

MIDDLE SCHOOL SCIENCE TEACHERS' PERSPECTIVES:
PROFESSIONAL LEARNING AND IMPLEMENTING THE COMMON CORE GEORGIA
PERFORMANCE STANDARDS FOR LITERACY

by

MICHAEL CASSIDY

(Under the Direction of Katherine F. Thompson)

ABSTRACT

The purpose of this qualitative case study was to examine five Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. One research question guided this study: What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

The theoretical frame for this study was guided by constructivism, including social constructivism and symbolic interactionism, while applying an interpretive analysis. The data collected were two semi-structured interviews with each participant, participant observations of 14 science meetings, collection of artifacts, and field notes. The constant comparative method was applied for data analysis. Findings indicated job-embedded professional learning (1) was determined by macro-level educational decisions and micro-level reactions, (2) created a spectrum of feelings: appreciation, ambivalence, apathy, and inundation, (3) allowed opportunities for different types of adult learning to occur, (4) focused more on reading than

writing, speaking and listening, and language, and (5) often lacked coherence. Suggestions for future research involving policymakers, school district personnel, school leaders, teachers, and professional learning providers are explained.

INDEX WORDS: Common Core Georgia Performance Standards, Georgia Educational Policy, Middle School, Professional Learning, Science-Literacy, Science Teachers

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DEDICATION

My Family

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES	xi
LIST OF FIGURES	xii
CHAPTER	
1 INTRODUCTION	1
Background of the Study	3
Statement of the Problem.....	14
Purpose of the Study	16
Research Question	16
Conceptual Framework.....	16
Overview of the Methods.....	18
Significance of the Study	20
Assumptions of the Study	21
Definition of Terms.....	21
Limitations of the Study.....	24
Organization of the Dissertation	24
2 REVIEW OF THE RELATED LITERATURE	25
Historical Influences of Educational Policy on Teacher Professional Learning ...	26

Current Georgia Educational Policies Affecting Science Teachers' Professional Learning	29
Theoretical Underpinnings of Professional Learning	53
Successful Professional Learning Practices	62
Chapter Summary	74
3 RESEARCH DESIGN AND METHODOLOGY	76
Purpose of the Study	76
Theoretical Framework	76
Rationale and Research Design	80
Data Sources	83
Data Collection	85
Data Analysis	89
Trustworthiness	96
Limitations of the Study	98
Chapter Summary	98
4 FINDINGS	100
Purpose of the Study	101
Context of the Study	103
Beginning of the Study Perspectives	106
End of the Study Perspectives	127
Emergent Themes	148
Chapter Summary	160
5 SUMMARY, DISCUSSION, AND IMPLICATIONS	164

Summary of the Research Design.....	164
Discussion.....	168
Implications for Future Research.....	184
Concluding Thoughts.....	192
REFERENCES	195
APPENDICES	
A FIRST SEMI-STRUCTURED INTERVIEW PROTOCOL	214
B SECOND SEMI-STRUCTURED INTERVIEW PROTOCOL.....	215
C PARTICIPANT OBSERVATION PROTOCOL	216
D PROJECT CONSENT FORMS - OBSERVATIONS.....	217
E PROJECT CONSENT FORMS - INTERVIEWS.....	219

LIST OF TABLES

	Page
Table 2.1: National Educational Policies and Committee Publications 1983-2013: Influence on Professional Learning	27
Table 2.2: CCSS Anchor Standards and Equivalent Science, Social Studies, and Technical Texts for Grades 6 through 8.....	34
Table 2.3: Three Dimensions of the Next Generation Science Standards	36
Table 2.4: Characteristic Features of Formal and Informal Learning	57
Table 2.5: Characteristics of High Quality Teacher Professional Learning	64
Table 2.6: Relationship between Professional Learning, Teacher Quality, and Adult Learning ..	66
Table 2.7: Characteristics of a Successful Middle School.....	68
Table 2.8: Middle School Concept Aligning with Characteristics of Effective Professional Learning	70
Table 3.1: Participant Observations of Meetings.....	86
Table 3.2: Summary of Participant’s Participation, the Data Collected, and Duration of Participation	89
Table 3.3: Sample of Initial Coding.....	92
Table 3.4: Sample of Memo Writing after Initial Coding	92
Table 3.5: Sample of Table for Participants Perceived and/or Identified Needs.....	94

LIST OF FIGURES

	Page
Figure 4.1: Example of Constant Comparative Method and Memos to Develop Themes	149
Figure 5.1: Spectrum of Feelings Felt about their Professional Learning Experiences.....	175

CHAPTER 1

INTRODUCTION

I push the door open and walk into a crowded rectangular room. There are over 30 round tables arranged in six rows across the room. I survey the room and spot the sign-in table out of the corner of my eye. I walk over to the table marked A-G. I flip through the sign-in sheet and find my name, Mike Cassidy. I initial and write down the name of my school, Mullarkey Middle School.

I turn around and casually walk toward the round tables while scanning the room spotting tent-shaped signs for each school: Shaw, Davis, Rain, Burke. “Where is Mullarkey Middle?” I think to myself. There it is. My colleague, Ms. Kennedy, a seventh grade math teacher, is sitting down at our school’s round table playing with her phone.

I pull out the chair to her right, “Hey Kennedy, I didn’t know you were picked to come to this, too.”

She looks up from her phone smiling, recognizing my voice, and greets me, “Hey, Cassidy. Yea, looks like Mr. Tomas picked the two of us to go.”

“Do you know what this session is about?” I ask.

“I don’t know, some new strategy the district wants us to use,” she says in an apathetic voice. “Remember to take notes because we will have to report this strategy to the rest of the faculty.” She puts her phone in her purse and slides a stapled packet of the PowerPoint presentation and notes over to me.

I read aloud, “Research-Based Extraneous Strategy.” I look up at Kennedy a little annoyed. “What is this? Didn’t they just say to use the Superfluous Strategy a month ago?”

Kennedy leans back in her chair and says,

Come on, Cassidy, you know the routine. The State tells the district about some new initiative or strategy they want used in classrooms. Then the district gets people from God knows where to teach us how to do it, even if it contradicts what we were told to do before. Then district personnel check up on us in a month to see if we are doing it. After that, you can go back to doing what you know is best.

I jokingly respond, “I guess this is the new flavor of the month” and lightly throw the packet on the table.

Moments later, a white man enters the room who is probably 50, but looks almost 70, and walks to the front of the room. He calls out, “Hello, everybody! How is everyone doing this morning?” There is a less than unenthusiastic reply from the group. He tries again, “Come on, I said, how is EVERYONE doing this morning?” There is a little louder grumble from the audience. “Okay, much better. My name is Dr. Murphy and I am from Irrelevant To What You Do In Your Classroom University. Today, I will be showing you research-based strategies to raise your students’ tests scores.”

He proceeds to read straight from the PowerPoint, although the strategy being discussed is student-centered. I tune him out. Trying to stay awake, I begin looking across the room to see what others are doing. Teachers are playing Candy Crush on their phones, attempting the daily crossword puzzle, grading papers, and doing anything else other than paying attention to the presentation.

A few hours pass.

“So any questions?” Dr. Murphy inquires. There is not a peep from the crowd. “Okay, great. You all do this and your students’ test scores will rise magically. I hope everyone has a wonderful day.”

Ms. Kennedy leans over to me and whispers, “So whatcha think?”

I reply indifferently, “I don’t see this strategy working with our kids. That strategy will only work at Savant Prep. I am just glad it is over.”

We both stand up and walk out of the room.

The scenario described was a fabrication of one of my professional learning experiences as a sixth grade science and English language arts teacher in Alabama. Often, I thought my professional learning experiences lacked relevancy to my classroom instruction, were a waste of my time, and did not satisfy my professional learning needs. In four years as a doctoral student at the University of Georgia, I had several conversations with teachers across the state about their professional learning experiences. Many of them felt as I did while many others felt the complete opposite. I found this dichotomy intriguing and wondered what districts and schools were doing to support their teachers. It was from my frustrations as a classroom teacher and conversations with other teachers that prompted my dissertation research on teachers’ perspectives on their professional learning.

Background of the Study

Over the last three decades, there has been a strong movement in education for national standards and accountability resulting in several publications and legislative acts (Goldstein, 2014; Kendall, 2011; Ravitch, 1995). In 1983, *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983) critiqued the mediocrity of

America's educational system, prompting states and the nation toward standards-based reform. *Curriculum and Evaluation for School Mathematics* (National Council of Teachers of Mathematics, 1989) was published, promoting the idea of educational improvement, beginning with an agreement on content standards that could be reproduced at both the national and state levels (Wixson, Dutro, & Athan, 2003). According to Barton (2009), in 1992 the National Council on Education Standards and Testing expressed their support for improving content standards as a vital element for education reform.

When Bill Clinton became president, he pushed the standards and accountability movement further (Goldstein, 2014). In 1994, two pieces of legislation were signed, the Improving America's Schools Act (Public Law 103-382) and Goals 2000: Educate America Act (Public Law 103-227). These acts required states to adopt new curriculum standards and tests in order to receive Title I money (Goldstein, 2014). Title I was part of the Elementary and Secondary Education Act (ESEA) (Public Law 89-10), signed into law by President Lyndon Johnson in 1965. Title I provides financial aid to local educational agencies and schools with high percentages of children from low-income families with the goal of providing all children the opportunity to meet challenging state academic standards (U.S. Department of Education, 2014). President Bill Clinton believed these legislative acts would improve one of Title I's flaws—states' and local school districts' inability to create high-quality curricular materials. He attempted to establish a National Education Standards and Improvement Council where educational researchers would develop standards, textbooks, and tests, which states and local school districts could adopt. Eventually, the Republican-controlled Congress withdrew their support of the movement and the programs were crippled (Goldstein, 2014).

By the end of the 1990s, education reformers remained frustrated because schools that continually failed state tests faced no consequences (Ravitch, 2010). When President George W. Bush entered the White House, he understood bipartisanship was essential to passing a school accountability law. In 2001, President Bush introduced the No Child Left Behind Act (NCLB) to Congress. The following year, Congress reauthorized ESEA, and NCLB was signed into law (Public Law 107-110). NCLB provided state education agencies with guidance for accountability and assessments (U.S. Department of Education, 2015a). Congress fully supported NCLB and demanded that 100% of American students be proficient in reading and mathematics by 2014 (Goldstein, 2014).

To receive federal funding under NCLB, state education agencies were required to create academic standards and assessments for reading and mathematics to measure academic achievement yearly for grades 3 through 8 and at least once during grades 10 through 12 (Abedi, 2004). Additionally, NCLB required all states to have science assessments in place by 2007 for teachers to administer at least once during grades 3 through 5, grades 6 through 9, and grades 10 through 12, totaling at least three assessments (U.S. Department of Education, 2004). Each state created its own proficiency standards and assessments for reading, science, and mathematics. States' definitions of proficient standards and assessments varied greatly (Perie, 2007). As a result, student achievement as a nation did not improve as hoped for in reading, science, and/or mathematics (Carmichael, Martino, Porter-Magee, & Wilson, 2010; McGuinn, 2006).

As President George W. Bush's presidential term came to an end and President Barack Obama's began, education reform continued to be at the top of the political agenda. Shortly after being elected president, President Barack Obama presented Congress with an economic stimulus package called The American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

Within the American Recovery and Reinvestment Act of 2009 was the administration's education program, the Race to the Top Fund (U.S. Department of Education, 2009a). The act was signed into law in February of 2009. President Barack Obama and Secretary of Education Arne Duncan announced their plans for the Race to the Top Fund grant program in July 2009 (U.S. Department of Education, 2009b).

The Race to the Top Fund was a United States Department of Education grant program that provided over \$4 billion to states and local school districts that agreed to implement a reform agenda based on certain criteria (Georgia Department of Education, 2014a). The application criteria for states to be awarded a grant were based in the hope to:

- (1) Improve teacher and principal accountability systems;
- (2) Implement reform agendas addressing achievement gaps;
- (3) Develop and adopt college- and career-ready standards and assessments;
- (4) Provide opportunities for charter schools;
- (5) Turn around low-achieving schools; and,
- (6) Build a data system to measure student growth and success to help improve classroom instruction. (U.S. Department of Education, 2009a, p. 1)

According to the U.S. Department of Education (2015a), student growth is defined as a change in student achievement for an individual between two or more points in time. Student achievement is defined as student scores on state assessments, end-of-year tests, and other measures that are comparable across classrooms (Goldstein, 2014). Additionally, states were encouraged to put a plan in place that had a strong emphasis on STEM (Science, Technology, Engineering, and Mathematics) education. Based on this criteria, the applications were scored on a 500-point scale (U.S. Department of Education, 2009a). Only 19 states were awarded Race to the Top funds, but

two-thirds of the states altered laws pertaining to public schools and public school teachers in order to compete in the grant program (Goldstein, 2014).

The majority of the states that entered the Race to the Top Fund grant program addressed the development and adoption of college- and career-ready standards (Weiss, 2013). Although states had the opportunity to develop and adopt their own college- and career-readiness standards, states were incentivized to adopt the Common Core State Standards (CCSS) to gain extra points on their Race to the Top Fund applications. Additionally, states could receive a NCLB waiver—flexibility from a law demanding 100% of students be proficient in mathematics and reading by 2014 (McNeill & Klein, 2011).

The CCSS were created by the National Governors Association Center for Best Practices and the Council of Chief State School Officers. The standards were for grades kindergarten through 12 in the areas of mathematics, English-language arts (ELA), and literacy in science, social studies, and technical subjects. The standards were designed to help young people develop knowledge and skills that would potentially help them in their future college and career endeavors (Kendall, 2011). The CCSS were meant to position U.S. students to compete in a global economy (CCSS Initiative, 2015a). The CCSS were launched in 2009, and currently 43 states, the District of Columbia, and the Department of Defense Education Activity have adopted the CCSS (CCSS Initiative, 2015b). The standards focused primarily on new content standards for mathematics and English language arts (Porter, McMaken, Hwang, & Yang, 2011).

Because of the lack of focus on science content standards in the Common Core State Standards (CCSS), several organizations began to develop the Next Generation Science Standards (Next Gen) in 2010. The National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and a nonprofit called

Achieve, Inc. all participated in developing the Next Gen. The Next Gen were released in spring 2013 (Achieve, 2015a; Pruitt, 2014). The organizations took a two-step approach to develop the standards. First, the developers defined a vision for science education in the 21st century and articulated what students need to know in each grade to be considered scientifically literate. The vision included a learning progression of core ideas (specific content and subject areas), scientific and engineering practices (understanding science content and scientific methods), and crosscutting ideas (underlying ideas that are common among science concepts) that integrate various disciplines of science. After developing a vision for science education, the second step was to invite all states to develop student performance expectations for each grade level, but only 26 states participated (Pruitt, 2014). Like the CCSS, the Next Gen aimed to prepare students for college and careers (Achieve, 2015a). As of 2015, many states have shown interest in adopting the Next Gen, but only 11 states have adopted them (Heitin, 2014).

In the remainder of this section, macro- and micro-level educational decisions are defined and how macro-level educational decisions influence micro-level educational decisions are explained. More specifically, for the purpose of this study, the state of Georgia's educational decisions about science content standards are mentioned and how these educational decisions impact science teachers are described.

When federal decisions (e.g., NCLB and Race to the Top) and/or state educational decisions (e.g., CCSS and Next Gen) are made, they are considered macro-level educational decisions (Johnson, 2013). The interrelations between the federal government and state government pertain to the amount of federal money received by the state and the promised results the state government made to the federal government (Manna & Ryan, 2011; McGuinn, 2011). Federal and state educational decisions are influenced by societal norms and values

(Brady, Duffy, Hazelkorn, & Bucholz, 2014). Every macro-level educational decision directly influences local school districts and individual schools' educational decisions. The educational decisions made by local school districts and schools are considered micro-level educational decisions (Johnson, 2013).

Micro-level educational decisions are made by school and school district administrators based on the voices of teachers, parents, the local school board, and the community (Brady et al., 2014). Every micro-level educational decision is made to produce desired state outcomes, which in turn satisfies the federal government (McGuinn, 2011; Spring, 2011). The desired macro-level outcomes lead to reactive micro-level educational decisions, a process that often fails to consider the impact on administrators, teachers, and students so unintended consequences occur (Darling-Hammond, 2010; Johnson, 2013).

One example of an unintended consequence was a failure on the part of some schools to focus on social studies and science instruction. For instance, the No Child Left Behind Act (NCLB) required reading and mathematics assessments in grades 3 through 8, but only once in science for grades 3 through 5. An elementary school principal decided the science assessment would be administered in third grade. The fourth and fifth grade teachers decided to teach only the mathematics and reading curriculum, not the science and social studies curriculum, because of the pressure for students to be "proficient" on reading and mathematics assessments (Perlstein, 2007). Therefore in this scenario, students failed to receive science and social studies education for two years because the federal and state educational decision emphasized reading and mathematics assessments over other content areas.

During the past few years, the state of Georgia made multiple macro-level educational decisions that influenced micro-level educational decisions. In 2010, Georgia competed for and

received \$400 million over four years from the Race to the Top Fund grant competition to support the implementation of its education reform plan. The priorities of Georgia's plan (Georgia Department of Education, 2014a) included:

- (1) Implementing high-quality standards and rigorous assessments for all students;
- (2) Implementing a new teacher and leader evaluation system;
- (3) Providing support for all schools including low-achieving schools; and,
- (4) Putting a strong emphasis on STEM education. (p. i)

Micro-level educational decisions were made for each aspect of Georgia's plan throughout the state, but for the purpose of this study, the researcher focused solely on the implementation of high-quality science standards in one school district.

To address the need for high-quality standards, Georgia infused the Common Core State Standards (CCSS) to add more rigor into its existing standards, the Georgia Performance Standards (GPS), resulting in what is now called the Common Core Georgia Performance Standards (CCGPS). The CCGPS were adopted in 2010. Districts implemented the CCGPS in 2012 for all grades kindergarten through 9 in mathematics, English language arts (ELA), and for literacy in science, social studies, and technical subjects. By the end of the 2015-2016 school year, the CCGPS should be fully implemented in all grades kindergarten through 12 (Georgia Department of Education, 2014b). In addition to the CCGPS, Georgia explored high-quality standards for science and became a Lead State Partner with the Next Generation Science Standards (Next Gen) in 2011. Being a Lead State Partner meant designating personnel to help write the standards, assigning personnel to be involved in discussions about the adoption and implementation of the Next Gen, making an announcement about being a part of the Next Gen creation process, and identifying a timeline for adopting science standards (Achieve, 2015b).

Georgia planned to adopt the Next Gen in 2015 but has yet to do so. For science, Georgia continues to use its existing content standards, GPS for Science.

Georgia's macro- and micro-level educational decisions involving science standards became complex. Science teachers implemented the GPS for Science, which were divided into Characteristics of Science and Content of Science. The Characteristics of Science related to habits of mind and the nature of science (exploring and investigating concepts). The Content of Science standards related to the specific content and subject matter for each grade level (Georgia Department of Education, 2015b). Simultaneously, science teachers implemented the CCGPS for literacy in science, which addressed reading content-rich information; reading, speaking, and writing grounded in evidence from text; and regular practice with complex text and its academic vocabulary (Georgia Department of Education, 2015c). Essentially, the CCGPS for literacy in science addressed reading, writing, speaking and listening, and language related to science content. At the same time, the Next Gen was still being discussed at the macro- and micro-levels. The 2015 Georgia Science Teachers Association (GSTA) Conference focused on providing Georgia's K-12 science teachers with instructional strategies for implementing the Next Gen (GSTA, 2015).

Literature suggests high-quality teacher professional learning related to implementing standards is crucial to carry out macro-level educational decisions (Desimone, 2011; Hess & McShane, 2013; Loveless, 2013). For high-quality teacher professional learning to take place, it has to be "ongoing, long-term, and related to the teachers' content area" (Zepeda, 2012, p. 8). Additionally, professional learning activities should be embedded within the workday to promote collaboration among content- and grade-level teachers (Borko, 2004; Crow, 2009; Porter, Garet, Desimone, Yoon, & Birman, 2001). Teachers should be involved in learning various

instructional strategies that are aligned with standards and student data (Darling-Hammond & McLaughlin, 2011; Guskey, 2003). Professional learning is considered the keystone for implementation of science content standards-based reform (Ewing, 2010).

For years, science education researchers and scholars acknowledged the need to prepare science teachers to integrate science content and content-related literacy skills (e.g., citing textual evidence to support their scientific argument) (Yore & Treagust, 2006). For instance, teachers that integrated science and literacy instruction improved students' reading comprehension and science content learning (Greenleaf, Litman, Hanson, Rosen, Boscardin, Herman, & Jones, 2011). Furthermore, science education researchers and scholars recognized that in-service teachers need professional learning on creating and grading assessments that address science related literacy skills to improve classroom instruction (Gottheiner & Siegel, 2012). A hypothetical example is science teachers including open-ended constructive response questions on their formative assessments rather than having all multiple choice questions. As a result, students explain their thinking and construct explanations from textual evidence rather than fill in a bubble. Teachers evaluate whether the student articulated a scientific argument and whether the student was knowledgeable of the specific content being assessed.

