that these questions are not necessarily dependent on one another. Instead, Casasanto (2016) argues that language can affect the way a person thinks regardless of whether or not a persons thinks in

language. Essentially, Casasanto (2016) argues that language and thought are separate things that can interact and influence each other but that this does not necessarily have to occur.

This binary line of questioning that Casasanto criticizes is not always the norm. The Whorfian Hypothesis has guided study on the question of if and how language affects or even determines thought. Since its implications can be seen to directly conflict with the views of Piaget and Vygotsky, the discourse can often focus on this distinction. However, Aneta Pavlenko (2016) looks closer into the details of some of Whorf's ideas to understand arguments that have been overlooked. Specifically, Pavlenko (2016) finds that Whorf's views on different languages give the Sapir-Whorf hypothesis more nuance. Whorf saw languages themselves as a way that humans think. Different languages, and the structure and mechanics that are specific to them, shape the way the speakers of those languages think. Interestingly, this implies, at least for Whorf, that language affects even scientists. Different features of language dictate the fundamental structures of thought. Whorf emphasized the importance of multilingual awareness, the understanding of this relationship between different languages and thought, to understand how science advanced in the Western world. He attributed the advancement of Western science to the multilingual awareness.

Modern linguists and psychologists think more and more that language has little to do with shaping our thoughts. Casasanto's work demonstrates a trend among some modern linguists in pushing back against the extreme yes-or-no line of questioning relating to language and thought. In this vein, Gary Lupyan (2016) challenges the assumption that language has little to do with shaping thoughts and suggests that human

cognition is, by its very nature, language-augmented. In a way, he doubles down on the Whorfian hypothesis (a.k.a. "Sapir-Whorf Hypothesis") while resisting a definitive answer on the topic. He uses analysis of some of the fundamental mechanisms of human language to argue that language functions as an active control system for the mind.

Guillaume Thierry (2016) goes further to claim that the question, of whether or not language and cognition are linked and to which extent, is moot. According to him: "they just are". Thierry's work largely focuses on the relationship between language and neurological pathways in the brain. He emphasizes the need to research more nuanced questions about language and non-verbal information processing.

Elisabetta Robotti (2012) takes these questions into direct practice. A 2012 study analyzes the natural language that students use when vocalizing a math proof. The study claims that a student's natural language, if relevant variables are accounted for, can be used to identify a student's cognitive process. According to Robotti (2012), the language that a student uses when working through a mathematical proof can not simply tell researchers how they are thinking at a given moment but can actually allow researchers to identify different phases that students are in with regard to their cognitive process.

The question proposed in Chapter One, about how language affects thought, is compelling. The academic authorities on this topic, Piaget, Vygotsky, and Whorf, were contemporaries (they were all born within a year of each other: 1896-1897) and their theories constitute the majority of the proposed possibilities that could exist between language and thought. On one extreme, Piaget, language does not influence thought and cognition and is simply a tool for expressing the thoughts that a person has. On the other extreme, Whorf (and Sapir), language, depending on how one interprets the Whorfian

Hypothesis, literally determines the types of thoughts that a person can have. The Piagetian side of this extreme feels more comfortable and safe. The idea that we have thoughts and that language is something that we use to express those thoughts is easy to wrap our heads around. The Whorfian extreme, on the other hand, seems harder to accept. It is challenging to submit to the idea that the language we speak could, quite literally, determine and control both what and how we think.

Modern views on this topic from scholars such as Cosasanto, Gary Lupyan, and Thierry, tend to focus less on the definitive question of which factor, language or thought, is causal to the other. The general thought is that these factors are related and interdependent. Instead, modern scholars stress the importance of asking questions about *how* language and thought interact. The questions that derive from this mode of thinking are more complex, nuanced, and subtle than the definitive ones that Piaget, Vygotsky, and Whorf were asking. They require deeper understanding of all factors involved in asking the question.

Summary

The purpose of this section was to explore the nature of the link between language and thought. As educators, we understand the students need reading and language skills and that they generally experience greater achievement when they have these skills. The literature generally confirms this view with modern scholarship revealing that the more binary questioning of the past, though useful and necessary, is a stepping stone for the more complex and nuanced questions that educators need to be considering in their classrooms. Reading and language skills affect and are affected by thinking. For science and math teachers, the questions is not whether or not reading and language skills should

be a part of science and math curriculum. They should. Rather, the more important question asks *how* reading and language skills are implemented in science and math curriculum as to make reading ubiquitous across content areas in a school's learning program.

Teaching Reading and Language Skills

All educators are aware of the importance of reading and language skills when it comes to student success. Language arts teachers teach standards that directly address reading and language comprehension skills. Special education teachers gather and track data about reading and language skills for students on their caseloads and they work with their students towards improving these skills. Reading specialists work intensively with all students who may need extra help with developing their reading and language comprehension skills. All of these education professionals utilize methods that are designed to help improve reading and language comprehension skills. This section will survey these methods within the context of a high school curriculum. For the education professionals that already use these methods, this section will provide little new information. However, for educators in science, math, and other content areas where reading may not be as much of a norm, this section will serve as a refresher of the tools and methods that work when helping to improve a student's reading and language comprehension skills.

Reading, language, and cognitive development are closely linked. Peter Smagorinsky (2013) suggests that Vygotsky's views on the importance of socialization in learning are significant concepts for teachers of reading, writing, and language to incorporate into their curriculum. Being mindful of the social environment of a school

can help educators create learning environments that help students, especially students whose home social environments foster cognitive development that is inconsistent with a typical school environment. If social environment affects language and cognition then varied social environments should produce different cognition and language skills. Schools typically have a specific social environment and, thus, produce a specific type of cognition/language. Some social environments can be consistent with this. Others could not. Smagorinsky (2013) concludes that schools should focus on inclusion and ensure that all students feel welcome. This is especially important with populations of students identifying as LGBT as they are more at risk of developing body dysphoria issues if not given proper social support structures.

Reciprocal Teaching, as described by Annamarie Sullivan Palinscar (1988), is a set of teaching strategies designed to help students with poor reading and comprehension skills change they way they view reading and improve reading comprehension. The model emphasizes teachers and students discussing the meaning of the texts that they are reading. The conversations between and among teachers and students are structured as to focus on specific reading strategies including generating questions, summarizing, clarifying, and predicting which are all types of "strategic engagement" that successful readers experience. Modeling these strategies helps students use them when they read on their own.

Miriam Alfassi (1998) goes further to claim that "strategy instruction" like reciprocal teaching produces better results than traditional teaching. When students are asked to be conscious of what they are reading *and* what they are thinking as they read then they are more likely to have better comprehension of the text that they are reading.