In recent years, science professional learning literature focused mainly on implementing inquiry-based classroom instruction (Capps, Crawford, & Constan, 2012; Crawford, 2007; Hewson, 2007; Loucks-Horsley, Hewson, Love, & Stiles, 1996) and how it aligns with the Common Core State Standards (CCSS) and the Next Generation Science Standards (Next Gen) (Chowdhary, Liu, Yerrick, Smith, & Grant, 2014; Krajcik, Codere, Dahsah, Bayer, & Mun, 2014). Inquiry-based science instruction aims to activate student knowledge instead of drill and practice and memorization of facts. The purpose of inquiry-science teaching is to engage

students in debating their science understanding by experiencing science through practice (Capps et al., 2012). During inquiry-based classroom instruction, students ask questions, investigate and analyze data, and make arguments based on experimental or textual evidence (Krajcik et al., 2014).

Numerous other studies have investigated student growth when science content instruction was integrated with literacy instruction (Brown & Ryoo, 2008; Carrejo & Reinhartz, 2012; Cervetti, Barber, Drogh, Pearson, & Goldschmidt, 2012; Fine, Zygouris-Coe, Senokossoff, & Fang, 2011; Greenleaf et al., 2011). Each study found that science teachers attending literacy-based professional learning seminars were more likely to implement literacy strategies. When science teachers implemented literacy strategies, researchers found that student test scores rose in both science content and reading comprehension. Additionally, students who engaged in science-literacy practices showed improvement in science understanding, science vocabulary, and science writing.

Professional learning is often considered the solution for implementing macro-level (federal and state) educational decisions at the micro-level (school districts and schools) (Desimone, 2011; Hess & McShane, 2013; Loveless, 2013). In 2015, Georgia science teachers implemented the Georgia Performance Standards (GPS) for Science and the Common Core Georgia Performance Standards (CCGPS) for literacy in science. At the same time, the Next Generation Science Standards (Next Gen) were considered for adoption. The Next Gen had not been adopted, but was being discussed at the state and district level. Research is needed to understand whether or not Georgia science teachers are being supported during science standards-based reform. The first step in understanding whether or not Georgia science teachers

in this study were supported in their implementation of science standards-based reform was to examine their perspectives on their professional learning.

Statement of the Problem

From 2010 to 2015, the state of Georgia was in the midst of making macro-level educational decisions related to high-quality science standards. In 2010, Georgia adopted the Common Core State Standards (CCSS) by infusing them with the Georgia Performance Standards (GPS), resulting in what was called the Common Core Georgia Performance Standards (CCGPS). The CCGPS were implemented in mathematics, English language arts, and for literacy in science, social studies, and technical subjects. The GPS for Science remained intact as the content standards and the CCGPS for literacy in science covered the reading, writing, speaking and listening, and language standards as they related to science instruction (Georgia Department of Education, 2015b; Georgia Department of Education, 2015c). Georgia planned on adopting the Next Generation Science Standards (Next Gen) in 2015, but in January 2015, State School Superintendent Richard Woods expressed interest in having Georgia create its own science standards (Dalton, 2015). Although the state school superintendent indicated that Georgia would not adopt the Next Gen in January 2015, the Georgia Science Teachers Association (GSTA) held a conference in February 2015 concentrating on strategies for implementing the Next Gen (GSTA, 2015). To clarify, science teachers in the 2014-2015 school year implemented the GPS for Science and the CCGPS for literacy in science, not the Next Gen. Some participants reported implementing Next Gen instructional strategies to address the GPS for Science and CCGPS for literacy in science.

The lack of certainty in Georgia's macro-level educational decisions around science standards led to micro-level ambiguity for school districts and schools throughout

implementation of the CCGPS for literacy in science. Standards-based reform can create new and exciting opportunities for some teachers while initiating resistance and anxiety for others as well (Hall & Hord, 2011). The implementation of CCGPS for literacy in science required teachers to change their instructional practices and their approaches related to teaching science. Some science teachers resisted integrating reading strategies into their lessons because they felt pressure to teach a breadth of content and so helping students with their reading did not seem their responsibility (Bybee, 2014; Stewart-Dore, 2013). Other teachers wanted to help students develop science-literacy skills but thought they lacked the tools and strategies to meet their students' needs (Murnane, Sawhill, & Snow, 2012).

To help calm science teachers' anxiety and resistance, Georgia identified professional learning opportunities as an essential component to implementing the CCGPS effectively (Kober & Retner, 2012), which included support for teaching literacy in science. Relying on teacher professional learning is a common practice in helping teachers implement new instructional practices and carry out standards-based reform (Desimone, 2011; Hess & McShane, 2013; Loveless, 2013). Science education research emphasized the importance for professional learning opportunities surrounding literacy strategies to help improve student science-content knowledge and literacy skills (Brown & Ryoo, 2008; Carrejo & Reinhartz, 2012; Zohar & Barzilai, 2013). In a survey conducted by Scholastic and the Bill and Melinda Gates Foundation (2014), 81% of Georgia teachers claimed the implementation of the CCGPS was challenging, while 84% of teachers recognized the need for more professional learning opportunities. Science education research and professional learning research provided evidence that Georgia science teachers' professional learning needs and activities surrounding the CCGPS for literacy in science should be examined.

Purpose of the Study

The purpose of this study was to examine science teachers' perspectives on their professional learning as they implemented the Common Core State Standards (CCSS) in a Georgia middle school. The state of Georgia infused the CCSS with their existing standards, the Georgia Performance Standards (GPS), resulting in what was called the Common Core Georgia Performance Standards (CCGPS). The CCGPS were implemented in mathematics, English language arts (ELA), and for literacy in science, social studies, and technical subjects. For the purpose of the study, the GPS for Science were the content standards and the CCGPS for literacy in science addressed science-related reading, writing, speaking and listening, and language skills. This study examined five middle school science teachers' perspectives on their professional learning as they implemented the CCGPS for literacy in science.

Research Question

The purpose of this study was to examine five middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The scope of this study was focused on middle school science teachers.

The overall research question was

- (1) What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

Conceptual Framework

To examine adequately middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for

literacy in science, it was essential that the theoretical framework used would help define an understanding of social interactions that existed during professional learning activities. The attempt to understand the teachers' perspectives was further refined by applying an interpretive theoretical perspective.

The context of this qualitative study was guided by constructivism, including social constructivism and symbolic interactionism, while applying an interpretive analysis. Constructivism is based on the belief people actively construct their own meanings and knowledge from their lived experiences (Fosnot & Perry, 1996; Steffe & Gale, 1995). For this study, constructivism was relevant in examining how science teachers made meaning of their professional learning activities through their interactions with one another. Knowledge was constructed by each participant, but the participants created different interpretations from the same professional learning activity (Crotty, 1998; Denzin & Lincoln, 2005). Every participant in this study participated in formal and informal professional learning activities; therefore, each participant had his or her own perspectives on their professional learning.

Although each participant had individual perspectives, the participants partook in group activities, also. Social constructivism accepts that meanings develop from social interactions with others (Patton, 2002). Individual learning is influenced by the culture of the group and the social setting in which learning takes place (Denzin & Lincoln, 2005). In an attempt to understand the interactions between the teachers during their science meetings, the researcher conducted the study using both a constructivism and social constructivism lenses.

To study the teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, the researcher relied on symbolic interactionism. Symbolic interactionism aims to understand how

individuals make meaning through the development of self in social situations. Furthermore, symbolic interactionism focuses on the idea that objects, things, and events have no meaning unless individuals assign meaning to them through social situations (Prasad, 2005). For example, in this study, the school culture played a role in cultivating teachers' perspectives on their professional learning because they all experienced similar situations.

Symbolic interactionism is rooted in the pragmatist tradition. Pragmatism values theories and beliefs based on practical application (Blumer, 1969). Symbolic interactionism was used in this study to understand the perspectives of the teachers because people made meanings from what they did with objects (Charmaz, 2014). For this study, the object with which the participants interacted was their professional learning activities.

Overview of the Methods

This study examined middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The design of this study was qualitative in nature. Qualitative researchers recognize the complexity of social life and how everyday life is meaningfully produced by people. The objective of the qualitative researcher is to understand the experiences of participants and to comprehend how all parts come together to form a whole (Merriam, 2009). This research study was appropriate for a qualitative study because it examined details surrounding specific perspectives about teachers' thought processes and emotions about their professional learning experiences as they implemented the CCGPS for literacy in science. To do so, an interpretive qualitative approach was used to understand meanings and the nature of participants' professional learning experiences (Prasad, 2005).

More specifically, the researcher used a qualitative case study research design to investigate the problem and to answer the research question (Creswell, 2013). Case study research relies on various sources of evidence so the researcher can converge data in a triangulating fashion (Yin, 2003). Triangulation refers to using a variety of data sources and comparing the data gleaned from those sources to one another (Yin, 2009). To examine the teachers' perspectives, the researcher used qualitative methods for triangulation. The four data collection techniques applied were (1) participant observations, (2) collection of artifacts, (3) researcher field notes, and (4) semi-structured interviews.

In total, 10 middle school science teachers were recruited to participate in this study, but the researcher selected five science teachers to participate in the study. The researcher focused on five participants because those five teachers were able to partake in all data collection activities. The other five teachers were not chosen because they were unable to be involved in all data collection activities. Therefore, the researcher believed the case study was best conducted with five middle school science teachers, not all 10 science teachers.

Once all data were collected, the researcher engaged in an iterative, inductive process of data analysis. After reading the data holistically, the researcher coded the data, wrote memos, and created tables to explore and to record as much analytic detail about the categories being developed (Charmaz, 2014). Throughout the coding and memo writing process, the constant comparative method was applied to compare different pieces of data (Corbin & Strauss, 2015). The comparison of different pieces of data allowed the researcher to develop categories and themes.

Significance of the Study

Simultaneously from 2010 to 2015, Georgia science teachers implemented the Georgia Performance Standards (GPS) for Science and the Common Core Georgia Performance Standards (CCGPS) for literacy in science. At the same time, the Next Generation Science Standards (Next Gen) were considered for adoption by the Georgia Department of Education. The Next Gen was advocated for at the macro- and micro-levels, but never adopted. The CCGPS for literacy in science required science teachers to integrate literacy instructional practices in their classrooms. Science education research indicated some science teachers resisted integrating reading strategies into their lessons because they did not think it was their responsibility (Bybee, 2014; Stewart-Dore, 2013). Other teachers felt they lacked the skills to meet their students' literacy needs (Murnane, Sawhill, & Snow, 2012). Science education research highlighted the importance of professional learning opportunities around literacy strategies for improving student science-content knowledge and literacy skills (Brown & Ryoo, 2008; Carrejo & Reinhartz, 2012; Zohar & Barzilai, 2013). Furthermore, Georgia identified professional learning opportunities as a crucial component to implementing the CCGPS effectively (Kober & Retner, 2012), but teachers requested more professional learning opportunities (Scholastic and the Bill and Melinda Gates Foundation, 2014).

Desimone (2009) argued that teacher professional learning research should examine a collection of teachers' professional learning experiences. The significance of this study was that it examined middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. This study informed a school district and a school about the types of support that are

needed for middle school science teachers to implement successfully the CCGPS for literacy in science.

Assumptions of the Study

As the researcher approached this study, the researcher had some assumptions as to what the interviews with middle school science teachers would reveal. The researcher instinctively assumed that the teachers were familiar with the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Also, the researcher assumed the participants received formal professional learning opportunities to implement the CCGPS for literacy in science and would be able to recall their experiences. Furthermore, the researcher assumed if the participants were not receiving formal professional learning opportunities to implement the CCGPS for literacy in science then they would informally seek professional learning opportunities to satisfy their professional learning needs. The researcher assumed the participants were actively implementing professional learning strategies in their classroom to address the CCGPS for literacy in science.

Additionally as the researcher mentally prepared for this research, the researcher made assumptions as to what observations would reveal during the science meetings. The researcher assumed formal and informal professional learning activities occurred during these meetings and that the researcher would be able to collect artifacts pertaining to the CCGPS for literacy in science. The researcher assumed the participants wanted to have informal conversations about their professional learning. Lastly, the researcher assumed the participants would not be concerned about the research findings being reported to their school leaders and district officials.

Definitions of Terms

Common Core State Standards- According to the Council of Chief State School Officers (CCSSO), “The Common Core State Standards (CCSS) are a set of high quality academic

expectations in English-language arts (ELA) and mathematics that define the knowledge and skills all students should master by the end of each grade level in order to be on track for success in college and career” (CCSSO, 2015, para. 1).

Common Core Georgia Performance Standards (CCGPS) for literacy in Science- According to the Georgia Department of Education (2015c), CCGPS for literacy in science means:

- (1) Building knowledge through reading content-rich nonfiction;
- (2) Reading, writing, and speaking grounded in evidence from text; and,
- (3) Regular practice with complex text and its academic vocabulary. (para. 1)

Educational Change- According to Duke (2004) educational change is defined as “a change intended to alter the goals of education and to improve what students are expected to learn, how students are instructed and assessed, and how educational functions are organized, regulated, governed, and financed” (p. 31).

High-Quality Standards- Also referred to as college- and career-ready standards. The U.S. Department of Education (2015a) claimed,

A state's college- and career-ready standards must be either (1) standards that are common to a significant number of States; or (2) standards that are approved by a State network of institutions of higher education, which must certify that students who meet the standards will not need remedial course work at the postsecondary level. (para. 3)

Job-embedded Learning- Occurs through ongoing discussion between teachers pertaining to what does and does not work in a particular setting. Job-embedded learning is about sharing best practices among teachers that are discovered by trying new programs, practices, and reflecting on and revising implemented lessons (Zepeda, 2015).

Macro-Level Educational Decisions- For the purpose of this study, macro-level educational decisions pertained to Race to the Top decisions made by the federal and Georgia’s

governments, and national and state-wide organizations (Brady, Duffy, Hazelkorn, & Bucholz, 2014). The Race to the Top Fund was not a federal mandate, but Georgia accepted federal money and promised certain results based on specific stipulations (McGuinn, 2011). Although, macro-level educational decisions were made for each aspect of Georgia's Race to the Top reform plan, this study focused on the decisions made surrounding science standards implementation (Galey, 2015). The macro-level educational decisions were in relation to what Georgia's government and the federal government agreed upon. These state decisions, in turn, directly influenced micro-level decisions (Johnson, 2013).

Micro-Level Educational Decisions- For the purpose of this study, micro-level educational decisions were made by school districts and schools. These decisions were influenced by parents, teachers, school boards, and communities (Brady et al., 2014). Micro-level educational decisions were made in reaction to macro-level educational decisions and to produce desired macro-level outcomes (Johnson, 2013). For this study, the decisions surrounding the implementation of the CCGPS for literacy in science were the focal point.

Middle School- In the state of Georgia, middle schools can receive funding as a single school site only if it houses grades 6 through 8 with a fulltime principal (O.C.G.A. 20-2-290).

Next Generation Science Standards (Next Gen)- For the purpose of this study, the Next Gen were not being implemented but were being discussed at the macro- (state) and micro-levels (school district and school). Therefore, the researcher included information about the Next Gen. The Next Gen were a multi-state effort to create new education science standards that were "rich in content and practice, arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education" (Achieve, 2015a, para. 3).

Professional Learning – The Georgia Department of Education (2015d) defined professional learning as “the means by which teachers, administrators, and other staff acquire, enhance, and refine the knowledge, skills, practices, and dispositions necessary to create and support high levels of learning for all students” (para. 1).

Limitations of the Study

The study was limited by the number of science teachers who participated in the study. While 10 science teachers were recruited, only five teachers participated in the study. Therefore, only a small portion of the school’s faculty shared their perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Organization of the Dissertation

The organization of the dissertation begins with a description of the background and the statement of the problem with the research question, which explains the reasoning for the study. Chapter 1 provides an overview of the conceptual framework and methods used to collect data, all while addressing the significance of the study. Key terms were defined as they relate to the study.

Chapter 2 presents a review of the related literature relevant to the context of the study. The review includes the historical influences of policy on teacher professional learning, current influences of Georgia’s policy on professional learning, the theoretical underpinnings of professional learning, and successful practices of professional learning. Chapter 3 describes the research method and how the study was performed. The case study findings from the data are presented in Chapter 4. Chapter 5 discusses the findings and implications for future research.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

What is professional learning and how is it defined? The Georgia Department of Education (2015d) defined professional learning as “the means by which teachers, administrators, and other staff acquire, enhance, and refine the knowledge, skills, practices, and dispositions necessary to create and support high levels of learning for all students” (para. 1). The term professional learning is used interchangeably with professional development. The function of professional learning activities is to expand teachers’ knowledge and skills by empowering educators to improve curriculum and instruction and to aid student growth (Glickman, Gordon, & Ross-Gordon, 1998; Zepeda, 2012). Research is needed to learn more about teachers’ professional learning experiences (Desimone, 2009).

The purpose of this study was to examine middle school science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The scope of this study was focused on middle school science teachers.

The overall research question was

- (1) What are Georgia middle school science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

This chapter presents the review of related literature in which this study was grounded. First chronicled are the historical influences of educational policy impacting teacher professional

learning because for educators to move forward they must remember the past (Andrews, 2013a). Next, the current Georgia educational policies affecting science teachers' professional learning, specifically macro- and micro-level educational decisions are described. Lastly, the theoretical underpinnings of professional learning and successful professional learning practices are discussed.

Historical Influences of Educational Policy on Teacher Professional Learning

Over the last three decades, there have been significant changes in education (Goldstein, 2014). There have been changes in curriculum standards and accountability, and as a result, teacher professional learning has experienced significant reform (Wynne, 2010). In 1983, the publication of *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983) captured the public's attention by critiquing the country's schools and teachers. The report posited that many teachers did not have the content knowledge, skills, and training to produce educated individuals. The public demanded that teachers strengthen both content knowledge and pedagogy. Ultimately, *A Nation at Risk* altered the public's perception of teachers and public education.

Although *A Nation at Risk* (National Commission on Excellence in Education, 1983) grabbed the attention of Americans to change educational policies, it did not cause any immediate legislative changes. Instead, this report influenced education reform movements for the next three decades (Goldstein, 2014). *A Nation at Risk* affected multiple aspects of public education, but for the purpose of this study, the impact on teacher professional learning was the center of attention. To understand how *A Nation at Risk* and other national educational policies and initiatives shaped teacher professional learning, Table 2.1 demonstrates the significant

recommendations from committees and policy reforms directly influencing teacher professional learning.

Table 2.1

National Educational Policies and Committee Publications 1983-2013: Influence on Professional Learning

Document	Year	Source	Recommendation Impacting Professional Learning
<i>A Nation at Risk: The Imperative for Educational Reform</i>	1983	National Commission on Excellence in Education	Called for strengthening teacher preparation, both in content and effective teaching practices for pre-service and in-service teachers.
<i>A Call for Change in Teacher Education</i>	1985	National Commission on Excellence in Education	Called for teacher training programs to be improved and to make teaching a more desirable occupation.
<i>Curriculum and Evaluation for School Mathematics</i>	1989	National Council of Teachers of Mathematics	Called for improvement of mathematic standards and teachers to improve mathematics content knowledge.
<i>Goals 2000: Educate America Act</i>	1994	U.S. Congress	Called for teacher training programs to better prepare teachers to teach all American students for the next century.
<i>Improving America's Schools Act of 1994</i>	1994	U.S. Congress	Called for additional support and funding for teacher professional development.
<i>1998 Amendments to the Higher Education Act of 1965</i>	1998	U.S. Congress	Called for improved teacher quality by improving teacher preparation and professional development activities.
<i>The No Child Left Behind Act of 2001</i>	2001	U.S. Congress	Called for accountability system for prospective teachers and development of current teacher workforce.
<i>Teaching at Risk: A Call to Action</i>	2004	The Teaching Commission	Called for high standards for teacher classroom performance by providing ongoing professional development to help teachers meet demands of new standards.

<i>American Recovery and Reinvestment Act of 2009</i>	2009	U.S. Congress	Called for states to form evaluation systems for teachers and identified professional development as a way improve student learning. This was part of Race to the Top Fund grant program.
<i>Common Core State Standards Initiative</i>	2010	National Governors Association and the Council of Chief State School Officers	Called for more support for teacher and student learning in mathematics and literacy. Also, established professional learning standards.
<i>Elementary Secondary Education Act Flexibility</i>	2011	U.S. Congress	Called for more accountability systems towards student growth. Teachers were to have more rigorous evaluations.
<i>Next Generation Science Standards</i>	2013	National Science Teachers Association, the American Association for the Advancement of Science, the National Research Council, and Achieve	Called for supporting science teachers to have deeper content knowledge and the ability to teach content-literacy skills.

Adapted from Wynne, 2010, pp. 27-29

Table 2.1 presented the historical influences of educational policy on teacher professional learning since 1983. This timeline did not present all education reform movements, but it did display major changes. What can be learned from the review of this historical timeline? Andrews (2013a) discussed the importance of studying the past of middle grades education, but her analogy was suitable for studying past education reforms impacting teacher professional learning as well. Andrews explained:

To understand the past, imagine the dangers of amnesia. If you wake up tomorrow and cannot remember who you are, cannot remember any of your own personal history, how will you know where to go, what to do, what you believe, and what is important to you? With amnesia, in many ways, you will be alien to yourself, directionless in unfamiliar territory. In short, with amnesia around [teacher professional learning's] past, how can we know how to move forward as advocates for an improved future? (p. 52)

Andrews's remarks amplify the importance of looking at past education reforms. Educators should be informed about how past education reforms impacted teacher professional learning and educators should not be surprised that professional learning has remained an important aspect of educational reform. Professional learning has always been an essential component for carrying out macro-level (federal and state) education reform policies and initiatives at the micro-level (school districts and schools) (Desimone, 2011; Hess & McShane, 2013; Johnson, 2013; Loveless, 2013).

Given that the purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, the next logical step was to take a look at current Georgia educational policies affecting science teachers' professional learning. The Race to the Top Fund grant competition in Georgia is examined, focused mainly on implementing high-quality standards in science classrooms. Later, the theoretical underpinnings of professional learning and successful professional learning practices are discussed in relationship to the present study.

Current Georgia Educational Policies Affecting Science Teachers' Professional Learning

Georgia's educational policymaking is best described as a "marble cake" not a "layer cake" (Bailey & Mosher, 1968, p. 2) because the boundaries between federal, state, and local governments are interwoven, not divided. For clarification purposes, the researcher used the terms *macro-level* and *micro-level* to help decipher between these boundaries. Macro-level refers to educational decisions made by federal and state governments, legislators, agencies, and organizations (Brady et al., 2014). Macro-level educational decisions intertwined federal and state entities because of funding (Spring, 2011). School districts' and schools' educational

decisions are referred to as micro-level educational decisions. Micro-level educational decisions were seemingly made in reaction to macro-level educational decisions. For example, science teachers incorporated more literacy-based instruction in their lessons because state standards changed. This reactive stance existed because micro-level results had to satisfy desired macro-level outcomes (Darling-Hammond, 2010; Johnson, 2013). The implementation of macro-level educational decisions about science standards meant teachers needed to change instructional practices (Fullan, 2007; Hall & Hord, 2011).

Macro-Level Educational Decisions

In 2009, the federal government extended an invitation for all states to compete in a grant program called the Race to the Top Fund. The grant program offered over \$4 billion for states to create and implement education reform agendas (Georgia Department of Education, 2014a). The Race to the Top Fund created a frenzy among states as they competed against each other for federal money. To be clear, the Race to the Top Fund was not a federal mandate and participating in the competition did not guarantee states federal funding. The Race to the Top Fund was viewed as a creative way to avoid the perceived shortcomings of the No Child Left Behind Act (NCLB), in particular states' mandates to produce certain test scores (McGuinn, 2011).

In 2010, Georgia competed for and received \$400 million over four years to support the implementation of its education reform plan. The priorities of Georgia's reform plan (Georgia Department of Education, 2014a) mirror the requirements of the Race to the Top Fund and included a commitment to:

- (1) Set high standards and rigorous assessments for all students, leading to college and career readiness;

- (2) Provide great teachers and leaders;
- (3) Provide effective support for all schools, including the lowest achieving schools; and,
- (4) Lead the way in science, technology, engineering, and mathematics (STEM). (p. i)

For this reform plan to be implemented, there had to be intergovernmental relations at the macro-level (Furgol & Helms, 2012). Although the Race to the Top Fund was a voluntary federal program, if Georgia wanted to receive all \$400 million of the federal funds, Georgia had to comply with federal stipulations by implementing an original reform plan (Manna & Ryan, 2011). However, the federal government relied upon governors, state legislators, and organizations such as the Council of Chief State Schools Officers to implement their reform plans. Moreover, the federal government wanted Georgia to carry out its reform plans (McGuinn, 2011), so therefore, both the federal government and the Georgia government had to act in accordance with one another to satisfy their goals.

Macro-level educational decisions were made for each aspect of Georgia's reform plan. For the purpose of this study, the researcher focused solely on the implementation of high-quality science standards. In the following sections, macro-level educational decisions surrounding high-quality science standards are explained. More specifically, the Common Core State Standards (CCSS), the Common Core Georgia Performance Standards (CCGPS), and the Next Generation Science Standards (Next Gen) are described. Additionally, the complications the standards caused at the macro-level (state) are summarized. Later, how macro-level educational decisions impacted micro-level educational decisions in regard to implementing educational change is discussed.

Common Core State Standards (CCSS)

Georgia, like 43 other states, the District of Columbia, and the Department of Defense Education Activity, adopted the Common Core State Standards (CCSS) to address the need for high-quality standards (CCSS Initiative, 2015b; Weiss, 2013). The CCSS were created by the National Governors Association Center for Best Practices and the Council of Chief State School Officers. The standards were set for grades kindergarten through 12 in the areas of mathematics, English-language arts (ELA), and literacy in science, social studies, and technical subjects. The mission of the CCSS (CCSS Initiative, 2015c) was to:

Provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need to succeed in college and careers. With American students fully prepared for the future, our communities will be positioned to compete successfully in the global economy. (para. 3)

This mission statement was created for all stakeholders to understand more fully what was expected of every child in every grade level. The CCSS were designed to be:

- (1) Aligned with expectations for college and careers success;
- (2) Clear, so educators and parents know what they need to do to help students learn;
- (3) Consistent across all adopting states;
- (4) Inclusive of both content and the application of knowledge through higher order skills;
- (5) Built on the strengths of current state standards and on learning learned in using them;
- (6) Realistic, for effective use in the classroom;
- (7) Informed by other top-performing countries, so that all students are prepared to succeed in the global economy and society; and,
- (8) Evidence- and research-based. (Kendall, 2011, pp. 11-12)

The standards were designed to help young people develop knowledge and skills that would potentially support them in their future college and career endeavors. The CCSS were meant to position U.S. students to compete in the global economy (CCSS Initiative, 2015a; Kendall, 2011).

Common Core Georgia Performance Standards (CCGPS)

Georgia infused the Common Core State Standards (CCSS) to add more rigor into its existing standards, the Georgia Performance Standards (GPS), resulting in what is now called the Common Core Georgia Performance Standards (CCGPS). The CCGPS were adopted in 2010. School districts implemented the CCGPS in 2012 for grades kindergarten through 9 in mathematics, English language arts (ELA), and for literacy in science, social studies, and technical subjects. By the end of the 2015-2016 school year, the CCGPS should be fully implemented in all grades kindergarten through 12 (Georgia Department of Education, 2014b). The CCGPS primarily focused on new content standards for mathematics and ELA (Porter, McMaken, Hwang, & Yang, 2011). The CCGPS for literacy emphasized reading, writing, and speaking grounded in evidence from texts (Georgia Department of Education, 2015c). According to the National Governors Association (2010), ELA teachers should focus on literature (e.g., poetry, short stories, etc.) and literary non-fiction. Therefore, content-specific texts were taught in other core content areas such as mathematics, science, and social studies.

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the CCGPS for literacy in science. Therefore, the researcher explored the literacy standards and how they related to science content. The Common Core State Standards (CCSS) outlined ten reading standards for core content areas and technical texts. As a reminder, the CCSS were infused with the Georgia Performance Standards

(GPS) to form the Common Core Georgia Performance Standards (CCGPS). Table 2.2 includes the CCSS anchor standards and equivalent science and technical texts for grades 6 through 8. To address the literacy standards, science teachers were expected to integrate reading strategies into their classroom instruction (Spencer & Bouwma-Gearhart, 2014).

Table 2.2

CCSS Anchor Standards and Equivalent Science, Social Studies, and Technical Texts for Grades 6 through 8

Standard #	CCSS Anchor Standards	Grades 6-8
<u><i>Key Ideas and Details</i></u>		
1	Read closely to determine what the text says explicitly and make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusion drawn from text.	Cite specific textual evidence to support analysis of science and textual texts.
2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
3	Analyze how and why individuals, events, or ideas develop and interact over the course of a text.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
<u><i>Craft and Structure</i></u>		
4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6 through 8 texts and topics.
5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text relate to each other and the whole.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
6	Assess how point of view or purpose shapes the content and style of a text.	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
<u><i>Integration of Knowledge and Ideas</i></u>		
7	Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually.
8	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

9	Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text of the same topic.
<i>Range of Reading and Level of Text Complexity</i>		
10	Read and comprehend complex literary and informational texts independently and proficiently.	By the end of grade 8, read and comprehend science/technical texts in the grades 6 through 8 text complexity band independently and proficiently.

Adapted from Spencer and Bouwma-Gearhart 2014, pp. 51-52

Table 2.2 highlighted the Common Core State Standards (CCSS) for literacy in a middle grades science classrooms. Because the CCSS were infused with the Georgia Performance Standards (GPS), these standards represent the Common Core Georgia Performance Standards (CCGPS) for literacy in science, as well. For example, when addressing standard number 4, teachers could introduce key terms by their root words, so students would be able to decipher new terms.

To clear up any confusion, the CCGPS affected only how science teachers were to teach literacy skills in their classrooms, not science content. Georgia’s science content standards were still the Georgia Performance Standards (GPS) for Science, which were adopted in 2004 and divided into Characteristics of Science and Content of Science. The Characteristics of Science related to the habits of mind and to the nature of science (exploring and investigating concepts). The Content of Science depended on the specific content and subject matter for each grade level (Georgia Department of Education, 2015b). Therefore, science teachers were implementing the CCGPS for literacy in science, which addressed reading content-rich information; reading, speaking, and writing grounded in evidence from text; and, regular practice with complex text and its academic vocabulary, and the GPS for Science as their content standards (Georgia Department of Education, 2015c). For the purpose of this study, the researcher examined middle

school teachers’ perspectives on their professional learning as they implemented the CCGPS for literacy in science, not the GPS for Science.

Next Generation Science Standards (Next Gen)

To make things more complex at the macro-level (state), Georgia simultaneously considered adopting the Next Generation Science Standards (Next Gen). In 2011, Georgia became a Lead State Partner. A Lead State Partner is defined as a state that designates personnel to help write the standards, assigns personnel to be involved in discussions about the adoption and implementation of the Next Gen, announces being a part of the Next Gen creation process, and identifies a timeline for adopting the standards (Achieve, 2015b).

The Next Gen contained eight scientific and engineering practices that defined inquiry for science classroom practices (Spencer & Bouwma-Gearhart, 2014). From the eight scientific and engineering practices, four were identified as language-intensive and sense-making practices: (1) developing and using models, (2) constructing explanations (for science) and designing solutions (for engineering), (3) engaging in argument from evidence, and (4) obtaining, evaluating, and communicating information (Hakuta, Santos, & Fang, 2013; Lee, Quinn, & Valdes, 2013). Table 2.3 shows the three dimensions of the Next Gen and the language-intensive, practices, concepts, and core ideas with the sense-making practices *italicized*.

Table 2.3

Three Dimensions of the Next Generation Science Standards

Scientific and Engineering Practices	Crosscutting Concepts	Disciplinary Core Ideas
1. Asking questions (for science) and defining problems (for engineering) <i>2. Developing and using models</i> 3. Planning and carrying out investigations	1. Patterns, similarity, and diversity 2. Cause and effect: Mechanism and explanation 3. Scale, proportion, and quantity	Physical Science PS 1: Matter and its interaction PS 2: Motion and stability: Forces and interaction PS 3: Energy PS 4: Waves and their application in technologies for information transfer

4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. <i>Constructing explanations (for science) and designing solutions (for engineering)</i> 7. <i>Engaging in argument from evidence</i> 8. <i>Obtaining, evaluating, and communicating information</i>	4. Systems and system models 5. Energy and matter: Flows, cycles, and conservation 6. Structure and functions 7. Stability and change	Life Science LS 1: From molecules to organisms: Structures and processes LS 2: Ecosystems: Interactions, energy, and dynamics LS 3: Heredity: Inheritance and variations of traits LS 4: Biological evolution: Unity and diversity Earth and Space Sciences ESS 1: Earth’s place in universe ESS 2: Earth’s systems ESS 3: Earth and human activity Engineering, Technology, and the Application of Science ETS 1: Engineering design ETS 2: Links among engineering, technology, science, and society
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Adapted from Spencer & Bouwma-Gearhart, 2014, p. 53, emphasis in original

Table 2.3 displayed how the scientific and engineering practices were interwoven with language use and sense-making practices. For example, engaging in argumentation from evidence (no. 3) would require students to develop and to use models (no. 1) to explain their thinking and to construct explanations (no. 2) from textual evidence. Students obtained, evaluated, and communicated information (no. 4) as they engaged in explaining and critiquing science content. The scientific and engineering practices required students to engage in science discourse as they read, wrote, and developed models. Students spoke and listened to one another as they presented their argument for further collaboration (Kelly, 2007; Lee et al., 2013). Like the Common Core State Standards (CCSS), the Next Generation Science Standards (Next Gen) aimed to prepare students for college and careers (Achieve, 2015a) and affected how science teachers taught literacy skills. The Next Gen were not adopted at the time of this study, but discussed at length at the macro-level (Dalton, 2015).

Summary of macro-level educational decisions. To summarize, macro-level educational decisions were made to infuse the Common Core State Standards (CCSS) with the existing Georgia standards, the Georgia Performance Standards (GPS), resulting in what was called Common Core Georgia Performance Standards (CCGPS). The CCGPS were for mathematics, English language arts (ELA), and for literacy in science, social studies, and technical subjects. The GPS for Science were still implemented for science content and the CCGPS for literacy in science addressed content-related reading, writing, and speaking and listening skills. Simultaneously, the Next Generation Science Standards (Next Gen) were being discussed at the macro-level but not yet adopted. For the purpose of this study, the researcher examined middle school teachers' perspectives on their professional learning as they implemented the CCGPS for literacy in science, not the GPS for Science or the Next Gen. The purpose of reviewing all the standards was because each set could potentially influence teacher professional learning.

To make matters more confusing at the macro-level surrounding science standards, Georgia politicians and state organizations became divided on what standards should and should not be implemented. In 2010, former Republican Governor Sonny Perdue, co-chaired the National Governors Association initiative that created the CCGPS and the Georgia Board of Education voted to adopt the standards as well (Downey, 2014). Perdue, who left office in 2011, believed the CCGPS were a pushback towards federal influence on education and embraced governors' input, but other Georgia politicians believed the CCGPS were a federal intrusion (Barrow, 2014).

A few years later in 2014, some Georgia politicians and state legislators introduced Senate Bill 167, which was in opposition of the Common Core Georgia Performance Standards

(CCGPS). The bill passed the Senate with a vote of 34 to 16 and had the support of current Governor Nathan Deal. Many state education organizations spoke out against the bill. The House Education Committee voted Senate Bill 167 down 13 to 5 (Jones, 2014; Georgia Association of Education, 2015). Furthermore, Georgia State School Superintendent Richard Woods was asked in January 2015 about the plan to adopt the Next Gen and he stated, “We’re looking at some standards outside of the Next Generation Science Standards. Again, I’m not saying science is my field of background or expertise, but I think we can do a good job [creating our own standards]” (Dalton, 2015, para. 7). A month later in February, the 2015 Georgia Science Teachers Association (GSTA) Conference focused on providing Georgia’s science teachers with instructional strategies for implementing the Next Gen (GSTA, 2015). Because of the attention high-quality standards were getting from Georgia political parties, implementation was hindered at the micro-level (Bowling & Pickerill, 2013; Furgol & Helms, 2012). For the school year 2015-2016 (while this present study was being written), Georgia changed the CCGPS to the Georgia Standards of Excellence. The language of the standards were practically the same (Georgia Department of Education, 2015e).

To clarify, macro-level educational decisions were made for each aspect of Georgia’s education reform plan. This study focused on implementing high-quality standards and its effect on science teachers’ professional learning. Only the Common Core Georgia Performance Standards (CCGPS) for literacy in science and the Georgia Performance Standards (GPS) for Science were being implemented. The Next Generation Science Standards (Next Gen) remained in an undecided state. Although, Georgia politicians were in disagreement about the CCGPS and the Next Gen standards, micro-level educational decisions were made about implementing high-quality science standards.

In the following section, micro-level educational decisions pertaining to implementing high-quality science standards are addressed. Within this section, educational change and science-literacy related professional learning studies are discussed. Later in the chapter, the theoretical underpinnings of professional learning and successful professional learning practices are described.

Micro-Level Educational Decisions

Race to the Top federal funds influenced state educational decisions in regard to high-quality standards, which impacted what was implemented in local schools (Spring, 2011). During this study, science teachers were implementing the Georgia Performance Standards (GPS) for Science as their content standards and the Common Core Georgia Performance Standards (CCGPS) for literacy in science for content-related literacy skills. The adoption of the Next Generation Science Standards (Next Gen) were still being discussed at the macro-level (state) (Dalton, 2015). The implementation of the CCGPS for literacy in science meant integrating literacy and science instructional strategies. To implement high-quality standards at the micro-level (school districts and schools), professional learning is considered imperative (Furgol & Helms, 2012).

In the following section, educational change is defined. Within this section, characteristics of change, types of change, barriers to change, and a concerns-based model are explained. Then, science-literacy related professional learning studies are described. Later, theoretical underpinnings of professional learning and successful professional learning practices are discussed.

Educational Change

Educational change is considered any change that helps schools, districts, and states accomplish their goals more effectively by reconfiguring structures, initiatives, and practices with improved ones (Fullan, 2001). Duke (2004) defined educational change as “a change intended to alter the goals of education and to improve what students are expected to learn, how students are instructed and assessed, and how educational functions are organized, regulated, governed, and financed” (p. 31). Educational change relies on teachers’ thought processes and actions (Fullan, 2007). In short, educational change is thought of as any purposeful decision made to improve teaching and learning (Duke, 2004).

Georgia’s decision to adopt and implement the Common Core Georgia Performance Standards (CCGPS) meant academic content and pedagogical approaches had to be restructured to align with the new standards (Galey, 2015). For successful implementation of standards, retooling teachers with new materials and instructional strategies was imperative. Professional learning is considered the best approach (Kober, McIntosh, & Retner, 2013). The purpose of this study was to examine middle school teachers’ perspectives on their professional learning as they implemented the CCGPS for literacy in science. To do so, the researcher needed to understand the characteristics of change, the types of change, the barriers to change, and a concerns-based adoption model.

Characteristics of change. The Common Core Georgia Performance Standards (CCGPS) for literacy in science required teachers to change their instructional strategies and their approaches to their profession. Zepeda (2012, p. 25) referred to the work of Hord, Rutherford, Huling-Austin, and Hall (1987, pp. 5-7) to identify six characteristics of change. Hord et al.’s research revealed that change is

- (1) *A process*: Meaningful change is a process that occurs over a period of several years, and is not a single event;
- (2) *Accomplished by individuals*: Change is not affected by groups of people or programs, but through the efforts of individuals;
- (3) *A highly personal experience*: Because each person is a unique individual, each person reacts to change in a unique way;
- (4) *Incremental*: As individuals involved in change begin to trust and respect the new practice, they begin to grow in their ability to use it;
- (5) *Understood best in terms of one's own practice*: A teacher tends to react to change in terms of what impact it will have on the teacher's classroom, students, planning, and time, for example; and,
- (6) *Focused on the individuals involved in implementation*: First and foremost, change must focus on the people who will implement it, not on the materials to be used; materials do not effect change, people do. (Zepeda, 2012, p. 25, emphasis in original)

This study focused on middle school teachers who were implementing the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Essentially, the study concentrated on the individuals involved in implementation by examining their personal opinions and experiences with various professional learning activities.

Types of change. The Common Core Georgia Performance Standards (CCGPS) for literacy in science created new opportunities for school personnel. Schlechty (1997) identified three types of change: procedural change, technological change, and systematic change. Procedural change reconfigured the order in which events occurred and the time in which they happened. Technological change occurred as technology innovations happened. Schools and

classrooms are provided all types of educational technology devices. Systematic change referred to how work is being done, including beliefs, values, and rules of the organization. To implement the CCGPS for literacy in science, all three types of changes needed to be addressed at the micro-level (school districts and schools). Standards-based reform challenged teachers' beliefs about the purpose of their jobs, therefore, systematic change needed to occur. Systemic change is considered the most difficult to accomplish (Zepeda, 2012).