The ideas that Alfassi (1998) propose emphasize the importance of metacognition in learning. Susan Bull, Tim Jackson, and Michael Lancaster (2010) use computer-based strategies to inform first-year college students on their own misconceptions. These researchers found that when students are asked to be aware thoughtful of misconceptions that they may have on a given topic they are more able to self assess their understanding and adjust focus of their study habits to achieve better results in classes. Students themselves thought it helpful to know more about their own misconceptions. They were able to use this information to better identify their own problems with the content.

Many researchers have embraced the realization that metacognitive tools are important when it comes to reading comprehension. One method consistent with this idea is the "Think-Aloud Strategy". As described by McKeown (2007), the Think-Aloud strategy is a reading strategy often used with English language learners to help them self-monitor their reading comprehension. With this strategy, students and teachers work together to construct understanding of a text. McKeown's study focused on middle school aged students. Often, an issue that struggling readers have is that they do not have sufficient background knowledge of a text making it more difficult for them to comprehend to content. With the Think-Aloud Strategy, students and teachers can work together to identify the experiences that the students already have and connect them with the content of the text, providing the student with a higher level of connection with and comprehension of the text. The "interpretive community" that results from students and teachers reading together in small groups allows for unseen and differing viewpoints to build connections with the content of the text. The strategy is more than simply a reading strategy because it provides three distinct benefits: 1) it provides researchers with a

method by which to understand the cognitive processes of readers, 2) it is a direct method of instruction, and 3) it provides a forum for social interaction. All of these features make it an effective method for improving reading comprehension in struggling readers whether they are English language learners or have simply not yet developed the reading skills they need.

Virginie Jackson (2016) studied the efficacy of the Think-Aloud strategy with struggling readers directly. With first grade students, Jackson conducted a simple study. Two sets of student were given instruction on science topics using the same texts. One group was instructed using the Think-Aloud strategy and the other group was instructed using traditional strategies. The group that used the Think-Aloud strategy showed significantly higher reading comprehension of the specific text. The school in the study found that the Think-Aloud strategy to be a very effective method by which to help all students increase reading comprehension.

Other researchers have found similar results when working with elementary-aged children using science texts. Evan Ortlieb and Megan Norris (2012) conclude that Think-Aloud strategy significantly increases a student's reading comprehension of science text when practiced actively during the reading.

High school students can also benefit from metacognitive strategies like the Think-Aloud strategy. Byeong-Young Cho (2014) explores reading strategies that accomplished high-school readers use when reading content from the Internet. According to Cho (2014), successful readers modify metacognitive tools for self-monitoring and finding meaning that are used in traditional print-based reading strategies.

These students also utilize strategies that are unique to reading on the Internet such as using text location features.

Though there may still be debate as to the extent, it is generally understood that reading, writing, and language comprehension, and thinking are all linked. Thus, when teaching reading and language comprehension skills it is useful to be aware of how students are thinking about their reading. Specifically, it is invaluable to equip students with tools and strategies that allow them to reflect on their reading and thinking in real time. Metacognitive reading strategies such as the Think-Aloud strategy have been shown to help students in many grade levels and at varied levels of reading ability to improve reading comprehension.

Reading in Content Area Classes

This capstone project is being pursued largely due to the observation that, in the school in question, reading, writing, and language comprehension mainly happens in certain classes more than others. Science and math classes are identified as the specific classes in the school where reading is happening the least often with the least focus on developing reading, writing, and language comprehension skill. This section explores the literature on reading, writing, and language comprehension in content area classes. It seeks to reveal the nature of teaching reading, writing, and language comprehension skills in content area classes. It also explores possible explanations as to why rates of reading, writing, and language instruction in these content area classes are the way they are.

Content area teachers generally do not explicitly provide direct reading comprehension instruction in their classes. Molly Ness (2016) shows that teachers in content areas such as social studies and science simply do not feel confident in their

abilities to teach these skills. Additionally, and importantly, teachers in these content areas do not feel responsible for teaching these skills. The standards covered in these classes and the high-stakes state testing associated with them make it difficult for content area teachers to justify dedicating scarce class time to teaching reading and language comprehension skills.

Content area teachers are not out of line in thinking this way. In the article *Time on Text and Science Achievement for High School Biology Students,* Wyss, Dolenc, Kong, and Tai (2013) confirm the fears that content area teachers have of getting behind in content. They also justify the decisions to refrain from providing direct instruction that many teachers end up making; specifically biology teachers, in this instance. They find that, at least for biology classes, the amount of time that students spend reading biology texts has no affect on learning outcomes. Rather, the quality of the hands-on and inquiry-based learning experiences has a larger affect on how well students master the content standards.

Despite the challenge of needing to juggle time dedicated to content area standards and time dedicated to direct instruction of reading, writing, and language comprehension skills, such skills are necessary for higher-level thinking. Specifically, a student's reading comprehension level directly affects their success in science classes (Cano, García, Berbén, & Justicia, 2014). In 2014, a study performed by Cano et al (2014) analyzed several variables affecting student achievement in science classes. Variables studied included learning approaches used by students, student self-regulation, science achievement, how and when students ask questions in class, and reading comprehension. The study concluded that reading comprehension was related to all other

factors either directly or indirectly. There are many variables that affect how well a student learns. In science classes, these variables can be different and have varied affects on achievement. What Cano et al (2014) confirm is that reading and language comprehension skills are still key factors that affect student achievement, even in a science class.

So, of course, reading is important, even for students in content area classes outside of language arts. And teachers in these classes face challenges to bring reading into their classes. Luckily, there is research that focuses on how teachers can overcome these challenges and equip themselves with the resources they need to successfully help students improve reading and language comprehension skills.

Joanne Lieberman (2009) shows how lesson study can change the way content area teachers see their role. Lesson studies are methods where classroom teachers research lessons or classroom activities together. The focus is on new and innovative ideas. The teachers don't necessarily know how students will react to the lesson. New lessons or classroom activities are tried in classes and the results were unknown. Lieberman (2009) finds that going through this progress as a group and analyzing the results of controlled classroom experiments gives teachers the freedom to try new things without fear of reprimand. In this way, lesson studies serve as a means to form learning communities. Though using professional learning communities (PLCs) in education is a common practice for teachers in many schools, Leiberman (2009) uses the term "Community of Practice" to describe any group of people with a common interest and willingness to learn how to be better practitioners of the specific topic (Fitzgerald, 2016). Ultimately, Leiberman (2009) concludes that lesson studies and the resulting

communities that they facilitate bring teachers together so that they can learn from one another in an open, supportive, and innovative way.

Lieberman's (2009) work identifies five areas that determine the effectiveness of these learning groups: participation, collegiate support, professional development, space for discussion, and time for thinking. In a study with Australian teachers, Angela Fitzgerald (2016) outlined the effect that all of these areas have on the participants. There were several important conclusions taken from the study. First, if provided with the five areas listed above, Communities of Practice can effectively help participants learn more about a topic of shared interest and equips them with tools and strategies to "think and practice differently" (Fitzerald, 2016). Second, Communities of Practice, like those that develop organically from the Lesson Study process, are an inexpensive and time-sensitive way to get professionals, including teachers, together to begin changing professional practices. The method is easily adaptable and is shown to provide high benefit without a large commitment from participants. Finally, the study emphasizes the importance of participation by participants. Though the five areas mentioned are important for the success of a Community of Practice, the most important is participation. A space for discussion does not have to be a physical space; it can be a virtual forum. A participant may not give or receive direct support from colleagues and the group can still produce helpful ideas. For the example in the study, a participant may not even need to read the content being discussed or understand how it is relevant to changing their professional thinking and practice for the community to work. Fitzgerald's (2016) final, and arguably most important, conclusion is that all of these areas, though important, are irrelevant if the participants in the group do no actively participate. Willingness to

contribute to the conversation and reflect with community members on the experience is most important to the success of these types of groups.

Summary

Reading is important, even for students in non-language arts content area classes. And teachers in these classes often face challenges. In general, these teachers do not have sufficient training needed to teach reading and language comprehension skills in their classes. This lack of training contributes to the amount and quality of direct instruction of reading and language comprehension skills in content area classes. Content area teachers feel ill equipped to teach these skills. Furthermore, content area teachers also do not feel *responsible* for teaching these skills. Luckily, there are strategies that content area teachers can utilize to work together in teams and develop the skills needed to teach reading, writing, and language comprehension within the context of their content areas

Tools and Strategies for Developing Program Curriculum

This capstone project asks the question: How does a reading-centered academic program and culture affect achievement throughout content areas? The final product of the capstone will be a working, school-wide, cross-curricular reading program in a small charter public school. This section most directly informs the big question of the project. It surveys a variety of school-wide reading programs that have already been utilized in public schools and have delivered high student achievement through improved reading and language comprehension skills. It also analyzes the factors of these programs that make them successful. The section ends by detailing the Understanding By Design process as a means to develop curriculum and programing to deliver specific results.

In the article *Improving the Reading Skills of Adolescents*, John Holloway (2003) confirms what is generally assumed about reading and language comprehension skills as to their affect on student achievement: For middle and high school students, academic success is largely dependent on reading skills. He blames factors such as lack of motivation, egocentricity, and limited experience for the large number of students who persistently maintain lower reading skills despite many years of schooling. Holloway (2003) then outlines the efforts of a school that developed a reading course to address the low reading skills in a large percentage of its student population. The school provided teachers with extensive training and dedicated time to develop the curriculum for the course. The course emphasized reading comprehension exercises and vocabulary development. It stressed reading in home and at school as well as listening to teachers read.

According to William Penuel and Lawrence Gallagher (2011), when the goal of professional development is to teach teachers how to get a specific result from students, the best methods include those that provide teachers with explicit instruction on how to change their teaching in classes.

Reading Recovery is a reading program designed for first graders. According to Reading Recovery website, it's goal is to "dramatically reduce the number of first-grade students who have extreme difficulty learning to read and write and to reduce the cost of these learners to educational systems." Ballash (1994) shows how this program can be adapted for middle school and high school students who are still showing low reading skills. In the school where the program was adopted, the results were impressive with significant improvement in reading seen in all students who were part of the program.

Ballash (1994) advises high school teachers that want to adopt a school-wide program like Reading Recovery with their students to be sure that reading aloud to students is utilized as a part of the program.

Reading programs in high schools are not all the same. Robert Slavin, Alan Cheung, Cynthia Groff, and Cynthia Lake (2008) provide a survey of some of the most used types of reading programs and attempt to determine the factors that make a reading program most effective. The four types of programs that Slavin et al (2008) identify are programs that use a prescribed reading curriculum, programs that depend largely on computer-based instruction, "mixed-method "programs where instruction is split between large group teaching and small group instruction using computers, and programs that depend on providing extensive professional development to teachers so that they can consistently and effectively get the desired results from students. Slavin et al (2008) find that reading programs for focus on the daily teaching practices in the classroom are significantly more effective than those that depend heavily on a specific prescribed curriculum or computer-based activities. The most successful learning programs also incorporated extensive professional development for classroom teachers as to foster consistent and affective practices for teaching reading.

Mei Lai, Aaron Wilson, Stuart McNaughton, and Selena Hsiao (2014) show how the Learning Schools Model can help students improve achievement. The Learning Schools Model focuses on continual analysis of student data. In this model, instructional practices are changed based on student results. PLCs work together to analyze student data, plan relevant instructional changes, and implement those changes. Lai et al (2014) examine an instance when several schools applied the learning schools model to improve

student literacy overall and in content areas. Lai et al (2008) found that using this model helped student literacy generally as well as in content areas. Literacy instruction in specific content areas was helpful and necessary but general literacy instruction should always be maintained. Also, the type and amount of literacy instruction, content specific or general, should be adjusted according to the specific needs of the school. Continual analysis of data in PLCs can inform decisions on the proper mix of literacy instruction for specific schools.

Combined strategy instruction utilizes both the reciprocal teaching model and the direct explanation model to improve reading skills in a school. Miriam Alfassi (2004) shows that combining these two techniques can help students access higher cognitive processes as they learn from reading texts. The combined techniques are shown to provide students with tools that they can use to reach these higher levels of cognition.

Understanding By Design Framework

Understanding by Design (UbD) is a well-known process for developing curriculum that achieves desired results. Developed by Wiggins and McTighe in 2001, this process utilizes "backwards planning" when designing curriculum. The process consists of three key steps: 1) Identify Desired Results, 2) Determine Assessment Evidence, and 3) Plan Learning Experiences and Instruction. The process is entirely focused on student results from the very beginning. It is only after very clear goals are defined that curriculum development begins.