Barriers to change. According to literature, integrating literacy with science instruction brings exciting opportunities for some teachers, but made others concerned (Bybee, 2014; Murnane, Sawhill, & Snow, 2012). Barriers to change are created because of resistance by people (Zepeda, 2012). Zepeda (2012, p. 27) drew on the work of Basom and Crandall (1991, p. 74) to identify seven barriers to change in schools:

- (1) *Interrupted sequence of leadership:* Frequent changes in key leadership positions prohibit the creation of a climate for change;
- (2) *Change is viewed as unmanageable:* Too many educators do not believe that meaningful change is possible;
- (3) *Poor preparation:* Teachers and principals are frequently ill-prepared for the complex nature of change; conflict management and organizational behaviors represent new and forbidding territory to many;
- (4) *Underrepresentation in the decision-making process:* Teachers or administrators who are disenfranchised from the decision-making process have no ownership stake in change; therefore, they do not “buy in” to the process;
- (5) *Tradition:* Some teachers and administrators become so deeply attached to the way that they believe school ought to be that any change can be a very painful experience;

(6) *Competing needs and visions*: Administrators and teaching faculty at times have difficulty agreeing on what changes are needed and how resources should be allocated; and,

(7) *Insufficient resources*: Too many times, a lack of time and/or money derail the change process before it starts. (Zepeda, 2012, p. 27, emphasis in original)

If barriers to change were present during this study, teachers would be unable to implement the Common Core Georgia Performance Standards (CCGPS) for literacy in science. If barriers were removed, teachers were more likely to change their instructional practices. One way to understand if barriers to change were removed was to examine teachers' perspectives on their professional learning as they implemented CCGPS for literacy in science.

Concerns-based adoption model (CBAM). The implementation of the Common Core Georgia Performance Standards (CCGPS) for literacy in science adjusted science teachers' instructional practices. Science teachers were asked to integrate literacy instruction with their science content. Changes in content and in instructional practices generate different personal concerns (Zepeda, 2012). Hord et al. (1987) organized the concerns teachers may have into a Concerns-Based Adoption Model (CBAM). There are three constructs of CBAM: Stages of Concern, Innovation Configurations, and Levels of Use. CBAM assisted the researcher in understanding the participants' personal concerns about changes in their practice.

Stages of concern. Stages of Concern is defined as the wide range "of feelings, perceptions, worries, preoccupations and moments of satisfaction for those engaged with implementing new approaches" (Hall & Hord, 2011, p. 55). The stages vary in intensity and people move in and out of the stages while experiencing change (Zepeda, 2012). CBAM's seven Stages of Concern (Hall & Hord, 2011) are:

- Stage 0: Awareness—aware that an innovation is being introduced but not really interested or concerned with it;
- Stage 1: Informational—interested in some information about the change;
- Stage 2: Personal—interested in knowing the personal impact of the change;
- Stage 3: Management—concerned about how the change will be managed in practice;
- Stage 4: Consequence—interested in the impact on students or the school;
- Stage 5: Collaboration—interested in working with colleagues to make the change effective; and,
- Stage 6: Refocusing—refining the innovation to improve student learning results.

(Holloway, 2003, pp. 1-2)

In this study, being aware of the teachers' concerns enabled the researcher to understand the various perspectives of the participants. In Stage 0, teachers are unconcerned with the change and possibly have other worries. In Stages 1 and 2, teachers are concerned about self and need more information about the change. As teachers continue to implement practices, they become more concerned about how much time the new practices were taking, which is Stage 3. Finally, during Stages 4 to 6, self and task concerns begin to vanish as teachers see the impact the new practices have on their students' learning (Hall & Hord, 2011).

Innovation configurations. Innovation Configurations had the potential to describe the similarities and differences in how each participant implemented literacy strategies in this study (Hall & Hord, 2011). Participants thought they made changes and used the new innovation or instructional strategy, but their approach looked different in each classroom. Innovation Configurations addressed the fact that each participant did not implement the Common Core Georgia Performance Standards (CCGPS) for literacy in science the same way.

Levels of use. Hord et al. (1987) determined eight Levels of Use to help monitor progress of implementation of change. CBAM's Levels of Use described a set of behavioral profiles that determined the different approaches in using an instructional strategy. Zepeda (2012, p. 29) references Hord et al.'s (1987, p. 55) eight Levels of Use:

- Level 0: Nonuse—no involvement in the innovation and no moving in becoming involved;
- Level 1: Orientation—information on innovation has been acquired quite recently and teacher is exploring the possibility of implementing it;
- Level 2: Preparation—setting aside time to review the materials and planning to implement the innovation;
- Level 3: Mechanical Use—energy is focused on day-to-day use of innovation with modification just beginning;
- Level 4A: Routine—stability in use is now apparent and little preparation for use is needed;
- Level 4B: Refinement—use of innovation is varied in order to increase impact on students;
- Level 5: Integration—innovation now used in concert with colleague's strategies; and,
- Level 6: Renewal—teacher reexamines innovation to determine if major modifications are needed to continue to have impact on students. (Zepeda, 2012, p. 29)

Understanding the teachers' concerns about their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science enabled the researcher to understand more fully their individual perspectives. Each participant had individual

beliefs and experiences about their professional learning. Because teachers have different individual beliefs, people respond differently to change (Zepeda, 2012).

Summary of micro-level educational decisions. Micro-level (school district and school) educational decisions were made in reaction to macro-level (federal and state) desired educational outcomes (Darling-Hammond, 2010; Johnson, 2013). Micro-level educational decisions were made for each aspect of Georgia's reform plan. This study focused on the implementation of high-quality standards, specifically the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Standards-based reform means implementing educational change for school districts, schools, and teachers (Fullan, 2007; Hall & Hord, 2011). To understand if educational change occurred, it was important to understand the characteristics of change, types of change, barriers to change, and understanding personal concerns of the teachers (Zepeda, 2012).

The participants of this study were asked to change their instructional practices by amalgamating literacy instruction into their content area. These changes can produce positive and negative feelings among teachers (Hall & Hord, 2011). According to studies, some science teachers refused integrating literacy strategies into their lessons because they thought teaching literacy skills was not their responsibility (Bybee, 2014; Stewart-Dore, 2013). Other science teachers lacked confidence in teaching science-related literacy skills (Murnane, Sawhill, & Snow, 2012).

Historically, teacher professional learning was designed to help teachers implement new instructional strategies and to accomplish standards-based reform (Desimone, 2011; Hess & McShane, 2013; Loveless, 2013). Both, macro- and micro-levels recognized the importance for professional learning opportunities surrounding literacy strategies for its science teachers, but

teachers claimed they were not being supported enough (Kober & Retner, 2012; Scholastic and the Bill and Melinda Gates Foundation, 2014). Research on teacher professional learning should examine a collection of teachers' professional learning experiences (Desimone, 2009). The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. In the following section, studies about science-literacy related professional learning are described. Later, the theoretical underpinnings of professional learning and successful professional learning practices are reported.

Science-Literacy Related Professional Learning

At the time of this study, Georgia was in the middle of multiple macro- and micro-level educational decisions surrounding high-quality science standards. The Common Core Georgia Performance Standards (CCGPS) for literacy in science and the Georgia Performance Standards (GPS) for Science were being implemented, while adopting the Next Generation Science Standards (Next Gen) remained undecided. Georgia was unsure whether or not they would adopt the Next Gen during the time of this study (Dalton, 2015). To accomplish science standards-based reform, professional learning was considered essential for implementation (Ewing, 2010). There is a growing body of research supporting teaching science and literacy simultaneously at all grade levels.

In elementary classrooms, studies reported the effectiveness of teaching science content and literacy skills side-by-side (Brown & Ryoo, 2008; Carejo & Reinhartz, 2012; Zohar & Barzilai, 2013). In secondary classrooms, students were expected to read science-specific texts more fully but received little explicit reading instruction (Tong, Irby, Lara-Alecio, & Koch, 2014). Middle school students did not receive explicit literacy instruction in science classrooms,

but there was an increasing demand for students to be science literate (Greenleaf et al., 2011; Lee & Spratley, 2010).

Scientific literacy typically means to understand the nature of science. Literacy has multiple meanings, which includes the act of listening, speaking, reading, writing, and critiquing multiple texts (Cooper, Chard, & Kiger, 2006). Unfortunately, studies about professional learning pertaining to the Common Core State Standards (CCSS) for literacy in science classrooms are scarce (Jagger & Yore, 2012). Therefore, the researcher included studies about professional learning seminars that integrated science and literacy instruction.

The majority of science-literacy related professional learning studies have concentrated on implementing inquiry-based instruction, prospective science teachers, English language learners, and implementing science-literacy units (Capps, Crawford, & Conostas, 2012; Cervetti, Barber, Drogh, Pearson, & Goldschmidt, 2012; Gottheiner & Siegel, 2012; Krajcik, Codere, Dahsah, Bayer, & Mun, 2014). Inquiry-based science instruction is supposed to activate student knowledge and discourage teachers from using memorization methods (Capps et al., 2012). For example, instead of taking notes from a PowerPoint, inquiry-based instruction encourages students to ask questions, investigate and analyze data, and make arguments based on experimental or textual evidence. Students present their work to classmates to improve their speaking and listening skills (Krajcik, et al., 2014).

Science education researchers and scholars acknowledge the importance of preparing prospective science teachers to blend literacy and science instruction (Yore & Treagust, 2006). Science teachers are encouraged to teach students to listen closely, speak and write clearly, comprehend reading materials, and critique science texts. Van Zee, Jansen, Winograd, Crowl, and Devitt's (2013) study suggested how courses can be arranged to encourage prospective

teachers to incorporate literacy practices in a science classroom. In this study, students met twice a week for an entire semester. The instructors stressed questioning, predicting, exploring, observing, discussing, writing, and reading in science contexts. Van Zee et al.'s (2013) study found preservice teachers changed their views about science teaching after teaching lessons. At first, the prospective teachers doubted the importance of integrating literacy instruction into their lessons. After teaching the lessons, the prospective teachers realized combining literacy and science instruction was imperative for student learning. The reason the prospective teachers changed their minds was because they saw the impact their lessons had on students' reading skills and science content knowledge.

Carrejo and Reinhartz (2012) conducted a mixed methods study that included classroom observations and analysis of fifth grade state science and reading tests. The researchers discovered English language learners improved their science and reading test scores when language literacy (reading, writing, speaking and listening) was taught in science classrooms. Teachers implemented daily vocabulary matching activities to help develop language literacy and science content knowledge. For example, one student was given a science term and read the word out loud while another student with the matching definition then read the definition out loud. This activity was completed when all science terms and definitions were matched. The repetition of terms and definitions improved science-language literacy.

Another study examined the effect of professional learning sessions with middle school teachers of English language learners giving science and reading assessments (Lara-Alecio, Tong, Irby, Guerrero, Huerta, & Fan, 2012). The researchers provided on-going professional development for middle school teachers about inquiry-based vocabulary science practices. Additionally, the researchers integrated reading, writing, and technology into the professional

development sessions. Results suggested the professional development seminars helped teachers of English language learners improve students' reading and science assessment scores.

Furthermore, incorporating science and literacy instruction helped improve the students' oral reading fluency.

Chowdhary, Liu, Yerrick, Smith, and Grant's (2014) study discovered the importance of professional learning for science teachers in understanding interdisciplinary science inquiry as it related to the Next Generation Science Standards (Next Gen) and the Common Core State Standards (CCSS). Teachers engaged in workshops on implementing science inquiry strategies and how they connected to both the Next Gen and CCSS. The workshops helped teachers align the CCSS for literacy, the Next Gen, and strategies for interdisciplinary science inquiry. Because of the ongoing support, teachers reported feeling confident in implementing interdisciplinary science inquiry strategies while addressing Next Gen and CCSS for literacy in their classrooms. During classroom observations, the researchers noticed that the participants who did not attend all the workshops did not align interdisciplinary science inquiry strategies with the Next Gen and CCSS. The teachers who attended all the workshops translated what was learned in the workshops into classroom practices.

Other researchers (Greenleaf et al., 2011) reported that students of science teachers who participated in professional learning sessions pertaining to literacy instruction improved their reading comprehension and science content learning. In the study, researchers provided a group of randomized high school science teachers with professional learning sessions that emphasized reading strategies. Researchers conducted pre- and post- surveys about teachers' knowledge and beliefs of science and literacy instructional practices, interviews about professional learning,

collected artifacts of teaching materials and student work, and collected pre- and post-assessments of students' science content and reading skills.

Professional learning opportunities have helped teachers gain knowledge and confidence in teaching content-related reading (Fine, Zygouris-Coe, Senokossoff, & Fang, 2011). During a 4-day professional learning opportunity, science teachers read and discussed articles connected to their content area and reading strategies. Also, the teachers discussed how they would implement reading strategies into their classroom. The researchers found that when teachers had reading strategies at their disposal, they felt more prepared and confident to implement content-related reading strategies. Researchers concluded that building teachers' confidence was essential for new strategies to be implemented. However, the researchers never followed-up with the participants to measure the impact of the professional learning sessions.

Another study (Cervetti et al., 2012) compared fourth grade classrooms that implemented an integrated science-literacy unit to a science-only unit paired with regular literacy instruction. The classrooms that implemented the science-literacy unit engaged students in reading texts, writing notes and reports, conducting investigations, and discussing key concepts and processes. The classrooms that implemented the science-only unit used state-provided curriculum materials, which addressed only science content standards. Both groups of students improved their overall reading comprehension. However, the students who engaged in the science-literacy unit showed greater gains in science understanding, science vocabulary, and science writing than the students who engaged in the science-only unit.

Fang and Wei (2010) examined two sixth grade inquiry-based science programs, one with reading immersion and the other without. The reading immersion program included reading strategies and science reading trade books, while the other included only inquiry-based

strategies. The students who participated in the reading immersion program made greater gains on reading and science standardized assessments than those who did not. The researchers concluded that infusing reading strategies with science content allowed students to cope better with content texts, which improved their learning in both reading and science.

Numerous studies provided evidence that professional learning focused on literacy instruction for science teachers translated into students improving both science content knowledge and literacy skills (e.g., Brown & Ryoo, 2008; Carrejo & Reinhartz, 2012; Zohar & Barzilai, 2013). Research suggested professional learning was an essential component for teachers to integrate science and literacy instruction, which influenced student achievement and growth. The next logical step was to examine a group of teachers' professional learning experiences (Desimone, 2009). This study aimed to meet the challenge of conducting that next step. The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Next, the chapter discusses the theoretical underpinnings of professional learning. Adult learning principles are explained and a description of the multiple ways teachers learn during their professional learning activities is provided. Also in this section, the different types of activities in which adult learners learn best are mentioned. The chapter ends with a discussion of successful professional learning practices as a way to understand better the formal and informal professional learning activities in which the participants were involved in.

Theoretical Underpinnings of Professional Learning

Zepeda (2012) stated "The cornerstone of successful professional development is the way in which adults are engaged in learning" (p. 46). The central question is, how do adults learn?

Over the course of nearly a century, scholars and researchers have been unable to come up with a single answer, theory, or model of adult learning that defined all we know about adult learners (Merriam, 2001). Merriam (2001) suggested the two pillars of adult learning theory are andragogy and self-directed learning. Within self-directed learning, researchers theorized about multiple ways adults learn, including formal, informal, non-formal, and incidental learning (Golding, Brown, & Foley, 2009; Hager & Halliday, 2006; Malcolm, Hodkinson, & Colley, 2003; Marsick & Watkins, 2001).

Andragogy

The term andragogy coined by Knowles (1983) was defined, “as the art and science of helping adults learn” (p. 34). Adult learners move from being dependent to being self-directed. Adults approach “an educational activity with both a greater volume and a different quality of experience than youths” (Knowles, 1990, p. 59). Zepeda (2015, p.17) referenced Knowles and Associates (1984, p. 12) suggesting adults learn based on the following principles:

- (1) Need to Know: Adults need to know the reason—the “why” or the reasons for learning.
- (2) Experience: Adults rely on and draw from prior experience and knowledge.
- (3) Self-concept: Adults relate how they learn to their own sense of self.
- (4) Readiness: The more immediate the need, the higher the readiness to learn.
- (5) Orientation and Application: As adults learn new knowledge, they want to apply it immediately.
- (6) Motivation: Adults derive satisfaction and self-motivation to learn as they mature.

(Zepeda, 2015, p. 17)

These principles provided a baseline for how teachers in this study learn best. The researcher believed that participants in this study should be supported with the principles of adult learning.

Self-Directed Learning

The pioneers of self-directed learning—Houle (1961), Tough (1978), and Knowles (1970)—described in their work how adults learn on their own. Building on their work, researchers created conceptual models to explore the characteristics and attributes of those who were self-directed in their learning (Candy, 1991; Garrison, 1997). According to Merriam, Caffarella, and Baumgartner (2007) the main goals of self-directed learning are:

- (1) To enhance the ability of adult learners to be self-directed in their learning;
- (2) To foster transformational learning as central to self-directed learning; and,
- (3) To promote emancipatory learning and social action as an integral part of self-directed learning. (p. 107)

Self-directed learning allows adult learners to take charge of their own learning. In this study, teachers participated in informal professional learning activities to satisfy their needs. For instance, participants discussed researching instructional strategies online.

Adults taking charge of their own learning provides opportunities for learning to be sustained over time. Self-directed learning encourages adults to engage in formal, informal, non-formal and incidental learning practices (Zepeda, 2015). In the following sections, formal, informal, non-formal, and incidental learning are discussed and how to engage adult learners is mentioned. The chapter ends with a report of successful professional learning practices, including job-embedded professional learning.

Formal, Informal, Non-formal, and Incidental Learning

The purpose of this study was to examine teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The related literature on formal, informal, non-formal, and incidental learning was imperative to consider because the participants experienced all types of professional learning activities. Over the years, researchers attempted to define and to distinguish between formal, informal, non-formal, and incidental learning, but the concepts were often interrelated and the attempts to distinguish them were contradictory (Golding, Brown, & Foley, 2009; Hager & Halliday, 2006; Malcolm, Hodgkinson, & Colley, 2003; Marsick & Watkins, 2001). Because of the immersion of digital tools and platforms for teachers, digital learning opportunities are also discussed (Killion, 2013).

Formal learning. Formal learning occurs in educational settings such as universities or other organized programs. Adult education programs that follow a prescribed program are considered formal learning (Schugurensky, 2000). The institution controls both the goals and means of learning (Mocker & Spears, 1982). In most cases, the setting for formal learning consists of adults sitting in a room with an instructor and learning in various ways such as small group interactions and lectures. Most adults participate in formal learning for career- or job-related purposes (Merriam & Bierema, 2014). Essentially, formal learning situations involve:

- (1) A specific curriculum;
- (2) Teachers or trainers who are responsible for teaching the curriculum; and,
- (3) An assessment system that assesses and certifies the learning attainments of the individual learners. (Hager, 2012, p. 207)

Researchers and scholars generally agreed on the definition for formal learning, but their definitions differ when defining informal, non-formal, and incidental learning (Malcolm et al., 2003; Eraut, 2000; Hager & Halliday, 2006; Marsick & Watkins, 2001; Schugurensky, 2000). Some researchers and scholars believe the latter three types of learning cannot be separated from one another (Billett, 2002; Davies, 2001).

Informal learning. Informal learning covers all situations in which adults learn including those that are referenced as unintentional (Hager & Halliday, 2006). Any activity involving the pursuit of knowledge or skill which occurred without a pre-established curriculum is believed to be informal learning (Livingstone, 2006). Adults learn based on their interests, experiences, and through engagement with colleagues. Essentially, informal learning is learner-centered (Beckett & Hager, 2002; Malcolm et al., 2003), but it should not be considered an inferior form of learning (Coffield, 2000). Table 2.4 compares the characteristic features of formal and informal learning.

Table 2.4

Characteristic Features of Formal and Informal Learning

Features	Formal Learning	Informal Learning
Planned learning vs. contingent and opportunistic learning	Teacher/trainers are in control of planning, delivery, and assessment.	Learner is in control, learning is unplanned, and arises contingently and opportunistically as events unfold.
Pre-specification vs. emergence	Learning is predictable as it is described in documents, standards, or learning outcomes.	Learning emerges from unexpected events and there is no pre-established curriculum.
Explicit vs. tacit	Learners are expected to articulate what they have learned.	What is learned is tacit and learners may be unaware of what they have learned.
Focus on teaching/training and content vs. focus on the learner and their learning	Focused on teaching and not what is being learned.	Focused on the learner and their learning.