The UbD framework promotes characteristics that are consistent with what the research shows works in school-wide reading programs. It is also consistent with research-based reading strategies discussed in previous sections of this chapter. The

framework embraces seven tenants that are central to its philosophy. These tenants emphasize the characteristics of effective curriculum development. The first tenant states that "learning is enhanced when teachers think purposefully about curricular planning" (Wiggins, 2011). Teachers need to be actively involved in the development of a curriculum for it to be most effective. The second tenant emphasizes the importance of curriculum and teaching to address student understanding. The curriculum must directly address the content that is most relevant to the desired result (Wiggins, 2011). The third tenant states that "students autonomously make sense of and transfer their learning through authentic performance" (Wiggins, 2011). Students can better learn by showing their understanding in authentic ways. The UbD framework provides examples of authentic ways students can show understanding. The fourth tenant emphasizes the importance of backward planning. Effective curriculum is designed with results in mind first (Wiggins, 2011). The fifth tenant shifts the traditional idea of the role of the teacher. Rather than the sole disseminator of knowledge, the teacher is instead a "coach of understanding" (Wiggins, 2011). In effective curriculum, teachers ensure that students are learning more than they ensure all content is merely being taught. The sixth tenant emphasizes the importance of active reflection on the curriculum. If something is not working, such as a teaching strategy or learning activity, then it should be adjusted or changed until it is effective (Wiggins, 2011). The "because that's how we've always done it" mentality is not a part of an effective curriculum. Finally, the seventh tenant emphasizes the need to take action on the change that reflection brings. If it is recognized that a change is needed, then the change needs to actually be implemented in order for something to happen (Wiggins, 2011).

Conclusion

The literature confirms the importance of reading and language comprehension skills in learning. These skills are critical for mastering content in all content areas, not just language arts classes. The literature also confirms observations made in Chapter One regarding the challenges that face content area teachers when teaching reading and language comprehension skills in their curriculum. Content area teachers are not properly equipped to teach the reading and language comprehension skills that students need to best master the content in these classes. This research supports the need for development and implementation of the school-wide, cross-curricular reading program in the school in question as a means to help both struggling students and content area teachers with the ultimate goal being to improve reading and language comprehension skills in students for all content areas, provide content area teachers with the means to better help students, and change the perception of reading, writing, and language comprehension as belonging solely to the language arts classroom to a tool that students use to succeed.

Summary

School-wide reading programs come in many shapes and sizes. However, the literature reveals some consistent factors that make a school-wide, cross-curricular learning program successful. Lack of teacher training is an important factor that prevents content area teachers from confidently and effectively teaching reading and language comprehension skills in their curriculum. Teachers who teach reading instruction need proper training in order to provide effective instruction and actually improve a student's reading and language comprehension skills. Data must guide instruction. Reading

programs that are successful change their instructional practices as student need changes. Relying on a prescribed curriculum does not accommodate changing student need. Also, student data must be analyzed in peer groups. Typically, this means PLCs are looking at data together and making decisions about instruction. Finally, programs that work are build around attaining desired results. As outlined in the UbD framework, curriculum activities and experiences should be the last things developed when designing a reading program. It is only after understanding exactly what a school wants its students to achieve and how that achievement will be measured that specific curriculum materials, lessons, activities, etc., should be developed our assigned to the program.

Introduction to Chapter Three

Chapter Three is focused on the details of the project. It outlines the details of the school-wide reading program itself. It also includes a description of the setting and intended audience of the program. This is followed by a survey of some of the reading strategies that will be used to gather initial data for the program. Finally, a detailed timeline of the development and implementation of the reading program is provided.

CHAPTER THREE

Project Description

Introduction

How does a reading-centered academic program and culture affect achievement throughout content areas? This is the question that guides this capstone project. As stated in previous chapters, the final product from this capstone project will be a school-wide, cross-curricular learning program for a small public charter school. The goal of the project is to: 1) improve the reading, writing, and language comprehension skills of students at the school, specifically students who are struggling with reading, writing, and language comprehension, and 2) change and improve the way students perceive reading, writing, and language comprehension, specifically students who have consistently struggled with reading and language comprehension skills.

The school has strong motivating factors that encourage the development of this reading program. It is accountable to its authorizer. In the state of Minnesota, authorizers of charter schools track various contractual goals that they set with their schools as a means to measure an individual school's success. The school for which this reading program is being developed has low reading, writing, and language comprehension scores on most state accountability tests. Though the school has made continued efforts to improve achievement in these areas, the results simply have not been

acceptable. The school has identified this area as a problem and has made a renewed effort to focus on reading and language comprehension skills for all students, school-wide. The teaching staff acknowledges the need to make deliberate, informed choices when developing the reading program as to ensure that it produces the results that students and the school as a whole need. Once attained, these results will help students directly. As an added benefit, these results will also provide evidence for the school's authorizer that the school is meeting its contractual obligations to help students.

Project Overview

Such a program cannot be implemented overnight. As the research suggests, successful school-wide reading programs are adaptive to student needs. This requires teaching staff to trained in effective reading instruction. It also requires that teachers analyze data in real time and adjust instruction accordingly. Teachers, of course, cannot analyze data, at least data that is useful, unless they know what they are measuring. Furthermore, teachers cannot know what they should be measuring unless they already know, and agree on, the results that they want see in students. It is clear that developing this reading program must begin with identifying specific outcomes that the school wants to see in students.

Program Design Framework

Considering this chain of reasoning, it becomes apparent that the Understanding by Design framework is an ideal method for designing the school's reading program. The emphasis on beginning with desired results is consistent with the needs of the school. These outcomes are already defined in the school's contract with its authorizer. Next, the UbD framework advocates for identifying clear standards of measuring data to track the

desired results. The school already has staff that does this type of tracking; typically for reading and language comprehension skills of specific students with Individualized Education Plans (IEPs). The methods are in place. The reading program will expand their reach to take into account all students who need help with reading and language comprehension skills. The program will also to focus the use of these methods to apply to the specific goals identified for the entire student population. Finally, once goals and measures are identified, the UbD framework allows for planning of the details of the actual instruction and learning experiences. Part of the challenge for this stage of the development of the reading program will be training all staff on how to teach these methods. Many members of the school's staff, such as language arts and special education teachers, already have expertise in these areas. They will be key assets in training the rest of the staff how to teach these skills throughout content areas. As discussed in Chapter 2, Wyss (2013) and Ness (2016) suggest that content area teachers tend to resist including direct reading instruction in their classes for many reasons including feeling unqualified, perceiving a lack of time and resources to address content specific standards, and not feeling responsible for teaching reading skills. This last step could be a challenge, as it will require some staff to learn new skills in an already demanding working environment.

Choice of Method

Developing this reading program will require input and time from my colleagues and myself. We will work together to identify the specific results that the school needs. We will utilize the UbD process as described by Wiggins and McTighe (2011) to identify desired results before we identify assessment metrics and design curriculum.

Setting and Audience

The program will be developed and implemented in a small charter public school serving a largely at-risk student population. It will be a school-wide, cross-curricular reading program with the desired result of improving reading and language comprehension skills in the school's student population. As discussed in earlier chapters and sections, the school's student population is "at risk" for many reasons. More than 40% of students in the school have IEPs. Many students struggle with moderate to severe mental health issues. Still others face challenges in their home lives that interfere with their attendance in school and, thus, their academic success.

The high needs of the school's student population pose a challenge to the schools teaching staff. They are accountable for the academic success of all students. However, in order to help students achieve academic success, teachers must address the many variables that prevent student from finding success first. This can create significant extra work. The program is being designed to provide teachers a consistent, effective way to help all students as a part of their everyday teaching. It is also intended to, eventually, reduce some of the extra work required of individual teachers.

Project Description

Teachers in the schools Teacher-Powered Schools (TPS) committee will lead the design and implementation of the school-wide reading program using the UbD process. The development team will consist of weekly meetings of the core development group. The school's class schedule is divided into month-long blocks. Different teaching strategies will be implemented in specific in respective blocks. Data, in the from of writing samples, vocabulary assessments, etc., will be analyzed by the curriculum

development team at the weekly meetings. Reflection on the data will inform any changes that should be made. Changes will be implemented in subsequent blocks. The reflection-change process will continue through the fourth block (first semester) of the school year.

Project Timeline

The timeline for the development of this school-wide, cross-curricular reading program will be heavily dependent on the steps and tenants detailed in the Understanding by Design (UbD) framework for curriculum design. As discussed in Chapter Two, the UbD framework emphasizes "backward planning" when developing curriculum. The school's Program Development Team will begin by identifying the specific desired objectives for reading and language comprehension improvement in students.

The Program Development Team will work through the UbD curriculum design process a minimum of three times for before a scheduled school-wide implementation in December, 2017. It should be noted that, as per the UbD framework, the process of program implementation, reflection, analysis of data, and program adjustment will continue in perpetuity. The program will never be "done". The goal of this project is to get the program established school-wide so that a system is in place that can help both students and content area teachers with reading and language comprehension skill in content area classes. This program can and will change as student and teacher needs change.

The school's class schedule is based on a block system. Classes are offered in 1-month blocks. At the end of each block, classes conclude and new classes are offered. This system provides and ideal forum in which to apply program design variables. Each

block provides a complete and contained curricular unit in wich the Program Design Committee can test and reflect on the different variable of the reading program. Through successive iterations of the design process new content area teachers will be brought in to the Program Development Team and will be provided with training, resources, and professional support to include and teach reading and language comprehension skills in their curriculum.

Table 1 provides a detailed timeline for the development and implementation of this school-wide reading program.

TABLE 1: Detailed timeline of action steps for the development and implementation of the

Action Step	**Resources Needed/ Key People:**	**Timeline to accomplish step:**
Program Development Team will analyze initial data from reading strategies currently being attempted in science classes (e.g. vocabulary assessments, reading prompts, case study papers, etc.)	Data from science classes, Program Development Team, Committee Time	End of Block 1 (October 13, 2017)
Officially identify and state (in minutes) goals of school-wide reading program with Program Development Team. Goals must be directly aligned with current contractual goals of the school. Continually communicate with authorizer for guidance.	Program Development Team, Committee Time, Authorizer	End of Block 1 (October 13)
Establish initial set of reading strategies, informed by analysis of reading data above, to test in science and social studies classes. Program Development team will choose 3-5 strategies and create a detailed description for how to embed and implement each strategy in classroom instruction. The committee will also identify specific data to be collected for later reflection and analysis.	Program Development Team, LangArts/SpEd staff, Science Classes, Committee Time	Before beginning of Block 2 (October 13)
Use reading strategies in science classes and social studies classes, gathering data as per protocol developed by Program Development Team.	Program Development Team, LangArts/SpEd staff, Science Classes, Committee Time	Block 2 (October, 2017)
Science teacher and social studies teacher check-in/debrief with Program Development Team twice during block 2 (end of week 2 and end of week 4) to discuss challenges/observations/needed changes to instructional strategies/etc.	Program Development Team, LangArts/SpEd staff, Science Classes	Block 2 (October, 2017)

Program Development Team analyzes data from Block 2 science and social studies classes, reflects on successes/challenges as they pertain to the defined goals of the program, and identifies reading changes needed in instruction.	Program Development Team, Classroom data Committee Time	Before start of Block 3 (November 13, 2017)
Program Development Team defines additional (if needed) reading strategies for a second strategy set to use in content area classes, defining methods for implementation and data collection as with initial strategy set.	Program Development Team	Before start of Block 3 (November 13, 2017)
Program Development Team trains remaining content area teachers on how to embed/implement chosen reading strategies in curriculum and collect data for reflection.	Program Development Team	Before start of Block 3 (November 13, 2017)
All content area teachers use reading strategies in respective classes, gathering data as per protocol developed by Program development Team.	Program Development Team, LangArts/SpEd staff, Science Classes, Committee Time	Block 3 (November/ December, 2017)
All content area teachers check-in/debrief with Program Design Team twice during block 3 (end of week 2 and end of week 4) to discuss challenges/observations/needed changes to instructional strategies/etc.	Program Development Team, LangArts/SpEd staff, Content Area Classes	Block 3 (November/ December, 2017)
Program Development Team analyzes data from Block 3 science classes and content area classes, reflects on successes/challenges as they pertain to the defined goals of the program, and identifies reading changes needed in instruction.	Program Development Team, Classroom data Committee Time	End of block 3 (December, 2017)
Program Development Team defines additional (if needed) reading strategies to use in content area classes, defining methods for implementation and data collection as with initial and second strategy set.	Program Development Team, Classroom data Committee Time	Before Block 4 (January, 2017)
Program Development Team trains or retrains content area teachers on how to embed/implement chosen reading strategies in curriculum and collect data for reflection.	Program Development Team, Content Area Teachers Classroom data Committee Time	Before Block 4
Curriculum Committee (all GenEd and SpEd teachers) check-in/debrief regarding reading program twice during block 4 (end of week 2 and end of week 4) to discuss challenges/observations/needed changes to instructional strategies/etc.	Curriculum Committee LangArts/SpEd staff, Content Area Classes	Block 4
Program Development Team formally defines scope of the school's reading program: specific goal, strategies with resources, training schedule for content teachers, team reflection/data analysis schedule (e.g. "we will inform our instructional practices through reflection on our reading data as a team at curriculum committee meetings")	Curriculum Committee, Committee Time, Classroom Data, Authorizer	End of Block 4

Continual reflection of data on a biweekly basis during committee time	Curriculum Committee, Student Data,	...Forever

This timeline will provide the Program Development Team with a clear and tight schedule for development and implementation of this reading program before the beginning of Block 4 of the 2017-2018 school year. As noted above, the program will never be "done" and will need continual maintenance as informed by student data.