Focus on individuals vs. focus on both groups and individuals	What is taught is usually individually assessed.	Learning is collaborative/collegial but at the same time individual.
Context-free learning vs. contextualized learning	Focused on general principles rather than specific applications. It is decontextualized.	Learning is highly contextualized and features unpredictability.
Knowledge and its application vs. seamless know-how	Conceptualized in theory and practice.	Appropriately thought of holistically as seamless know-how.

Adapted from Hager, 2012, pp. 209-210

The differences between formal learning and informal learning are relevant because this study examined teachers' formal and informal professional learning activities. Participants regularly engaged in formal professional learning activities but sought other professional learning opportunities on their own, as well.

Non-formal learning. Non-formal learning is viewed as interchangeable with informal learning or as in between formal and informal learning (Hager & Halliday, 2006). According to Schugurensky (2000), non-formal learning consists of all learning that takes place outside of educational settings but can be organized and have learning objectives. For example, a museum can be considered a place where non-formal learning takes place (Koreneva, 2015). Another example of a non-formal learning activity is a professional learning activity where teachers share their expertise or knowledge with one another (Schwier & Seaton, 2013). During this study, participants credited one teacher for helping them implement a reading instructional strategy. Non-formal activities are known to be short-term, reoccurring, individualized and interest-driven, learner-centered, and democratic (Schugurensky, 2000). Descy and Tessaring (2001) believed non-formal learning is anything that is purposeful from the learner's perspective rather than coming from the institution.

Incidental learning. Incidental learning is considered another category within informal learning (e.g., Callahan, 1999; Cseh, 1998). Marsick and Watkins (2001) differentiated incidental learning from informal by defining it “as a byproduct of some other activity, such as task accomplishment, interpersonal interactions, sensing the organizational culture, or trial-and-error experimentation” (p. 25). Incidental learning is believed to happen during non-routine circumstances and when people re-frame their understanding of something through reflection (Marsick et al., 2009). Learners are not conscious of their learning and what is learned is unintentional, taken for granted, or tacit (Marsick & Watkins, 2001). Incidental learning is considered difficult to identify because the individual may not be aware that learning has occurred (Marsick et al., 2009).

Some researchers distinguish between informal and incidental learning by claiming incidental learning was result of a significant unplanned or unintentional event (Carter, 1995; Hodkinson & Hodkinson, 2004). Illeris (2009) added multiple categories within informal and incidental learning. Illeris identified five spaces: (1) everyday learning, (2) school and educational learning, (3) workplace learning, (4) internet-based learning, and (5) net-based professional network learning (pp. 139-140).

Learning through technology. According to Killion (2013) learning through digital platforms is aligned with adult learning principles. Learning through technology is used for formal, informal, non-formal, or incidental learning experiences. The use of technology enhanced adults’ learning through five attributes:

- (1) Personalization—The person can select adapt what they learn, how they learn, and when they learn.

- (2) Collaboration—Individuals with common interests and needs connect to co-construct knowledge.
- (3) Access—People can learn wherever and whenever they want.
- (4) Efficiency—Alleviates pressure of other routine tasks, immediate access to learning materials, and can be used as a vehicle for feedback.
- (5) Learning designs—Such as personalized learning or people being connected globally, designs can create deeper learning. (pp. 11-12)

Criticism of ways adults learn. Adults seek many different ways to learn. Some researchers think it is detrimental to distinguish the various types of adult learning (Billett, 2002; Davies, 2001; McGivney, 2002). Davies (2001) expressed concerns about classifying the different types of learning, stating:

I do have some concerns that the notion of formal, non-formal and informal may become fixed as if these are three rooms with high walls around them so that the integrated holistic way in which real people learn and make sense of their world is lost. It may be that while we break down boundaries between sectors, new boundaries are being constructed around different forms of learning. (p. 113)

McGivney (2002) agreed that there should not be one unanimous definition. She claimed that attempting to explain what informal learning was like “trying to grasp jelly” (p. 102). Billett (2002) believed there was no such thing as informal learning. Instead, he saw learning as a normal activity that should not be defined by whether or not it is formal.

Strategies to engage adult learners. Whether or not the different types of learning, formal, informal, non-formal, and/or incidental, should be distinguished from one another, the question remains: how do educators of adults engage adult learners best? Zepeda (2015) cited the work of Roberts and Pruitt (2009, p. 75) to identify strategies to engage adult learners:

- (1) Make learning both an active and an interactive process;

- (2) Provide hands-on, concrete experiences, and real-life experiences;
- (3) Employ novelty, but also connect to the adult learner's prior experiences and knowledge;
- (4) Give them opportunities to apply the new knowledge to what they already know or have experienced;
- (5) Be aware of the diversity in an adult group. Use a variety of approaches to accommodate different learning styles and experiences and use examples;
- (6) Use small-group activities through which learners have the opportunity to reflect, analyze, and practice what they have learned;
- (7) Provide coaching, technical assistance, feedback, or other follow-up support as part of the training; and,
- (8) Give adult learners as much control as possible over what they learn, how they learn, and other aspects of the learning experience. (pp. 18-19)

Adults learn by being self-directed, through collaboration with their colleagues, and by focusing on learning skills that are applied immediately to their line of work (Zepeda, 2015). The adult learning literature was relevant to this study because professional learning activities should be aligned with adult learning principles. The purpose of this study was to examine middle school teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The teachers' perspectives provided insight into the types of professional learning activities in which they were involved.

In the following section, successful professional learning practices are described. Within this section, teacher professional learning is defined, high-quality characteristics of professional learning are discussed, the relationship between professional learning, teacher quality, and adult

learning is explained, and the relationship between the middle school concept and professional learning is presented. Additionally, job-embedded professional learning and how technology can enhance job-embedded professional learning practices is outlined. The chapter ends with a summary of the related literature.

Successful Professional Learning Practices

Professional learning is defined as “learning for students, teachers, and other professionals who support children” (Zepeda, 2015, p. 2). Successful professional learning practices are supposed to involve people working to improve curriculum, instructional practices, and student assessments to make student growth possible (Gordon, 2004). Teacher professional learning should be embedded into the culture of the school as day-to-day work, rather than an extra task teachers have to accomplish (Fullan, 2007). Professional learning should spark curiosity, motivation, and new ways of thinking (Kent, 2004). The National Staff Development Council, now known as Learning Forward (2015a) claimed the purpose of professional learning is “for educators to develop the knowledge, skills, practices, and dispositions they need to help students perform at higher levels” (para. 1).

Like adult learning, professional learning takes many forms. The purpose of this study was to examine middle school science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The following section describes the characteristics of effective professional learning, the relationship between professional learning, teacher quality, and professional learning, and the relationship between middle school and professional learning. The chapter ends with a description of job-embedded learning and a chapter summary.

Characteristics of Effective Professional Learning

Research about professional learning and its relationship with teachers and student achievement has grown exponentially and has resulted in the development of characteristics of effective professional learning. Originally set forth in 1997, Learning Forward (2015a) constructed the *Standards for Professional Learning*, and as a result drew attention to the context, process, and content in which professional learning is presented. The standards were a comprehensive approach to professional learning that included seven concepts:

- (1) Learning Communities—committing to continuous improvement, collective responsibility, and goal alignment. (Learning Forward, 2015b, para. 1)
- (2) Leadership—requiring skillful leaders who develop capacity, advocate, and create support systems for professional learning. (Learning Forward, 2015c, para. 1)
- (3) Resources—prioritizing, monitoring, and coordinating resources for educator learning. (Learning Forward, 2015d, para. 1)
- (4) Data—using a variety of sources and types of student, educator, and system data to plan, assess, and evaluate professional learning. (Learning Forward, 2015e, para. 1)
- (5) Learning Designs—integrating theories, research, and models of human learning to achieve its intended outcomes. (Learning Forward, 2015f, para. 1)
- (6) Implementation—applying research on change and sustaining support for implementation of professional learning for long-term change. (Learning Forward, 2015g, para. 1)
- (7) Outcomes—aligning its outcomes with educator performance and student curriculum standards. (Learning Forward, 2015h, para. 1)

Georgia adopted these standards in 2005 (Georgia Department of Education, 2005). Aspects of these standards were still present at the research site during the time of this study. Furthermore, similarities to Learning Forward’s (2015a) standards were present in other researchers’ lists of characteristics of effective professional learning (e.g., Birman, Desimone, Porter, & Garet, 2000; Borko, 2004; Corcoran, 1999; Garet, Porter, Desimone, Birman, & Yoon, 2001; Guskey, 2003; Hawley & Valli, 2000; Loucks-Horsley, Stiles, & Hewson, 1996; Zepeda, 2012). Table 2.5 displays the lessons and practices learned from research about professional learning.

Table 2.5

Characteristics of High Quality Teacher Professional Learning

Lessons and Practices	Research
Professional learning needs to extend over a period of time and allow teachers sufficient time to interact with resources.	Birman et al., 2000; Colatino, 2005; Darling-Hammond & McLaughlin, 2011; Garet et al., 2001; Guskey, 2003; Hawley & Valli, 2000; Loucks-Horsley et al., 1996; Porter, Garet, Desimone, Yoon, & Birman, 2001
Professional learning must be continuous, ongoing , and follow-up needs to be planned.	National Research Council, 2000; Corcoran, 1999; Garet et al, 2001; Joyce & Showers, 1995
Professional learning is embedded within the workday and relevant to what is going on in teachers’ classrooms.	Ancess, 2000; Borko, 2004; Garet et al., 2001; Zepeda, 2015
Professional learning is content- and grade-specific to teachers’ subject matter.	Birman et al., 2000; Corcoran, 1999; Garet et al., 2001; Desimone et al., 2002
Professional learning promotes collaboration, brainstorming, reflection and inquiry .	Crow, 2009; Hawley & Valli, 2000; Loucks-Horsely et al., 1998; McQueen, 2001;
Professional learning provides various learning strategies .	Birman et al., 2000; Garet et al., 2001; Joyce & Showers, 1995; Desimone et al., 2002;
Professional learning is site-based and coherent with state standards.	Corcoran, 1999; Garet et al., 2001; Guskey, 2003; Desimone et al., 2002

Professional learning is grounded in student data .	Darling-Hammond & McLaughlin, 2011
Professional learning is evaluated and assessed .	Guskey, 2000; Zepeda, 2012

Adapted from Zepeda, 2012, p. 9

Essentially, professional learning must be continuous and related to teachers’ content area (Zepeda, 2012). Professional learning opportunities should promote collaboration with fellow teachers about student work, assessments, and have continuous follow-up (Darling-Hammond & Falk, 2013). Zepeda (2015, p. 2) extracted from Creemer, Kyriakides, and Antoniou’s (2013, p. 15) work when cutting to the chase about professional learning research. They stated,

The researcher findings have revealed that professional development is more effective if the teacher has an active role in constructing knowledge (*teacher as action researcher*), to collaborate with colleagues (*collective critical reflection*), the content relates to, and is situated in, the daily teaching practice (*emphasis on teaching skills*), the content is differentiated to meet individual developmental needs (*linked with formative evaluation results*). (Zepeda, 2015, p. 2, emphasis in original)

When effective characteristics are present, teacher quality and continuous improvement of teaching are increased (Darling-Hammond, 2004; Kent, 2004; Zepeda, 2012). When professional learning opportunities are presented without these characteristics and are delivered as a temporary solution, this form of professional learning may be considered “educational malpractice” (Sparks, 2013, para. 2).

Relationship between professional learning and adult learning. Over the years, research revealed a relationship between high quality characteristics of professional learning, teacher quality, and adult learning (Zepeda, 2012) as illustrated in Table 2.6.

Table 2.6

Relationship between Professional Learning, Teacher Quality, and Adult Learning

Findings	Research
Different learning styles allow teachers to make individual goals and provide for self-directed activities.	Glickman, Gordon, & Ross-Gordon, 2009
To grow professionally, the needs of the teachers and students must be met.	Fenwick, 2004
Continuous, ongoing professional development increases likelihood of improved teacher pedagogy.	Gordon, 2004
Professional development linked to teachers' content areas improves their teaching strategies.	Frome, Lasater, & Cooney, 2005
Job-embedded is best on-site and ongoing.	Garet, et al., 2001
Extended time for activities increases effectiveness of the activity in terms of teacher learning.	Garet et al., 2001
Success rate is higher when entire staff collaborates on school improvement.	Lick & Murphy, 2004
Collaboration at school site allows teachers to problem solve among themselves.	Randi & Zeichner, 2004
Teachers learn most when activities are learning-, knowledge-, assessment-, and community-centered.	National Research Council, 2000
Learning communities increases potential to meet individual teacher needs.	National Research Council, 2000

Adapted from Zepeda, 2012, p. 53

Table 2.6 illustrated the relationship between high-quality professional learning characteristics and principles of adult learning.

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance

Standards (CCGPS) for literacy in science. Related professional learning literature was reviewed. This study took place in a middle school, therefore in the next section, the middle grades concept and how it aligns with effective characteristics of professional learning are discussed. The chapter will end with a description of job-embedded professional learning and a chapter summary.

Middle school and effective professional learning. The presented study took place in a middle school. To understand how middle schools are intended to operate, it was imperative to review the related literature pertaining to middle school ideology. Andrews (2013b) stated, “The middle school ideology is the ultimate context for all our efforts to improve middle grades schools; it overarches everything we do” (p. 784). So, what do middle schools do? The National Middle School Association (NMSA) (2010), now referred to as Association of Middle Level Education (AMLE), produced a list of essential attributes and characteristics that successful schools for young adolescents need. The essential attributes for young adolescents were:

- (1) Developmentally Responsive: Using the nature of young adolescents as the foundation on which all decisions are made.
- (2) Challenging: Recognizing that every student can learn and everyone is held to high expectations.
- (3) Empowering: Providing all students with the knowledge and skills they need to take control of their lives.
- (4) Equitable: Advocating for every student’s right to learn and providing challenging and relevant learning opportunities. (p. 14)

The attributes were intended to be a guide for middle schools to ensure adolescents’ a positive educational experience.

The four essential attributes of successful middle schools cannot be achieved without certain characteristics being present in the school. The characteristics were grouped into three categories: (1) Curriculum, Instruction, and Assessment, (2) Leadership and Organization, and (3) Culture and Community (NMSA, 2010). The characteristics are complimentary to one another and should be implemented together. Each characteristic is presented along with the proper category in Table 2.7.

Table 2.7

Characteristics of a Successful Middle School

Category	Characteristics
Curriculum, Instruction, and Assessment	Educators value young adolescents and are prepared to teach them.
	Students and teachers are engaged in active, purposeful learning.
	Curriculum is challenging, exploratory, integrative, and relevant.
	Educators use multiple learning and teaching approaches.
	Varied and ongoing assessments advance learning as well as measure it.
Leadership and Organization	A shared vision developed by all stakeholders guides every decision.
	Leaders are committed to and knowledgeable about this age group, educational research, and best practices.
	Leaders demonstrate courage and collaboration.
	Ongoing professional development reflects best educational practices.
	Organizational structures foster purposeful learning and meaningful relationships.
	The school environment is inviting, safe, inclusive, and supportive of all.

Culture and Community	Every student's academic and personal development is guided by an adult advocate.
	Comprehensive guide and support services meet the needs of young adolescents.
	Health and wellness are supported in curricula, school-wide programs, and related policies.
	The school actively involves families in education of their children.
	The school includes community and business partners.

Adapted from NMSA, 2010, p.14

Similarly, Jackson and Davis's (2000) pivotal middle grades education book, *Turning Points 2000: Education Adolescents in the 21st Century*, presented seven recommendations for the structure and practices in middle schools. Their recommendations were:

- (1) Organizing schools around relationships for learning that create a climate of intellectual development and a caring community of shared educational purpose;
- (2) Democratic governance;
- (3) Safe and healthy environments;
- (4) Staffing schools with teachers expert in young adolescents;
- (5) Involvement of parents and community;
- (6) Curriculum that is rigorous, relevant, and based on how students learn best; and,
- (7) Instruction that achieves excellence and equity. (pp. 23-24)

Likewise, the National Association of Secondary School Principals (NASSP) (2006) believed middle grades schools were best supported through collaborative leadership and professional learning communities, personalizing the environment, and personalizing learning with curriculum, instruction, and assessment.

According to Bickmore (2013), NMSA’s (2010), Jackson and Davis’s (2000), and NASSP’s (2006) descriptions of the middle school concept aligned with effective professional learning characteristics in three ways: (1) collaboration, (2) relevance, and (3) shared decision making (p. 735). During professional learning activities, collaboration among colleagues promoted inquiry, brainstorming, and reflection (Hawley & Valli, 2000). To educate young adolescents, collaboration among students, teachers, school personnel, parents, and the community is considered vital (Jackson & Davis, 2000; NASSP, 2006; NMSA, 2010).

Relevance is considered an effective professional learning characteristic because educators are more likely to implement what they learned if they are actively involved (Garet et al., 2001; Zepeda, 2015). Relevant learning involves problem solving and application to real life, which are associated with the middle school concept (NASSP, 2006; NMSA, 2010). Shared decision making in professional learning results in classroom implementation and student achievement (Desimone, 2009). Table 2.8 summarizes the middle school concept and characteristics of effective professional learning.

Table 2.8

Middle School Concept aligning with Characteristics of Effective Professional Learning

Theme	Effective Professional Learning Characteristic	NMSA (2010)	Jackson and Davis (2000)	NASSP (2006)
Collaboration	- Collaborative and collegial	-Collaborative shared leadership -Organizational structure supports relationships and learning	- Organizing schools based on relationships for learning - Involvement of parents and community	- Collaborative leadership and professional community -Personalizing the environment
Relevance	- Goal-oriented and problem-centered - Job-embedded	- Relevant, challenging, integrative, and	- Curriculum is rigorous, relevant, and	-Personalizing learning with curriculum,

	<ul style="list-style-type: none"> - Occurs over time - Value educators' experience - Aligned with adult learning principles 	exploratory curriculum and instruction	<ul style="list-style-type: none"> based on how students learn -Instruction that achieves excellence and equity 	instruction, and assessment
Shared Decision Making	<ul style="list-style-type: none"> - Collaborative and collegial - Value educators' experience - Aligned with adult learning principles 	<ul style="list-style-type: none"> - Collaborative shared leadership and decision making - School-initiated family and community partnerships 	<ul style="list-style-type: none"> - Democratic governance - Involvement of parents and community 	<ul style="list-style-type: none"> -Collaborative leadership and professional community -Personalizing learning with curriculum, instruction, and assessment

Adapted from Bickmore, 2013, p. 737

The information described in Table 2.8 helped the researcher understand the characteristics present in the middle school teachers' professional learning activities. The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Throughout the study, the researcher observed various meetings during which middle school teachers were involved in job-embedded professional learning. The next section explores what job-embedded professional learning is and explains how it is imperative for “teachers as they engage in the complexities of their work” (Zepeda, 2015, p. 3). Within this section, the use of technology as a job-embedded professional learning practice is described. The chapter ends with a summary of the related literature.

Job-embedded professional learning. The participants participated in job-embedded professional learning throughout this study. Job-embedded professional development is defined as “teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers' content-specific instructional practices with the intent of improving student learning”

(Croft, Coggshall, Dolan, Power, & Killion, 2010, p. 2). The study's participants identified problems within their classroom or school and found solutions to improve professionally (Croft et al., 2010). Job-embedded professional learning requires teachers to work with one another in inquiry-based work (Hawley & Valli, 2000). For high-quality job-embedded professional development to occur, it needs to be aligned with student standards and school improvement goals (Hirsh, 2009). Job-embedded professional learning includes "interactions with colleagues around teaching and learning, including conversations about instruction, peer observations, feedback, and advice-seeking about instruction" (Parise & Spillane, 2010, p. 324).

Formal and informal learning took place during job-embedded professional learning. Job-embedded professional learning occurs whenever a teacher is engaged in their work and actively thinking about how to support students learning (Zepeda, 2015). This study's participants learned from conversations with their colleagues during planning periods, by analyzing student data, and from listening to responses from students. Furthermore, the participants made meaning through reflecting on their own or discussing a situation with a fellow teacher. It is possible for teachers to learn from surfing the Internet, blogging, Tweeting, and Facebooking about their profession (Zepeda, 2015). All of these are considered examples of job-embedded learning experiences.

To have successful job-embedded professional learning, there are four essential conditions necessary:

- (1) Learning needs to be consistent with the principles of adult learning,
- (2) There must be trust in the process, in a colleague, and in the learner,
- (3) Time within the regular school day needs to be made available for learning, and
- (4) Sufficient resources must be available to support learning. (Zepeda, 2012, p. 126)

Later, Zepeda (2015) elaborated on the four essential conditions and described five characteristics of job-embedded professional learning:

- (1) Holds relevance for the adult learner—Adults want to be successful and derive value from their learning. Job-embedded learning is highly individualized.
- (2) Includes feedback as part of the process—Job-embedded learning includes feedback and collaborative supports as a built-in process (e.g., peer coaching or reflection journals).
- (3) Supports inquiry and reflection—Job-embedded learning promotes thinking more critically and reflectively about practice. This reflection can be done at the individual level or as a group.
- (4) Facilitates the transfer of new skills into practice—Job-embedded learning provides ongoing support, which is linked to transferring learned skills into practice.
- (5) Promotes collaboration—It is through collaboration that teachers share with one another, engage in discussions, and reflect about their experiences. (pp. 35-38)

For job-embedded professional learning to be at its best, teachers must learn to trust one another and work well in teams (Zepeda, 2015).

Job-embedded professional learning was relevant to the study because professional learning was part of the participants' daily work. Teacher learning became a part of the culture of the classroom and school (Croft et al., 2010; Zepeda, 2015). Within the workday, teachers met for various meetings and had numerous conversations with each other about teaching and learning. It was during these time that job-embedded professional learning took place (Zepeda, 2015).

In addition to the more traditional means of job-embedded professional learning such as face-to-face meetings and conversations, technology and digital tools can offer opportunities for teachers to engage in job-embedded professional learning in innovative ways (Zepeda, 2015). Technology enables teachers to work together synchronously and asynchronously. For example, two teachers can be in different rooms collaborating on the same Google Document for a lesson. Or the interaction between two people in a professional learning network can be at different times (e.g., responding to comments on Facebook or sharing resources via Twitter). Teachers are no longer limited to only talking with teachers from their school. Professional learning networks allow teachers to communicate and support one another through various digital platforms, such as Twitter, Pinterest, Facebook, and Edmodo (Meyers, Paul, Kirkland, & Dana, 2009; Zepeda, 2015).

Chapter Summary

The chapter began with a historical overview of how professional learning has been influenced by educational reform policies. The review began with the publication of *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983) and ended with the current standards-based reform movement (e.g., the Common Core State Standards and the Next Generation Science Standards). The purpose of reviewing past educational reforms and their influences on teacher professional learning was to limit the dangers of educational amnesia (Andrews, 2013a). Professional learning has been an essential component to carry out macro-level (federal and state) educational decisions at the micro-level (school districts and schools) (Desimone, 2011; Hess & McShane, 2013; Johnson, 2013; Loveless, 2013).

Next, the current Georgia policies affecting science teachers' professional learning was explored. The researcher mentioned all aspects that the state of Georgia was implementing, but focused on the implementation of high-quality standards for science and professional learning. The Common Core State Standards (CCSS), the Common Core Georgia Performance Standards (CCGPS) and the Next Generation Science Standards (Next Gen) were described in detail, more specifically how they created educational change. Then literature and research pertaining to science-literacy related professional learning was discussed.

A review of the theoretical underpinnings of profession learning were described. The various types of learning that occur in the workplace were mentioned. In the last section, the successful professional learning practices were explored. The section discussed the characteristics of high-quality professional learning, how they were linked to adult learning principles, and the middle school concept. Finally, related literature on job-embedded professional learning was presented.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The research design and methodology provided in this chapter detail the research process applied from the beginning of the study to the end of the study. This chapter includes the (1) purpose of the study, (2) research question, (3) theoretical framework that guided the study, (4) description of the research design and rationale for the study, (5) data sources, (6) data collection, (7) overview of data analysis, (8) trustworthiness of the study, and (9) limitations of the study.

Purpose of the Study

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The scope of this study was focused on middle school science teachers.

The overall research question was

- (1) What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

Theoretical Framework

Qualitative research was chosen because it recognizes the complexity of social life (Merriam, 2009). Qualitative research studies detail how everyday life is meaningfully produced by particular social actors (Prasad, 2005). Merriam (1985) argued that the objective of qualitative

research is to understand the experiences of participants and to comprehend better how all parts come together to form a whole. Merriam (2002) later elaborated: “Qualitative research is distinctive in that it is interpretive in nature, uses the researcher as the primary instrument of data collection and analysis—and is inductive in nature” (p. 5). Thus, examining middle school science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science was best achieved through an interpretive qualitative approach.

An interpretive theoretical perspective helped examine and understand the teachers’ perspectives on their professional learning as they implemented the CCGPS for literacy in science. By examining teachers’ perspectives on their professional learning, this study aimed to (1) gain insight into what teachers understood and implemented from their formal and informal professional learning activities; (2) understand the teachers’ professional learning needs as they implemented the CCGPS for literacy in science; and, (3) understand what teachers did to satisfy their own professional learning needs. Constructivism, including social constructivism and symbolic interactionism, guided this research.

Constructivism

Constructivism posits that people actively construct their own meanings and knowledge from their lived experiences (Fosnot & Perry, 1996; Steffe & Gale, 1995). For this study, constructivism was relevant in examining how science teachers made meaning of their professional learning activities through their interactions with one another. Knowledge was constructed by each participant, but the participants created different interpretations of their experiences from the same event or activity (Crotty, 1998; Denzin & Lincoln, 2005). For example, each participant recalled the same writing-related professional learning activity but

described the activity and what they learned from it differently. Although, every participant engaged in formal and informal professional learning activities as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, each participant had his or her own perspectives on their professional learning experiences.

Social Constructivism

Although each participant had his or her individual perspectives, the participants partook in formal professional learning activities as a group. Social constructivism evolves through social interactions with others (Patton, 2002). Individual learning is influenced by the culture of the group and the social setting in which learning takes place (Denzin & Lincoln, 2005). Kim (2001) called attention to the lived experiences the participants bring to the learning environment. Social constructivism is based on:

- (1) *Reality*: Meaning is created through interactions;
- (2) *Knowledge*: Humans create meaning through social interactions; and,
- (3) *Learning*: Occurs when there are social interactions. (p. 51, emphasis in original)

In an attempt to understand the interactions between teachers during their professional learning activities, and the resulting perspectives of the teachers, the researcher conducted all aspects of the study using constructivism and social constructivism lenses.

Symbolic Interactionism

To study the teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, the researcher relied on qualitative inquiry grounded in symbolic interactionism. Symbolic interactionism is concerned with examining how individuals make meaning, expressed through the development of self through social situations. Therefore, objects, things, and events have no

meaning unless individuals assign meaning to them through social situations (Prasad, 2005). Social situations for teachers occur throughout the day. Teachers will talk to one another in the halls, the teacher lounge, and in various meetings. The way teachers interact with one another is affected by the school culture. For example, if the school culture is a collegial atmosphere, teachers are more likely to collaborate. In this study, the participants' perspectives on their professional learning were impacted by the school culture because teachers are given ample time to be together.

Symbolic interactionism is rooted in the pragmatist tradition. Pragmatists value theories and beliefs rested on practical application. Meanings come from practical actions to solve problems, and through actions, people come to understand the world (Charmaz, 2014). Mead (1934) theorized that language is critical for the development of self and the conduct of social life. For Mead, self and mind develops together and depends on learning the language and symbolic means of one's society. From Mead's work, Blumer (1969) coined the term 'symbolic interactionism' and developed three fundamental assumptions:

- (1) Human beings act toward things on the basis of the meanings that the things have for them.
- (2) Meanings of things derive from, or arise out of, the social interaction that one has with one's fellows.
- (3) These meanings are handled in and modified through an interpretative process used by the person in dealing with the things they encounter. (p. 2)

Charmaz (1980) extended Blumer's position with three additional premises for clarification:

- (1) Meanings are interpreted through shared language and communication.

- (2) The mediation of meaning in social interaction is distinguished by a continually emerging processual nature.
- (3) The interpretive process becomes explicit when people's meanings and/or actions become problematic or their situations change. (p. 25)

Symbolic interactionism was applied in this study to understand the perspectives of the participants because people form meanings from how they interact with an object (Blumer, 1969; Charmaz, 2014). For this study, the object was the participants' professional learning activities or experiences. Qualitative research methods such as interviews and observations support the philosophy of symbolic interactionism (Prasad, 2005). The researcher chose a qualitative case study method to study middle school science teachers' perspectives on their professional learning as they implemented the CCGPS for literacy in science.

Rationale and Research Design

The state of Georgia was in the midst of making macro-level educational decisions pertaining to Georgia's Race to the Top reform plan (Georgia Department of Education, 2015a). Macro-level educational decisions were made for each aspect of the reform plan, but this study concentrated on the implementation of high-quality science standards (Galey, 2015). Georgia agreed to certain federal stipulations in exchange for federal Race to the Top funds (McGuinn, 2011). The agreed upon stipulations directly influenced micro-level (school districts and schools) educational decisions (Johnson, 2013). Micro-level educational decisions were made in reaction to desired macro-level outcomes. Often, these macro- and micro-level educational decisions fail to consider the impact on administrators, teachers, and students (Darling-Hammond, 2010; Johnson, 2013).

Georgia's educational decisions surrounding high-quality science standards led to micro-level ambiguity throughout implementation. Simultaneously, schools implemented the Georgia Performance Standards (GPS) for Science and the Common Core Georgia Performance Standards (CCGPS) for literacy in science with the Next Generation Science Standards (Next Gen) in an undecided state. The Next Gen was discussed at the macro- and micro-level but has yet to be adopted (Achieve, 2015c; Georgia Department of Education, 2015b). The CCGPS for literacy in science required teachers to change their instructional strategies and their approaches to teaching science. Educational change creates feelings of excitement and anxiety for teachers (Hall & Hord, 2011). For example, some science teachers became excited about teaching an integrated curriculum. Research suggests science teachers' refused integrating literacy practices into their content instruction because they did not view it as their responsibility (Bybee, 2014; Stewart-Dore, 2013). Other teachers lacked confidence blending literacy instruction into their subject matter (Murnane, Sawhill, & Snow, 2012).

To help teachers implement changes in science classrooms, the Georgia Department of Education identified professional learning as an essential component to implementing the CCGPS (Kober & Retner, 2012). Relying on teacher professional learning is a common practice to carry out standards-based reform (Desimone, 2011; Hess & McShane, 2013; Loveless, 2013). Science education research emphasized the importance of professional learning opportunities surrounding literacy instructional strategies to help improve student science-content knowledge and literacy skills (Brown & Ryoo, 2008; Carrejo & Reinhartz, 2012; Zohar & Barzilai, 2013). Although the Georgia Department of Education acknowledged the need to provide professional learning opportunities for its teachers, a majority of the teachers admitted needing more

professional learning opportunities than had been provided or offered to them (Scholastic and the Bill and Melinda Gates Foundation, 2014).

Desimone (2009) argued that teacher professional learning research needs to examine teachers' professional learning experiences. The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. To clarify, the study did not pay particular attention to the Georgia Performance Standards (GPS) for Science or the Next Generation Science Standards (Next Gen).

Case Study

The researcher selected a qualitative case study research design to investigate the problem and to answer the research question (Creswell, 2013). Yin (2003) defined case studies as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p. 13). Case studies empower researchers to explore programs, events, activities, and individuals (Creswell, 2013). The use of case study enables researchers to probe an area of interest in depth. Furthermore, case study was an appropriate approach for this study because “Case studies become particularly useful when one needs to understand a specific problem or situation in great-depth” (Patton, 2002, p. 23). In this case study, the researcher examined science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, rather than confirm previous beliefs.

The participants included five science teachers at Groveton Middle School. These five teachers were identified as the case study. The five teachers were considered a case because all

teachers were from the same school and had similar professional learning experiences. For confidentiality purposes, the researcher used pseudonyms to protect their identity—Ms. Frizzle, Mr. Escalante, Mr. Keating, Mr. Shoop, and Ms. Norbury. All data were coded and then inductively analyzed for categories. Categories were constantly compared to one another to further interpret the themes that emerged. Using the constant comparative method, the generalizability and the validity of the findings were expanded (Corbin & Strauss, 2015).

Data Sources

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Therefore, it was important to select participants who were middle school science teachers and who regularly participated in job-embedded professional learning activities.

Sampling

There are two types of sampling in qualitative research: purposeful and random (Bogdan & Biklen, 2003). The researcher selected purposeful sampling because it “can purposefully inform an understanding of the research problem” (Creswell, 2013, p. 156). Furthermore, purposeful sampling determines “what selection criteria are essential in choosing the people or sites to be studied” (Merriam, 2009, p. 77). The Groveton Middle School principal suggested science teachers based on the school's data but did not specify why with the researcher. The selection sample allowed the researcher to observe and interact with the participants regularly. A smaller sample size strengthened the study by enriching data rather than large statistical data representation (Patton, 2002).

Context of Study

The research site was Groveton Middle School in North Georgia. Groveton Middle School is a small-urban school serving grades 6 through 8 with a population of nearly 700 students. At the time of the study, the demographics of the students were roughly 5% Asian, 60% African American, 10% Hispanic, 20% White, and 5% Multi-racial—all similar to the school district's demographics. The free and reduced lunch was about 80%, qualifying Groveton Middle School as a Title I school. Nearly 25% of students at Groveton Middle School were in the gifted education program and about 15% received special education services. There were nearly 65 teachers at Groveton Middle School and about 45 of them had advanced degrees. The average years of teaching experience was roughly 15 years. Groveton Middle School included specialists in music, physical education, agri-science, art, gifted education, foreign languages, English to Speakers of Other Languages (ESOL), and special education.

Participants

The use of purposeful sampling encouraged the researcher to “discover, understand, or gain insight and therefore must select from [data] which the most can be learned” (Merriam, 1998, p. 61). After the principal suggested 10 science teachers as participants, the researcher contacted the department chair about the best time to speak with the science teachers. The department chair recommended the upcoming science department meeting. After a couple of weeks, all 10 consent forms were signed and turned in. The researcher decided to concentrate on five teachers to strengthen the case study. Every participant engaged in all data collection activities. The other five participants suggested by the principal for this study could not participate in all data collection activities, so they were excluded from the study by the researcher.

The five participants were interviewed twice and observed 14 times during science meetings. The five teachers combined for over 40 years of science teaching experience and over 30 years teaching at Groveton Middle School. The five participants were given pseudonyms for confidentiality purposes—Ms. Frizzle, Mr. Escalante, Mr. Keating, Mr. Shoop, and Ms. Norbury.

Next, data collection is explained, including a description of each method used. Later, data analysis of the study is described. The chapter ends with an explanation of the trustworthiness and limitations of the study.

Data Collection

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The design of this study was qualitative in nature. Creswell (2013) explained qualitative data collection as “a series of interrelated activities aimed at gathering good information to answer emerging research questions” (p. 118). Employing a multitude of data collection methods enabled the researcher to triangulate and to interpret data in a naturalistic manner. Triangulation is using a variety of data sources and comparing those sources to one another (Yin, 2009). The four data collection techniques applied were (1) participant observations, (2) physical artifacts, (3) researcher's field notes, and (4) semi-structured interviews.

Participant Observations

Participant observations led to a deeper understanding of the teachers' perspectives than interviews alone would have. Mainly, the observations provided context to the study (Patton, 1990). Participant observations occurred during 14 science meetings, which occurred during the

workday and lasted approximately one hour each. During each observation, the researcher recorded notes on the Observation Protocol (Appendix C). Table 3.1 displays the date of each observation and the topic of the meeting.

Table 3.1

Participant Observations of Meetings

Date	Topic of Meeting
1/8/15	Discussed vocabulary quiz
1/14/15	Discussed how to report data to district
1/20/15	Disaggregating test data (written responses vs. multiple choice)
1/22/15	Discussed literacy strategies they use in classroom
1/28/15	Preparation for district administration impact check
2/5/15	Helping each other with data
2/11/15	Discussed benchmark tests
2/12/15	Went over curriculum map
2/19/15	New technology platform
2/25/15	Strategies to revisit content students struggle with
2/26/15	Strategies to revisit content students struggle with
3/4/15	Went over curriculum map
3/18/15	Discussion about activities for next week
4/27/15	Community Discussion

The teachers present at meetings discussed the district’s emphasis on literacy assessments and other issues that were relevant at the time. No formal professional learning activities were observed during the meetings. Occasionally, informal discussions pertained to teaching literacy

skills. For example, a participant explained how to implement Magnet Summaries, a vocabulary and writing instructional strategy, to the other participants. The majority of the meetings revolved around district check-ups, reporting data, assessments, and lesson planning.

Physical Artifacts

During participant observations, the researcher collected physical artifacts, such as agendas and minutes from meetings, local school and district initiative plans, weekly school calendars, and district-wide calendars. Yin (2003) argued that “[p]hysical artifacts have less potential relevance in the most typical kind of case study... [but] when relevant, artifacts can be an important component in the overall case” (p. 96). The collection of artifacts painted a fuller picture for the case study, especially when participants could not recall specific professional learning experiences during interviews. The artifacts helped corroborate information from other data sources (Yin, 2003).

Field Notes

In addition to collecting artifacts, the researcher wrote field notes throughout the duration of the study. The field notes included reflections, musings, and ideas that came to the researcher while observing or interacting with participants. The notes varied from shocking details to interesting ideas (Hammersley & Atkinson, 2007). Field notes were taken before, during, and after all interviews and observations. Case study field researchers rely heavily on the use of field notes throughout their data collection process. The field notes served as a memory aid of what was said to the researcher in informal conversations and helped the researcher construct the second interview guide (Kvale & Brinkmann, 2009). Ultimately, the researcher’s field notes were a running account of personal feelings and thoughts about the various meetings and interviews.

Semi-Structured Interviews

As a way to gain deeper understanding of the science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, the five participants were individually interviewed twice. The purpose of a qualitative research interview is "to understand the world from the subjects' point of view, to unfold the meaning of their experiences, [and] to uncover their lived world prior to scientific explanations" (Kvale & Brinkmann, 2009, p. 1). The semi-structured interview approach authorized a certain amount of openness for the researcher. For example, the interview guide was an outline, and the researcher asked follow-up questions based on the participants' responses (Kvale & Brinkmann, 2009).

During the first interview for each participant, a semi-structured interview guide (Appendix A) was used. The interview guide was based on the literature pertaining to the study and the research question. The first round of interviews occurred at the beginning of the study, January and February 2015, and varied in length, 35 to 50 minutes. The length of interviews differed according to the length of their responses to open-ended questions. Some participants had more knowledge of the study and informally expressed more interest in the study. The first round of interviews was face-to-face and took place in each participant's desired location. All interviews were audio-recorded, transcribed, and later coded for themes.

Before the second round of interviews was conducted, another interview guide was created (Appendix B). The second interview guide was constructed based on field notes and initial themes from the first round of interviews discovered using the constant comparative method (Corbin & Strauss, 2015). Additional clarifying questions were added to the second

interview guide before each interview as well. The second round of interviews was conducted at the end of the study, March and April 2015, and varied in length, 40 to 45 minutes. All but one interview was face-to-face. One interview was conducted over the phone for convenience purposes. All interviews were audio-recorded, transcribed, and later coded for themes.

To summarize the participation of each teacher, Table 3.2 was created. Additionally, the table presents the data collected for each activity and the duration of participation.

Table 3.2

Summary of Participant’s Participation, the Data Collected, and Duration of Participation

Participants	Data Collection	Duration of Time
5 science teachers	2 semi-structured interviews. 14 observations of science meetings.	Each interview lasted approximately 45 minutes. Each was at the beginning and end of study, January or February 2015 and March or April 2015. Each science meeting observation lasted approximately 1 hour. Observations occurred weekly and occasionally bi-weekly.

In the following section, data analysis is described. Within the section, the rationale for the chosen analysis methods is explained and examples of the analysis are provided. Later, the trustworthiness and limitations of the study are mentioned.

Data Analysis

This qualitative case study produced an ample amount of data, so data analysis was directed to answering the research question and identifying patterns, categories, and themes (Miles & Huberman, 1994; Yin, 2003). The purpose of this study was to examine middle school science teachers’ perspectives on their professional learning as they implemented the Common

Core Georgia Performance Standards (CCGPS) for literacy in science. Although this case study did not apply grounded theory as a research methodology, methods typically associated with grounded theory analysis were utilized. The methods applied were coding, memo writing, table construction, and the constant comparative method (Corbin & Strauss, 2015; Charmaz, 2014).

The researcher coded by reading the data holistically and denoting concepts to stand for that data (Strauss & Corbin, 2015). Codes are labels assigned to data (Miles & Huberman, 1994). According to Charmaz (2014), codes should be used as conceptual tools to “fragment the data and thus take them apart, to define processes in the data, and to make comparisons for data” (p. 165). Open codes, in-vivo codes, and priori codes were employed by the researcher throughout data collection and analysis. Open codes break down data and identify their properties and dimensions. Using the actual words of the participants were the in-vivo codes. The researcher created priori or pre-existing codes based on previous research, interview guides, and the research question (Corbin & Strauss, 2015).