Summary

A team of teacher's consisting of the language arts teacher, special education teachers, and a general education teacher will utilize the Understanding by Design process for curriculum development to develop this school-wide reading program. This team, the "Project Development Team", will meet regularly throughout the first four blocks of the 2017-2018 school year to test and reflect on various reading, writing, and language comprehension strategies in content area classes. More content area teachers will be brought in to the Project Development Team for training and support for implementation of the materials and strategies that the team developed in earlier blocks. Though the program will never be finished, the goal is to have the foundations of a program active school-wide by the end of block four.

Introduction to Chapter Four

In Chapter Four I provide the results of the development and implementation of the school-wide reading program in my school. I reflect on the process detailing challenges and successes in my school's unique learning program. The chapter ends with

a discussion of further areas of development for the project and potential implementation of the reading program in other schools.

CHAPTER FOUR

Conclusions

Introduction

How does a reading-centered academic program and culture affect achievement throughout content areas? This question has guided the research, development of my capstone project: a school-wide, cross-curricular reading program at my school. In this final chapter I reflect on the process of working with my colleagues to develop the program, implement it in classes, and analyze student results for continual improvement. We learned a lot. We ran into obstacles. And we will never truly be "done" with this program. Student needs will change. Therefore, our program and we will have to change with them. The work we have done thus far gives us a solid foundation on which to build with the vision being a learning community where reading, writing, and language comprehension skills are a norm in all classes, not just language arts.

This chapter is arranged into six sections. The first section details the process we went through to research and develop the reading program for our specific learning community. The following section gives examples of student results, both successes and failures. In the next section I revisit research from chapter two and propose possible implications the project could have for my school and for teaching in general. After this I explore limitations that the project has for the specific learning community at my school

as well as other types of schools. In the final section of the chapter, I propose areas for further research and development as it pertains to the project.

The Initial Design Process and Implementation

The design process for this project started long ago. There were several members of our staff who identified the need for a cohesive, consistent, and effective system in our school that would give students the structures and feedback needed to develop reading, writing, and language comprehension skills.

We knew that our students were lacking in these skills. We saw it in their writing whether it be an assignment, and email to a teacher, or a post on one of the school's social media accounts. We saw it in their reading comprehension when seemingly simple words would trip them up and many would have trouble identify basic parts of texts like themes, plots, and characters. We saw it when students would declare that they would rather fail a class than write a paper or read a book or even an article. We also saw it in their standardized tests scores. Historically, our school's scores, especially for reading and language, have been quite low. Though impetus to develop this reading program has always been to help students succeed, the fact that it had potential to help improve our standardized test scores certainly didn't hurt as a motivating factor.

These observations were not surprising. Reading, writing, and working with language in a formal way is difficult. It is rare. Humans are among only a few species who can use language and, as David Christian explains in his 2011 TED talk, we are the only species with a versatile and adaptable symbolic language. The relationship between language and thought was one of my driving interests in doing this project. The point being that many students struggle with these skills. As educators, it is our job to identify

how a student is struggling and intervene in a way that can help them succeed. I also think that it is important to state that this idea, that language and thought influence each other, was a continually present part of my perspective as I taught strategies that were new to me. Though I cannot identify a direct way that this perspective affected the development of the project, I feel that it could have influenced specific decisions I made when working with students on reading, writing and language comprehension skills and is, thus, important to note.

The formal design of the project started with establishing our Program Development Team that consisted of the school's language arts teacher, two of the school's special education teachers, and myself. Initially, our team discussed what we wanted to see in a reading program. We imagined what the program could look like from the student perspective. Too often we heard the phrase "this isn't language arts class" when students were assigned reading or writing assignments in content area classes. We realized that we needed to change what it meant to read and write in our learning community. We needed to change them from their perception as tasks or chores that students were forced to get complete in rare and specific circumstances to a norm throughout the school's learning program where students saw them as a tool, like any other, that they could utilize to succeed in all classes and in life. This was the vision and we knew it was easier said than done.

Formal implementation of the program began during the first block of the school year. My school has two month-long blocks per quarter. This served as an ideal laboratory for testing out different reading, writing, and language comprehension

strategies. We could use strategies for a class and reflect monthly to assess success and reevaluate what we should do in the following block.

For this first block, we decided to implement three types of strategies: those intended to help students develop writing reading skills, those intended to help students develop writing skills, and those intended to help students develop better language comprehension. I applied these strategies in a life science class. I chose two articles that were inline with the school's quarter theme as a baseline reading strategy for this class. I utilized page marking, KWL note taking, and group reading for these articles throughout the block. The final project for the class were two, two-page case studies and a deliverable. I used the case studies, for which students had to find and reflect on an article in the context of their chosen topic, with a requirement of one revision as a baseline writing strategy. I spent extensive time working with students one-on-one via Google Docs to help them revise and edit their case studies. Finally, students completed a formative vocabulary assessment three times throughout the block to check their understanding of different vocabulary terms relevant to the course. This assessment was used as a baseline language comprehension strategy.

The results of this initial block were encouraging. They confirmed what we had already thought that we knew and gave us valuable insight that would guide our

Student Results and Redesigns

Results of the strategies used in the first block were encouraging. All students who completed revisions on their case studies passed the class and produced work of C quality or higher as measured by the project's rubric. More importantly, though, several students expressed pride in their work.

One student, after declaring that she had given up several times, completed her first case study. Initially, she simply didn't understand the article that she had chosen to be a part of her case study. I read though it with her, several times, and helped her reflect to verify that she understood the content and it's implications for her paper. After she started her first case study, I worked through the document with her, line-by-line, giving feedback and suggestions over two days. She admitted that she didn't think that she could do it and definitely wouldn't have been able to if she were at a larger school with less staff available to give one-on-one help. Though she was junior at the time, she explained that she simply had never learned and/or practiced many of the writing rules and conventions needed for high quality writing. She expressed genuine pride in her work.

Another student had a similar aversion to reading and writing. It was clear that he did not have strong reading and writing skills. He would avoid reading and writing whenever able. He would find reasons to stop working and would declare that he gave up. One factor that may have helped this student was the fact that we spent two full weeks in class working on the case studies. After a few days of receiving consistent individualized help and seeing that his work would not be done until it was of high quality he began to take the work more seriously. He expressed confidence in his writing and pride with his finished project.