An essential component to the analytic process was memo writing. Memo writing extended the researcher’s thought process of the codes. Furthermore, memo writing kept the analytical process moving forward. Memos opened up data exploration, identified and developed themes, made comparisons and asked questions, and explored relationships between codes (Corbin & Strauss, 2015). To help sort through the memos, the researcher created tables as conceptual visualizations. Tables systematically organized the data, showed relationships, and integrated ideas about data (Corbin & Strauss, 2015).

Throughout the entire data collection and analysis research phase, the constant comparative method was applied as a way to identify categories and themes (Corbin & Strauss, 2015). The first rule for applying the constant comparative method is “while coding an incident

for a category, compare it with the previous incidents in the same and different groups coded in the same category” (Glaser & Strauss, 1967, p. 106). Similar data was grouped into a category. Comparisons included “people with other people, people with themselves at different times, incidents with incidents, data with categories, and categories with other categories” (Charmaz, 2000, p. 515). Throughout this process, the researcher examined the middle school science teachers’ perspectives on their professional learning as they implemented the CCGPS for literacy in science.

Description of Analysis

Before the analysis began, the researcher disaggregated the data into the beginning of the study and the end of the study. The beginning of the study represented data collected in January and February 2015, whereas the end of the study data reflected data collected in March and April 2015. The purpose for dividing the data into the beginning and the end of the study was to highlight the nature of temporal change in the participants’ perspectives. The researcher thought the perspectives of the participants might change as the participants endured various stresses throughout the course of the study (e.g., student testing or teacher evaluations). Also, the researcher believed dividing the data into two categories made the data more manageable for analysis. Moreover, analysis occurred throughout data collection (Corbin & Strauss, 2015).

The analytic process began at the commencement of the study data. After each interview, the researcher reviewed observation notes and wrote field notes. Once the interviews were transcribed, the coding process began with a combination of open coding and in-vivo coding (Corbin & Strauss, 2015). During initial coding, the researcher applied gerunds and in-vivo codes to describe data. Gerunds were used as initial codes because they are easy to move and collapse into new codes (Charmaz, 2014). By applying open and in-vivo codes, codes were

developed for the data (Corbin & Strauss, 2015). Incident-by-incident coding technique was used to best explain the data (Corbin & Strauss, 2015). Table 3.3 is a sample of initial coding using open and in-vivo codes for one participant’s interview from the beginning of the study.

Table 3.3

Sample of Initial Coding

Excerpt	Initial Codes
<p>That is a good one. You know what, in my frustration with reading and writing, I should think about it more. Umm, oh man, we had a cool one at the beginning of the school year and I have his resources with me. I just wish I had the time to sit back, I need to make time to sit back and sort of look at some of the things that we learned in that last, in that last professional development. The one we had in the beginning of the school year. It was based on writing. So we did have a good on writing. Honestly, I just have not gone back to look at it. It has been so far from, it just, it just got caught in the shuffle with all the things from the beginning of the school year. I really forgot to go back to look at it.</p>	<ul style="list-style-type: none"> - Admitting frustration with reading and writing - Recalling a writing-related professional learning experience - Wanting more time to look at what they have learned - Recalling a writing-related professional learning experience - Wanting but forgetting to look back at materials - “Caught in the shuffle”

Table 3.3 is a sample of the researcher’s initial coding using open and in-vivo codes.

After initial coding, memos were written as a way to have a conversation with the data (Corbin & Strauss, 2015). Table 3.4 is a sample of a memo the researcher wrote after initial coding.

Table 3.4

Sample of Memo Writing after Initial Coding

<p>Memo – After Initial Coding of Mr. Escalante’s First Interview Date- End of January 2015</p>
<p>The interview was shorter than others because the teacher did not have much time and knew exactly what the study was about. The teacher answered every question directly and related everything to the CCGPS for literacy in science. Each question and answer addressed some part of their professional learning related to formal or informal learning. Lastly, the teacher addressed their needs. I think the interview process was a nice reflection for the teacher.</p>

I found it a little surprising that the teacher will do whatever the district asks and implement any strategy. Why does the teacher never push back? The teacher does seem to like the PALS reading strategy. I remember the conversation I had with the teacher previously about really liking this strategy during a science meeting.

Recall the meeting about them talking about separating the literacy data in their benchmark tests, but they decided not to. This teacher really wanted to do it.

Recall the meeting where they went over the school improvement plan and the teacher asked everyone if they used the strategies. All of them discussed collecting data for the upcoming district review. They had a difficult time remembering exactly what each strategy was.

Table 3.4 represents a sample of the researcher's memos after initial coding. The memo included the researcher's thoughts and how the researcher connected the participant's comments during other aspects of data collection.

The last step for the initial phase of analysis was applying the constant comparative method, which is comparing similarities and differences, relationships, and links between the interviews and other sources of data (Corbin & Strauss, 2015). For example, each participant discussed a professional learning experience surrounding a reading strategy called PALS Reading. Each participant mentioned how much they implemented and valued the strategy. All participants believed the strategy was beneficial but talked about their hesitations to implement the strategy at first.

After the initial phase of analysis, the researcher applied priori codes for focused coding purposes (Corbin & Strauss, 2015). Focused coding was a way to go through a large amount of data in a more analytical way and further reduce the data (Charmaz, 2006). The priori codes applied for focused coding were:

- (1) Teachers' Formal and Informal Literacy-Related Professional Learning Experiences,
- (2) Teachers' Formal and Informal Professional Learning Experiences,

(3) Teachers Engagement with High-Quality Characteristics of Literacy-Related Professional Learning,

(4) Teachers’ Identified/Perceived Literacy-Related Professional Learning Needs, and

(5) Teachers’ Identified/Perceived Professional Learning Needs.

The priori codes became the categories to house each code for each interview (Corbin & Strauss, 2015). This process was done for both the beginning of the study and the end of the study data.

The researcher then combined both data sets.

After the focused coding process and combining both sets of data, the researcher created tables for each category to apply the constant comparative method again (Corbin & Strauss, 2015). This was the final stage of analysis. Tables enabled the researcher to compare what each participant said within each category throughout the entire study. Table 3.5 represents a sample of a table created for the participants’ perceived and/or identified professional learning needs.

Table 3.5

Sample of Table for Participants Perceived and/or Identified Needs

	Escalante	Keating	Frizzle	Norbury	Shoop
Identified PL Literacy Need	More reading strategies and how to write constructive responses	Lots of reading, vocabulary and writing strategies. It’s “like a kid in candy store”.	Finding leveled reading materials	Speaking and listening.	Reading strategies, writing constructive responses and debate lessons
Perceived PL Literacy Need	Vocabulary, and addressing speaking and listening standards	Addressing speaking and listening standards	Science-specific writing. Speaking and listening standards	Writing constructive responses	Breaking down literacy standards
Comments	Recalls certain training, but not specifics. Wants a	Mentions never having vocab training. Wants grade	Says CCSS is not them, but pays attention to Next Gen.	Wants PL to be specific to science and students.	Cannot name standards. Does not acknowledge

	coach to teach writing lesson	level strategies	Says is very comfortable with literacy	Must see it demonstrated	literacy standards.
Identified PL Need	Specific grade level PL and field trips	Differentiation strategies	Content knowledge	N/A	Differentiation, technology to assess students
Perceived PL Need	Creating positive class environment for students to take chances	Technology to assess students' learning	Technology to assess students	Next Gen science skills	N/A
Comments	Feels administrative work gets in way. Feels students won't take chances. Does not use suggestion box	Pays attention to PL if it is hands-on. Does not use suggestion box	Gets frustrated when presented with too many strategies. Uses suggestion box	Needs time to digest what was learned. Does not use suggestion box. Ignores Next Gen because it is not standards	Had difficulty recalling much. Does not use suggestion box. Wants demonstrations videotaped.

Table 3.5 illustrated a portion of a table the researcher created in Microsoft Excel. In Microsoft Excel, the researcher provided more detail for each category, included some in-vivo codes, and researcher notes.

After the tables were constructed in Microsoft Excel, the researcher wrote more detailed memos. Memos helped the researcher form themes by utilizing the constant comparative method. The researcher continually wrote memos about each category to compare similarities and differences in the participants' comments. Memos helped collapse the data into themes. After the researcher uncovered the themes of the study, the researcher presented the findings to the participants as a way to member check and establish trustworthiness (Kaplan & Maxwell, 2005).

Trustworthiness

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. This study was a qualitative case study; therefore, it was essential to establish trustworthiness (Merriam, 2001). Establishing trustworthiness helps convince others that the findings are worth paying attention to (Guba & Lincoln, 1994; Patton, 2002). Trustworthiness was essential to assessing the value of this study. To help strengthen the findings and to help assist in establishing trustworthiness, the researcher identified the validity, reliability, and generalizability of the study (Guba & Lincoln, 1994).

Validity

All researchers are concerned with producing valid and reliable research in an ethical manner (Merriam, 2001). The triangulation of data established an understanding that the findings were from more than one piece of data (Bogdan & Biklan, 2003). Triangulation increased the overall validity of the case study (Yin, 2003). In this study, the researcher collected data from various sources, which included:

- (1) Transcriptions from two semi-structured interviews with each participant, totaling 10 individual interviews. Interviews lasted about 45 minutes each. Interviews were conducted at the beginning of the study and at the end of the study.
- (2) Observation notes from 14 science meetings. All meetings lasted roughly an hour.
- (3) Artifacts collected throughout the research, including agendas and minutes from meetings, local school and district initiative plans, weekly school calendars, and district-wide calendars.
- (4) Field notes were taken before, during, and after all interviews and observations.

To further validate the findings, member checking was used. The researcher's presence and reflexivity influenced the validity of this study. Reflexivity refers to the experiences, values, and biases that the researcher brought to the study (Hammersley & Atkinson, 2007). Therefore, member checking was vital to establish validity. Member checking is considered "the single most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do" (Kaplan & Maxwell, 2005, p. 111). Each participant was given the opportunity to clarify or correct the researcher's interpretations of the data collected.

Reliability

Patton (2002) claimed reliability is a consequence of the validity of the study. Guba and Lincoln (1994) agreed, stating that "Since there can be no validity without reliability, a demonstration of [validity] is sufficient to establish [reliability]" (p. 316). Reliability was established during the data collection phase by using developed interview guides and an observation protocol. The guides and protocol allowed the steps of the data collection procedures to be repeated (Yin, 2009). Also, multiple data sources were acquired to ensure consistency in the data. By interviewing five science teachers at Groveton Middle School, the data gathered helped establish reliable findings. During the interviews, the researcher asked open-ended questions. This way the participants did not give one particular response (Kvale and Brinkmann, 2009). Also, member checking established accuracy and clarity in the findings.

Generalizability

Generalizability depended on whether or not the findings can be applied to a larger population. This study's generalizability was limited by the use of a small, purposeful sample size (Yin, 2009). This study did not attempt to make broad generalized statements about teachers' perspectives. Rather, the purpose was to gather data to uncover themes from the

participants in this perspective-seeking study. Through careful analysis, findings about middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science were uncovered.

Limitations of the Study

The study was limited by the number of science teachers who participated in the study. While 10 science teachers were recruited, only five science teachers participated in the study. Therefore, only a small portion of the Groveton Middle School's faculty shared their perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Chapter Summary

A case study approach was used to examine five teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science at Groveton Middle School. The teachers participated in one-on-one interviews with the researcher and agreed to participant observations during their science meetings. Additionally, the researcher collected artifacts from the observations. The participants were asked to share their personal opinions and experiences with regard to their formal and informal professional learning experiences. Groveton Middle School's principal suggested 10 science teachers for participation but only five volunteered for all data collection activities. The participants were specifically chosen because of their accessibility to the researcher. Their accessibility allowed flexibility when scheduling interviews and observations. Throughout the study, the researcher took the necessary measures to establish trustworthiness, validity, and reliability.

This study used qualitative research methods. Data were collected from the five participants during one-on-one interviews, participant observations, and a collection of artifacts. Additionally, the researcher wrote descriptive field notes. Field notes were taken before, during, and after all interviews and observations. Interviews were audio-recorded and were transcribed immediately. The constant comparative method was applied throughout data analysis to determine themes. The study began in January 2015 and concluded April 2015. The review of literature, data collection, and data analysis occurred during this timeframe.

CHAPTER 4

FINDINGS

Educational reform policies and middle grades education have increasingly targeted teacher professional learning as an integral part to improve student achievement (Bickmore, 2013). Researchers, reformers, and policymakers consider professional learning as the key to change teacher practice and support reform initiatives aimed at enhancing student achievement (Borko, 2004; Darling-Hammond, LaPointe, Meyerson, Orr, & Cohen, 2007). For science standards-based reform, professional learning is identified as a crucial component for implementation in Georgia (Ewing, 2010; Kober & Retner, 2012). For high-quality teacher professional learning to take place, it needs to be continuous and related to teachers' content area (Zepeda, 2012). If the professional learning opportunities offered do not include ongoing support, it is considered "educational malpractice" (Sparks, 2013, para. 2). To find more definitive connections between teacher professional learning and student achievement, research needs to focus on the types of professional learning in which teachers engage (Zepeda, 2015). The logical way to understand the types of professional learning in which teachers engage is to examine a collection of teachers' professional learning experiences (Desimone, 2009).

The chapter begins by introducing the reader to the purpose of the study and an explanation of the analysis. This is followed by the context of the study, more specifically the context of the school district, the school, and the participants of the study. Individual profiles of the participants are not provided for confidentiality purposes. Next, the chapter includes the teachers' perspectives on their professional learning as they implemented the Common Core

Georgia Performance Standards (CCGPS) for literacy in science. The participants' perspectives are explained from the beginning of the study and the end of the study to highlight the nature of temporal change in their perspectives. The nature of temporal change is emphasized because teachers' perspectives can change possibly during different times of the school year. For example, teachers might be more stressed during state testing, so their perspectives might be more negative. The participants' perspectives derived from interviews, participant observations, and artifacts related to the research question. After individual perspectives from the beginning and the end of the study are described, the themes from the group are discussed. The chapter ends with the summary of the findings.

Purpose of the Study

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The scope of this study was focused on middle school science teachers.

The overall research question was

- (1) What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

The participants in this study included five science teachers who agreed to participate from a middle school in North Georgia. Participant observations and interviews for the study began in January 2015 and concluded in April 2015. Through one-on-one interviews, participant observations of meetings, field notes, and collection of artifacts, the data uncovered the teachers' perspectives on their professional learning as they implemented the CCGPS of literacy in

science. Participants were interviewed twice, once at the beginning of the study and again at the end of the study for approximately 45 minutes each.

The interview transcripts were coded, memos were written, and tables were created. Patterns emerged and categories were determined from the perspective of each participant in relation to their professional learning experiences as they implemented the CCGPS for literacy in science. The constant comparative method was used throughout data collection and data analysis. Categories were compared and themes were developed.

To begin the analysis process, the researcher disaggregated the data into two parts—the beginning of the study and the end of the study. Dividing the data into sections made the data more manageable and showed how perspectives can change over time. Once the data was divided, open-coding using gerunds was applied to document initial thoughts in the margins of each transcript. Next, memos were written and used to collapse initial codes. Then, the constant comparative method was carried out.

A second review of the transcripts was conducted and priori codes were applied to create larger data chunks associated with the research question and the related literature. Again, memos were written and used to create categories. Again, the constant comparative method was carried out. This was done with both sets of data, and then data was combined.

Because each interview included similar questions, categories emerged more clearly across all of the interviews. Tables were constructed for each category to carry out the constant comparative method again. Memos were written and themes were developed. To further validate the findings, artifacts and field notes were used in the analysis of the data. Additionally, member checking was applied with each participant as needed.

Context of the Study

During the time of the presented study, 2014-2015, Georgia's macro-level educational decisions surrounding high-quality science standards were convoluted. To provide some background information, macro-level educational decisions were made to adopt the Georgia Performance Standards (GPS) in 2004 (Georgia Department of Education, 2015b). The GPS for Science are content standards. In order to implement Georgia's reform plan in 2010, Georgia infused the Common Core State Standards with the GPS, creating the Common Core Georgia Performance Standards (CCGPS) (Georgia Department of Education, 2015c). The CCGPS became the science-related literacy standards. A few years later, in 2014, Georgia politicians and state legislators spoke out against the CCGPS. The Senate passed a bill to abolish the CCGPS, but the House Education Committee voted the bill down (Jones, 2014; Georgia Association of Education, 2015).

To make matters more complicated, in 2011, Georgia considered adopting the Next Generation Science Standards (Next Gen) and planned to implement the Next Gen in the school year of 2015-2016 (Dalton, 2014). But in January 2015, State School Superintendent Richard Woods was quoted as saying he thought Georgia should create its own high-quality science standards (Dalton, 2015). The following month, February 2015, the Georgia Science Teachers Association (GSTA) held a conference focused on implementing strategies for the Next Gen (GSTA, 2015). For the purpose of this study, in January 2015 to April 2015, the GPS and CCGPS were being implemented, not the Next Gen. The GPS for Science were the content standards, and the CCGPS for literacy in science addressed content-related reading, writing, speaking and listening, and language. The Next Gen was still being discussed at the macro- and micro-levels in Georgia.

Beal County Public Schools District

The study was located in Beal County Public Schools District (BCPSD) in North Georgia. At the time of this study, the BCPSD served nearly 15,000 diverse students in about 25 schools and had a variety of unique programs due to a strong community and partnerships with business leaders. The BCPSD put a strong emphasis on technology and strived to provide every student a district provided digital device. Over 60% of the teachers had advanced degrees and over 250 teachers were certified in gifted education. There were nearly 20 National Board Certified Teachers and 10 Georgia Master Teachers.

Groveton Middle School

The research site for this study was at Groveton Middle School in Beal County Public Schools District (BCPSD). At the time of this study, Groveton Middle School was a small-urban school serving grades 6 through 8 with a population of nearly 700 students. The demographics of the students were roughly 5% Asian, 60% African American, 10% Hispanic, 20% White, and 5% Multi-racial—all similar to the BCPSD's demographics. The free and reduced lunch rate was about 80%, qualifying Groveton Middle School as a Title I school. Nearly 25% of students at Groveton Middle School were in the gifted education program and about 15% received special education services. There were nearly 65 teachers at Groveton Middle School and about 45 of them had advanced degrees. The average years of teaching experience was roughly 15 years. Groveton Middle School included specialists in music, physical education, agri-science, art, gifted education, foreign languages, English to Speakers of Other Languages, and special education.

Participants

The principal of Groveton Middle School suggested that 10 science teachers to participate in the study. Only half of the suggested science teachers were able to partake in all data collection activities. Therefore, the researcher decided to concentrate on five science teachers to strengthen the case study. The five participants combined for more than 40 years of experience teaching science and 30 years of teaching at Groveton Middle School. Four out of the five participants had advanced degrees. All participants were considered veteran teachers at Groveton Middle School and in Beal County Public Schools District (BCPSD).

For confidentiality purposes, the researcher decided to give the participants pseudonyms—Ms. Frizzle, Mr. Escalante, Mr. Keating, Mr. Shoop, and Ms. Norbury. Pseudonyms protected the identity of the participants, which was a concern of theirs. Ms. Norbury’s response summed up this feeling after confirming an answer about the BCPSD, “Yes [laughed nervously]. Do not put my name with this.” The participants understood that school administration and district leaders would likely read this report; therefore, the researcher wanted to protect their identities as much as possible.

In the next section, the teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science are shared from the beginning of the study and the end of the study. The purpose for dividing their perspectives into the beginning of the study and the end of the study is to highlight the nature of temporal change in the participants’ perspectives. After the individual perspectives are presented, the themes that emerged across the group are discussed. The chapter ends with a summary of the findings.

Beginning of the Study Perspectives

For this study, perspective is defined as a first-person viewpoint that includes how individuals view “themselves, their understandings, their practices, and the settings in which” (Kemmis & McTaggart, 2000, p. 590) they are present. The participants’ viewpoints are “shaped by [their] values, intentions, and judgements” (p. 576). The purpose of this study was to examine science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. One research question guided this study: What are Georgia middle school science teachers’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

From analyzing the data collected during each individual interview, participant observations, field notes, and the collection of artifacts from the beginning of the study, various perspectives emerged. Mainly, the interview data is discussed. The other forms of data collection corroborated the findings. At the beginning of this study, the participants’ perspectives on their professional learning as they implemented the CCGPS in literacy in science varied in similarities and differences.

The study began in January 2015, shortly after winter break. In the researcher’s experience, winter break provided a time for teachers to reflect on their first semester and a chance to get away from the daily grind of the teaching profession. Most likely, teachers came back from winter break rejuvenated and optimistic about the second half of the school year. According to informal discussions with the participants, the first day back for teachers at Groveton Middle School was a time to re-organize their classrooms, collaborate with colleagues, and get ready for the students to return to school. More importantly, for the purpose of this study,

this marked the time when teachers attended professional learning activities and meetings to refresh their memories about the professional learning they had received throughout the school year thus far.