Several other students in this class expressed similar pride in their work. We wanted this reading program to improve the reading, writing, and language comprehension skills of our students. This can be measured fairly easily with assignment scores, grades, and standardized tests. I include qualitative data of students having pride

in their work because the other, arguably more difficult, goal of our reading program was to change the way students perceive reading and writing in school. The examples that I provided give us confidence that our program is on the right track.

Cross-Curricular Feedback

Upon reflection of the first block, the reading program development team identified some interesting findings. With some exceptions, most of the students in the life science class were also in a language arts class during the same block. The language arts teacher on the development team noted an overall improvement in writing skills specifically in this set of students. In this case, the sample size of students was very small. We also had limited usable data that could help us make any hard conclusions. But the observation did help us generate a question as to weather or not having students write in more than one context throughout the day could help them develop better writing skills overall. We used this question to develop a peer evaluation packet for editing essays.

Redesign

In the second block of the quarter, I utilized the same strategies as I did for the first block. I taught the same life science course with different students. However, for the case study, students did peer edits using the packet that our development team had designed. We saw different results for this class. Less class time due to scheduling issues prompted me to reduce the final project to a single case study. With few exceptions, the students in the class were all freshmen and were new to our school. This, coupled with a lack of reading and writing skills that contributed to student confusion with the peer review packet and low-quality feedback for edits and revisions. I spent less

time during the second block helping students one-on-one. The project design team identified this as a factor that may need to account for in our reading program.

Content Area Teachers

In chapter two I referenced several scholars who identified variables that affected if and how content area teachers teach reading, writing, and language comprehension skills in their curriculum. Ness (2016) shows that many content area teachers simply do not feel confident that they can effectively teach reading and writing. Wyss et al (2013) cites lack of classroom time and excessive focus, by teachers as well as state and federal authorities, on content specific standards as a factor that prevents these teachers from teaching reading and language skills. Despite these conditions, reading and writing skills are still vital tools for success in content area classes like science (Cano, 2014).

When bringing this reading program to the other content area teachers in the school, the development team expected resistance for the reasons described in the previous paragraph. We were surprised to find all staff on board and excited to find new and better ways to teach reading, writing, and language comprehension skills. They confirmed the problems that the literature suggests but they were eager to recieve training. We began sharing materials with other content area teachers in the second block of the quarter and planned to bring specific teachers in on the program development team.

As of the publish date of this capstone project, the reading program that we developed at the school has show some encouraging results as well as clear areas for improvement. Training the rest of the staff to be effective teachers of reading and writing skills will be our next challenge.

Project Implications

During the second block of the quarter our entire staff decided to form professional learning communities to meet at least twice per month. There were many reasons that we made this decision. Helping content area teachers develop strategies to teach reading and writing was one of them. Our new drive to work in professional learning communities has the potential to yield results of "communities of practice" as described by Lieberman (2009). Using professional learning communities to help content area teachers like myself is good practice as long as we structure them effectively. Liberman (2009) proposes that effective communities like the professional learning communities we are starting should have full participation from staff, collegate support between staff, a focus on professional development, a dedicated time and place for discussion, and time set aside for thinking. If our professional learning communities work as we hope, using similar methods have potential to help content area teachers in other school settings learn how to teach reading and writing effectively in their curriculum.

The question of whether or not having students read and write in different contexts throughout the day could improve their reading and writing skills could hold implications with other school settings as well.

Project Limitations

This project and the classroom materials developed for it were designed for a very small public charter school with: a small staff that has control over the day-to-day running of the school, a customized class schedule, and a unique student population with a very specific set of needs. These variables make for a very niche environment. Some

insights learned from using this program at this specific school may not translate to other school communities with different conditions.

Another potential issue is that the success or failure of this reading program in the school depends heavily on buy-in from other content area staff and support. Luckily, all staff at the school are on board. But staff dynamics are not always this easy at every school. A small number of staff that do not want to teach reading, for whatever reason, could potentially derail such a school-wide, cross-curricular reading program in a school.

Yet another potential hurdle that this program could face in my and other school settings is it's changing nature. Our reading program will never truly be 'done". If a program is developed it can be easy to think of it as "done". If this is the mentality that a team has with such a program then it can be difficult to change the program when student needs change. It may also make it easy to justify less continual reflection.

These limitations can affect where such a reading program would be most effective.

Further Research and Development

If and when our reading program becomes the norm in our learning community that we envision, it would be interesting to do more formal analysis of reading, writing, and language comprehension skills of our students. Measuring and tracking a student's specific levels in reading, writing, and vocabulary as they spend more time at our school could inform our practice.

We identified a need for focus on the distinction between narrative writing and technical writing in our reading program. They are different types of writing with different rules and conventions. Further research into the way students learn how to read

and write different types of texts could inform the continual redesign of our reading program.

Summary

The development of a school-wide, cross-curricular reading program for my school would not have been possible without buy in from an entire team of colleagues around a shared vision. One part of our vision was to see student skills in reading, writing, and language comprehension improve. Another, arguably more important, part of the vision was to see student think of reading and writing as a tool that they can use to succeed in all classes rather than simply a task or chore to complete in a language arts class. Thus far we have seen some favorable and some unfavorable results in student skill growth. However, a few examples of student testimonials give us confidence that the program is working toward the second part of our vision. Students are more confident and proud of their writing when they are given direct, specific, helpful feedback by teachers.

As stated several times in this paper, this reading program will never truly be complete. Student needs will always change and we, as educators must change with those needs. Hopefully this reading program will give our school a solid foundation upon which to build stronger and more confident readers, writers, and users of the English language.

REFERENCES

Alfassi, M. (1998). Reading for meaning: The efficacy of reciprocal teaching in fostering reading comprehension in high school students in remedial reading classes. *American Educational Research Journal, 35*(2), 309-332. doi:10.3102/00028312035002309

Alfassi, M. (2004). Reading to learn: Effects of combined strategy instruction on high school students. *Journal of Educational Research, 97*(4), 171-184. doi:10.3200/JOER.97.4.171-185

Ballash, K. M. (1994). Remedial high school readers can recover, too! *Journal of Reading, 37*, 686-687. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=508517691&site=ehost-live

Bull, S., Jackson, T. J., & Lancaster, M. J. (2010). Students' interest in their misconceptions in first-year electrical circuits and mathematics courses. *International Journal of Electrical Engineering Education, 47*(3), 307-318. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=aph&AN=57434552&site=ehost-live

Cano, F., García, Á, Berbén, A B G 1, & Justicia, F. (2014). Science learning: A path analysis of its links with reading comprehension, question-asking in class and science achievement. *International Journal of Science Education, 36*(10), 1710-1732. doi:10.1080/09500693.2013.876678

CARNES, R. L. (2014). A perceptual model of the whorfian thesis. *ETC: A Review of General Semantics, 71*(3), 263-271. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=aph&AN=101108801&site=ehost-live

Casasanto, D. (2008). Who's afraid of the big bad whorf? crosslinguistic differences in temporal language and thought. *Language Learning, 58*, 63-79. doi:10.1111/j.1467-9922.2008.00462.x

Cho, B. (2014). Competent adolescent readers use of internet reading strategies: A think-aloud study. *Cognition & Instruction, 32*(3), 253-289. doi:10.1080/07370008.2014.918133

Christian, D. (2011) The History of Our World in 18 Minutes [Video file] Retrieved from https://www.ted.com/talks/david_christian_big_history

Emihovich, C., & Lima, E. S. (1995). The many facets of vygotsky: A cultural historical voice from the future. *Anthropology & Education Quarterly, 26*, 375-383. doi:10.1525/aeq.1995.26.4.05x1059s

Fitzgerald, A., Cooper, R., & Sarkar, M. (2016). Nurturing quality science learning and teaching: The impact of a reading group. *Teaching Science: The Journal of the*

Australian Science Teachers Association, 62(2), 44-51. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=aph&AN=120759570&site=ehost-live

Holloway, J. H. (1999). Improving the reading skills of adolescents. *Educational Leadership, 57*(2), 80-81. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=507657523&site=ehost-live

Jackson, V., vjackson343@gmail.com. (2016). Applying the think-aloud strategy to improve reading comprehension of science content. *Current Issues in Education, 19*(2), 1-35. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=115909670&site=ehost-live

Lai, M. K., mei.lai@auckland.ac.nz, Wilson, A., aj.wilson@auckland.ac.nz, McNaughton, S., s.mcnaughton@auckland.ac.nz, & Hsiao, S., selena.hsiao@gmail.com. (2014). Improving achievement in secondary schools: Impact of a literacy project on reading comprehension and secondary school qualifications. *Reading Research Quarterly, 49*(3), 305-334. doi:10.1002/rrq.73

Lieberman, J. (2009). Reinventing teacher professional norms and identities: The role of lesson study and learning communities. *Professional Development in Education, 35*(1), 83-99. doi:10.1080/13674580802264688

Lupyan, G. (2016). The centrality of language in human cognition. *Language Learning, 66*(3), 516-553. doi:10.1111/lang.12155

McKeown, R. G. 1., rmckeown@cuesta.edu, & Gentilucci, J. L. 2. (2007). Think-aloud strategy: Metacognitive development and monitoring comprehension in the middle school second-language classroom. *Journal of Adolescent & Adult Literacy, 51*(2), 136-147. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=26915485&site=ehost-live

Murphy, B., Hedwall, M., Dirks, A., & Stretch, E. (2017). Short-form science. *Science Teacher, 84*(1), 34-41. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=aph&AN=120423543&site=ehost-live

Ness, M. K. 1., mness@fordham.eu. (2016). Reading comprehension strategies in secondary content area classrooms: Teacher use of and attitudes towards reading comprehension instruction. *Reading Horizons, 55*(1), 58-84. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=113745713&site=ehost-live

Ortlieb, E., evan.ortlieb@tamucc.edu, & Norris, M., mnorris@islander.tamucc.edu. (2012). Using the think-aloud strategy to bolster reading comprehension of science concepts. *Current Issues in Education, 15*(1), 1-9.

Palinscar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*(2), 117-175. doi:10.1207/s1532690xci0102_1

Pavlenko, A. (2016). Whorf's lost argument: Multilingual awareness. *Language Learning, 66*(3), 581-607. doi:10.1111/lang.12185

Penuel, W. R., & Gallagher, L. P. (2009). Preparing teachers to design instruction for deep understanding in middle school earth science. *Journal of the Learning Sciences, 18*(4), 461-508. doi:10.1080/10508400903191904

Penuel, W. R., Gallagher, L. P., & Moorthy, S. (2011). Preparing teachers to design sequences of instruction in earth systems science: A comparison of three professional development programs. *American Educational Research Journal, 48*(4), 996-1025. doi:10.3102/0002831211410864

Piaget, J. (1959). *The language and thought of the child*. New York: Humanities Press.

Radiolab. (2017). *Colors*. [podcast] Available at: http://www.radiolab.org/story/211213-sky-isnt-blue/ [Accessed 8 Oct. 2017].

Wilson, K.G, Daviss, B. (1994). Basic Facts. Retrieved from: https://readingrecovery.org/reading-recovery/teaching-children/basic-facts/

Robotti, E., elisabetta.robotti@gmail.com. (2012). Natural language as a tool for analyzing the proving process: The case of plane geometry proof. *Educational Studies in Mathematics, 80*(3), 433-450. doi:10.1007/s10649-012-9383-0

Slavin, R. E., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly, 43*(3), 290-322. doi:10.1598/RRQ.43.3.4

Slavin, R. E., & Madden, N. A. (1995). Success for all: Creating schools and classrooms where all children can read. *Yearbook (National Society for the Study of Education), 94th*(1), 70-86. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=508540690&site=ehost-live

Smagorinsky, P., smago@uga.edu. (2013). What does vygotsky provide for the 21st-century language arts teacher? *Language Arts, 90*(3), 192-204. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=84956126&site=ehost-live

Thierry, G. (2016). Neurolinguistic relativity: How language flexes human perception and cognition. *Language Learning, 66*(3), 690-713. doi:10.1111/lang.12186

Tomasello, M. (1996). Piagetian and vygotskian approaches to language-acquisition. *Human Development (0018716X), 39*, 269-276. doi:10.1159/000278478

Understanding by design (book). (2001). *Adolescence, 36*(144), 839. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=aph&AN=6439153&site=ehost-live

Wertsch, J. V. (2008). From social interaction to higher psychological processes: A clarification and application of vygotsky's theory. *Human Development (0018716X), 51*(1), 66-79. doi:10.1159/000112532

Wiggins, G. P., & McTighe, J. (2011). *The understanding by design guide to creating high-quality units* ASCD.

Wyss, V. L. 1., Dolenc, N., Kong3, X., & Tai, R. H. 4. (2013). Time on text and science achievement for high school biology students. *American Secondary Education, 41*(2), 49-59. Retrieved from http://search.ebscohost.com.ezproxy.hamline.edu:2048/login.aspx?direct=true&db=eft&AN=87332873&site=ehost-live