All of the first interviews began with the participants discussing their formal professional learning experiences that were provided at the micro-level (school district and school). Many of the participants were fully aware of the purpose of this study and discussed professional learning related to literacy practices immediately. In addition to discussing their formal professional learning experiences, the participants talked about their informal professional learning activities. The Common Core Georgia Performance Standards (CCGPS) for literacy in science was the focal point; therefore, participants conversed about the implementation process as well. Lastly, the types of professional learning the participants valued most and least, and their identified professional learning needs were discussed. The full interview guide for the first round of interviews is found in Appendix A.

For clarity purposes, the presentation of findings from the beginning of the study addressed the components of the CCGPS for literacy in science—reading, writing, speaking and listening, and language. Within the participants’ professional learning experiences with the components of the CCGPS for literacy, the participants’ perspectives from the beginning of the study are revealed.

Ms. Frizzle

The first interview with Ms. Frizzle occurred in early January after school in the classroom next to hers. Her classroom was occupied by students staying after school for a tutoring program. Even after a long day, Ms. Frizzle was more than willing to be interviewed about her perspectives about professional learning as she implemented the Common Core

Georgia Performance Standards (CCGPS) for literacy in science. Although Ms. Frizzle volunteered to participate in the study, it was unclear if she was fully cognizant of what the study was about at first. Furthermore, the researcher had only observed one meeting before this interview; therefore, some of the researcher's questions addressed professional learning opportunities the teachers received at Groveton Middle School. As a result, much of the conversation with Ms. Frizzle pertained to her perspectives about professional learning as a whole, rather than a complete focus on literacy-related professional learning opportunities. Ms. Frizzle discussed literacy-related professional learning opportunities and what determined these opportunities were shared, as well.

At the beginning of the interview, Ms. Frizzle explained the various ways she and her colleagues received professional learning in the Beal County Public Schools District (BCPSD). She stated,

The district provides professional learning during our pre- and post- planning days and throughout the year as well. Sometimes on teacher workdays, there are professional learning days or like half a day or it will be a professional learning opportunity. And then sometimes we do it throughout the school year during planning periods. We have what we call WOW [Working on the Work] sessions. It is usually on a Tuesday in second planning. And then in our faculty meetings we will actually have some professional learning that takes place over a period of several weeks. We might do a little bit each time we meet and so it accumulates. That is generally how we get our professional learning, unless I do a conference...I am participating in a Teach2Learn Grant, which is funding my attendance to the GSTA, Georgia Science Teachers Association [conference].

According to Ms. Frizzle and professional learning schedules, the majority of Ms. Frizzle's professional learning opportunities were job-embedded. At least once a week, teachers at Groveton Middle School went to a WOW session, which was usually led by an instructional coach. Through informal conversations during participant observations, Ms. Frizzle revealed WOW sessions focused on strategies that were suggested by the teachers or initiatives being implemented at the school. Groveton Middle School teachers filled out surveys about their

professional learning needs. Furthermore, all professional learning resources were put on a Google Drive that all teachers could access.

In regard to the professional learning opportunities provided by Beal County Public Schools District (BCPSD), Ms. Frizzle added that “[BCPSD] provides professional learning based on new things being passed in legislation like TKES.” TKES is the Teacher Keys Effectiveness System, which is a teacher accountability system in Georgia (Georgia Department of Education, 2015f). Furthermore, she talked about how a lot of her professional learning opportunities were determined by student data and the school improvement plan. Ms. Frizzle claimed the district science coach was responsible for providing the science teachers with this information. She declared,

[The science coach] basically funnels information, reiterates what is coming down, you know, what is being introduced to the legislature, what does the Next Generation Standards look like, how is that going to impact us in the classroom, you know, as far as our standards go or the way that we teach. In the case with the Next Generation Science Standards, it is not so much impacting our standards, it is impacting our approach and how we introduce or how we teach the concepts to the students, not actually changing the concepts.

State legislation or educational policies were mentioned a few times by Ms. Frizzle. Her discussion about state educational policies highlighted the impact macro-level educational decisions have on micro-level educational decisions (Johnson, 2013). Additionally, she discussed other initiatives like the use of technology at Groveton Middle School. Ms. Frizzle concluded with saying the district has “pressure coming down on them from the state. So you know, that all kind of trickles down to us.” Ms. Frizzle showed great gratitude for the science coach and how the science coach helped eliminate a lot of confusion.

As the interview shifted focus to standards, Ms. Frizzle discussed the Next Generation Science Standards (Next Gen) and how Georgia considered adopting the Next Gen at the macro-

level (state). She pointed out that the Next Gen does not change the standards, but it does change her approach to instruction. Ms. Frizzle mentioned examples of Next Gen instructional practices such as C.E.R. (Cite, Explain, and Reasoning) Framework. After she talked about the Next Gen, the researcher asked about the Common Core State Standards. Ms. Frizzle admitted,

The Common Core really doesn't affect science. The Next Generation Science Standards is kind of like our version of the Common Core. So I do not get to sit in on any of the professional learning concerning the Common Core. I hear about it, like in other meetings if we have whole group, like faculty meetings. You know, I hear it mentioned. I hear the other teachers talking about it. I am familiar with it, but it doesn't affect my content.

She later corrected herself when asked specifically about the Common Core Georgia Performance Standards (CCGPS) for literacy in science standards. She added,

I forgot about that. Yea. The literacy, well the literacy has always been a part [of science instruction]. That is really nothing new. But, yes there is a big focus on literacy in all of the content areas. That is definitely something that we focus on. That is also something we do in our trainings, not only district, but also something we do in school. We work on reading, incorporating reading strategies into our content areas through our instructional support specialist. They will do in-house trainings for us.

According to Ms. Frizzle, literacy instruction in her science classroom is nothing new.

Next, the conversation turned to the literacy standards and the in-house professional learning she received. Ms. Frizzle began with the two strategies Groveton Middle School's faculty was introduced to at the beginning of the school year, PALS Reading and Magnet Summaries. She explained both,

PALS [Reading] is more like a paired reading [strategy]. It is when one student reads to another student and then that student explains to that student what they thought they read. And then they reverse it. The second student now re-reads the same passage and the other reiterates to them what they think it means to them and they go back and forth throughout the passage. It can be a text passage, it can be an article, but that is a literary strategy that is supposed to increase reading comprehension. And we have used that in science already several times. There is another one called Magnet Summaries where they take your big word like periodic table. And then you come up with different words that relate to it, okay, so it can be families, it can be electrons, it can be protons. You come up with other words that support the big word, the magnet word....And then they write a summary

describing the word in the middle, but using all of the words around it and that is called a Magnet Summary.

Ms. Frizzle fully understood each strategy. She claimed to implement these strategies in her classroom. At first, she was concerned PALS Reading might be too “elementary” for her students, but now she thinks her students enjoy it. Ms. Frizzle believed PALS Reading and Magnet Summaries improved student achievement but did not think one strategy could be given all the credit for improvement. She thought it was a combination of all the literacy strategies she implemented.

Later, the interview shifted to writing-related professional learning activities. She recalled a professional learning activity before the school year started. Here is what she said about the professional learning activity and how she implemented it:

I don't use the strategy in the whole format like how he [the professional learning instructor] taught us. He taught us how to write a complete paper or essay or whatever. We don't do that long of writing in science, but I use different parts of that. I have tried to incorporate different parts like how to develop a good paragraph, things like that.

Ms. Frizzle refined the strategy, which is 4B on the Concerns-Based Adoption Model Levels of Use scale, which is refining the instructional strategy (Hord et al., 1987).

Ms. Frizzle continued to discuss her writing instruction. For daily warm-ups, she claimed to have her students answer questions in complete sentences. She claimed to talk to her colleagues about the strategies they used and how they modified their writing rubrics. Ms. Frizzle claimed to rely on English language arts (ELA) teachers for her writing instruction. Because of her discussions with ELA teachers, Ms. Frizzle felt confident in teaching writing skills.

In regard to vocabulary-related professional learning activities and instruction, Ms. Frizzle thought most of the science teachers at Groveton Middle School used TIP (Term,

Information, and Picture) charts. Instead of using TIP charts, Ms. Frizzle implemented a strategy she learned at a previous conference. The strategy she learned is called POST. She explained,

POST is picture, observation, scientific definition, and term. It kind of works its way backwards. So a picture is based on an experience, so after the students have done the lab or experience, or exploratory situation that they are involved in, or maybe it is a picture because we showed them a video, they can draw a picture of what they saw happen and write an observation. Then we tell them what that word is. Then they have to use their resources to write their scientific definition. They could use what they have learned from their observations, you know to come up with their own scientific definition or they can use a resource, you know to get that definition...POST makes it more exploratory.

During a participant observation, Ms. Frizzle explained this method and provided examples to some of her fellow science teachers. She claimed using POST for each vocabulary word in a unit. She includes this strategy within the 5 E model, which she explained learning during a Next Gen professional learning activity provided by the district science coach. Here Ms. Frizzle explained the 5 E model:

We do something called a 5 E model, where we introduce a new concept to a student by letting them engage in an experiment lab and let them explore before they have even done any of the vocabulary. Maybe even before they read about it. This can be the very first thing they do in a new unit. So that is a little different than in the past. Traditionally, you introduce a concept, you do all the vocabulary words, you do all of the work up front then you get to do the labs. One of the concepts behind the Next Generation is that we let the kids explore and discover on their own.

Ms. Frizzle claimed to align her instruction with both the Next Gen and CCGPS for literacy in science.

Ms. Frizzle appeared quite comfortable with teaching literacy skills in her classroom.

When asked about her specific professional learning needs, Ms. Frizzles identified content knowledge as a concern. She declared,

I would like to have more content-based, which is why I love going to the conferences because I have an opportunity there to choose and then I can get something that is more content-based and not pedagogy.... I would feel better as a teacher, I feel more confident when I am strong in my content. In middle grades [we] are kind of right there in middle, you know, where we are, we teach these concepts and in some cases at a high level....Yet

a lot of middle school teachers do not have a lot of content background. A lot of the undergrad work and even for me with my master's degree, I took nine hours of science classes. Three science classes out of 36 semester hours, 9 [hours] were in a science class. The rest was just a repeat of what I did in my undergrad. Basically that is what it was with the exception of the 6 hours I did in social studies because my masters is in middle grades education with a concentration in science and social studies. So that concentration I amounted to 9 semester hours in science and 6 in social studies. So, I would like to have a hardcore content [professional learning opportunity].

Professional learning activities related to content knowledge are considered an essential component for science-related literacy instruction (Brown & Ryoo, 2008). Earlier in the interview, Ms. Frizzle mentioned that the science coach offered help based on requests by individual teachers. Ms. Frizzle believed content knowledge was “the one thing we don't get enough of.” To satisfy her content knowledge, Ms. Frizzle searches the Web and talks to a family member who is a scientist.

Throughout the first half of this study, Ms. Frizzle talked about how happy she was with the professional learning opportunities she received, but noted that sometimes it could be a bit overwhelming. Ms. Frizzle reported, “I think the [BCPSD] is doing a good job at providing professional learning and responding to the requests and needs of the teachers, but sometimes I almost think they are overkill.” Ms. Frizzle thought Groveton Middle School was implementing too many initiatives simultaneously. She believed the technology initiative provided too many strategies, which led to some frustration. A lot of the frustration stemmed from how much time she spent in meetings. She jokingly stated, “Sometimes I think it is too much (laughs) because it seems that is all you do. You know, I want to do a little work in my room, like organize and get things ready.” Right after this statement, Ms. Frizzled mentioned how BCPSD has done a lot better job of supporting their teachers the last couple years.

In short, Ms. Frizzle was pleased with all of the professional learning she was receiving while implementing the Common Core Georgia Performance Standards (CCGPS) for literacy in

science. She believed many of her professional learning activities were determined by what initiatives and programs Georgia and the BCPSD adopted. She thought BCPSD was “probably trying to figure out that balance of professional learning” to implement all of the initiatives. She appeared to have mixed feelings about the literacy strategies being implemented and refined them a bit, but she had an overall understanding of the strategies. Ultimately, Ms. Frizzle wished she had more content-based professional learning opportunities and more time because “time is our enemy as teachers.”

Mr. Escalante

Mr. Escalante’s first interview happened on a freezing day in mid-January during his second planning period. His classroom had two space heaters blasting and was lined with lab tables and student work. Mr. Escalante picked the time and day for the interview. During the interview, Mr. Escalante flipped through student work. It appeared he was reviewing how well students had done on a previous assessment. The study began a few weeks prior to the interview and Mr. Escalante was always interested and forthcoming throughout the study. Frequently, Mr. Escalante asked questions about the purpose of the study.

As the interview began, Mr. Escalante jumped right into his reading-related professional learning experiences and instruction. He shared,

I teach based on what I learned in the past, but the one I use right now is PALS Reading.... I think it really works and the kids enjoy it.... Honestly, it depends on how you deliver it to the students, you know. You have to have a positive outlook. I try to add something to it to make it more exciting.... The professional learning activity was lecture based, but I think I have the handouts they gave us to give you an example of how it looks in the classroom.... They mention PALS a lot in our meetings. It is constantly brought up in our data team meetings.... We use that the most, but the district only looks at the data during the Impact check, not whether we are teaching [the strategy].

Mr. Escalante felt that PALS Reading was a valuable strategy. Furthermore, he understood the district wanted to see it implemented in his classroom. PALS Reading was mentioned in many of

the meetings observed. Whenever PALS Reading was discussed with Mr. Escalante, he talked positively about the strategy. Additionally, he discussed refining PALS Reading to best suit his students. PALS Reading appeared to have many characteristics of effective professional learning (Learning Forward, 2015a).

After discussing PALS Reading, the interview turned quickly to writing-related professional learning experiences and instruction. Mr. Escalante was not as informed about the writing strategies as he was the reading ones. He was unable to recall specifics about his training. Mr. Escalante explained,

Hmm. Writing. I don't know. I try to help them make complete sentences because they struggle with that the most. So, I try to get them to start sentences with a subject. I review that a lot.... I ask English language arts teachers a lot of question and they assist me. Also, I will look things up on the Internet.... You know what? We had a professional learning at the beginning of the school year that was based on writing. It was a good one and I will have to go back and look at it. It was one of those things where the strategies are good, but not efficient in terms of what they want us to do in addition to the initiatives. We have to be on the curriculum and stay up with the pacing guide.... I just have not set out the time to implement it in the classroom like I need to or like I want to. I've just been grabbing the stuff that is the most important and go with it. There are some things you plan on doing, but it gets caught in the shuffle. I need to be more purposeful in assisting them in how to write.

Mr. Escalante was concerned with his students' writing and grammar but possibly lacked the tools and strategies to meet his students' needs (Murnane, Sawhill, & Snow, 2012). On his chalkboard, he posted the various forms of the verb "to be." According to the documents collected, the professional learning activity Mr. Escalante struggled to recall was Writing to Command Attention, which was an all-day activity during pre-planning (before the school year started). During informal conversations, Writing to Command Attention was explained as a writing strategy that emphasized writing hooks, using dialogue, and citing specific content to engage readers.

Similarly to his thoughts about the writing strategy, Mr. Escalante thought the suggested vocabulary strategy was quite time-consuming as well. When discussing vocabulary instruction, Mr. Escalante commented, “We do the key words during reading a chapter, but it takes up so much time. There is just so much content. We emphasize certain terms, but focus on the things they are having the hardest time with.” Next, Mr. Escalante talked about his vocabulary-related professional learning experiences,

I have been to several vocabulary seminars though. I can’t think of this one strategy this one guy used, but it was sort of a fun way of doing vocabulary. It just took a long time. It wasn’t efficient for a whole vocabulary list for one unit, but was good for one or two words. It was something like TIP [term, information, and picture] charts or the 4 square strategy.

Again, Mr. Escalante had difficulty recalling his formal professional learning and relied on prior knowledge. Time (or lack thereof) seemed to be Mr. Escalante’s biggest concern with literacy instruction. Being concerned with time is Stage 3 on the Concerns-Based Adoption Model (Hall & Hord, 2011).

As the interview came to an end, Mr. Escalante discussed his overall classroom instruction and professional learning experiences. Mr. Escalante confessed,

I have to be honest with you, it depends on what the district wants us to implement most at the time and what they are looking for. This is all based on our school improvement plan and I do whatever strategy they think is going to benefit the students the most. That is what we will focus on and then I add what I think is beneficial....These are great questions and this is kind of incriminating, but we get a lot of professional learning. It sort of blends together sometimes. They have given us a lot of training. I just can’t recall it now. With my frustration with reading and writing, I will think about it more. I will have to make the time to go back and look at the materials.

Mr. Escalante gave the impression of being overwhelmed. During meetings, the participants often talked about the strategies the district wanted to see implemented. Most of their discussions were about PALS Reading. According to Mr. Escalante, district initiatives determined his professional learning experiences.

In summary, Mr. Escalante implemented PALS reading in his classroom and enjoyed all of his professional learning experiences. When discussing other literacy skills, Mr. Escalante had difficulty recalling the professional learning experience or the strategy. Often, Mr. Escalante discussed literacy instructional strategies with his colleagues, which is one aspect of job-embedded professional learning (Zepeda, 2015). Teacher discussions about instructional strategies were observed during some planning periods. Mr. Escalante understood the importance of science-literacy skills being taught, but he was concerned about the various other initiatives being implemented and covering content (Bybee, 2014). He did not blame anyone but himself for not reviewing the materials. Although he acknowledged getting a lot professional learning materials, he felt it was his responsibility to review the instructional strategies.

Mr. Keating

The first interview with Mr. Keating transpired in his classroom. He and the researcher sat around his desk. The interview occurred during a planning period toward the end of January. He made sure to clear his schedule, so that there were no distractions during the interview. By this time, the researcher had established rapport with the participants, and Mr. Keating was very aware of the purpose of the study. The interview with Mr. Keating was the shortest, 34 minutes. The reason for the shortened time is unknown. His answers were brief and to the point. Mr. Keating was always an active participant in the observed meetings. During observations, the researcher noticed that Mr. Keating's colleagues relied on his knowledge of differentiated instruction.

Like all of the first round of interviews, the interview with Mr. Keating began with a question about his formal professional learning experiences. Mr. Keating knew the study was about the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Therefore, when he shared his professional learning experiences that are provided by the school and school district, he commented,

Basically, the professional learning experiences that I have had are how to follow and implement the common core strategies that are set forth by the district, breaking down the standards, how to recognize the power standards, implementing different teaching strategies to teach those standards....Basically, training on everything that I need to know to help students to succeed.

Throughout the interview, Mr. Keating raved about how he felt supported by school administration and that all of his professional learning experiences were helpful. At times, he thought some sessions were repetitive but admitted it is nice to have a refresher because “it is helpful to hear that information more than once.” Overall, Mr. Keating was thankful for all professional learning activities offered.

In regard to literacy instructional strategies, Mr. Keating discussed PALS Reading. He stated how the faculty wanted to find a common reading strategy and the strategy was “modeled from the guy who led the all-day training....eight hours.” This day-long literacy-based professional development session is an example of formal learning (Merriam & Bierema, 2014). Mr. Keating was very comfortable with implementing PALS Reading. He appreciated that the strategy allowed for differentiation instruction. Also, he liked PALS Reading because it helped the students “read more fluently and to comprehend what they’re reading.” This is an example of Stages 4 through 6 of Concerns Based Adoption Model (CBAM), which means self and task concerns begin to vanish as the participants see the impact the new practices have on their students’ learning (Hall & Hord, 2011). Mr. Keating thought the success of PALS Reading depended on how it was implemented in classroom. He shared, “I think it works at its best when students are fully engaged...not when students are too noisy or kids are horse playing.” Although, Mr. Keating values PALS reading, he spent time researching other reading strategies online, but

he did not elaborate about implementing the researched strategies. He mentioned wanting more training on other reading strategies.

After discussing the use of PALS Reading in his classroom, the conversation switched to writing and vocabulary-related professional learning and instruction. When discussing his writing-related professional learning experiences, Mr. Keating did not provide many details. He said, “We did do a professional learning in writing also and basically it was a four-hour training if I can recall. Basically, different strategies of writing and how students are supposed to write.” The training he was referring to occurred at the beginning of the year and it was an all-day activity, according to artifacts collected. Mr. Keating vaguely explained implementing the strategy saying, “I do but I modify it to meet individual needs, also.” Mr. Keating did not elaborate on how he modified the writing strategy when asked. The conversation turned to Mr. Keating’s professional learning experiences related to vocabulary instruction. He claimed not to have any experience. He declared, “Not teaching vocabulary, no I haven’t.” His understanding of the writing and vocabulary-related professional learning experiences were minimal.

As for informal professional learning practices, Mr. Keating spends a lot of time researching strategies to help his students. He stated,

I research ways to teach kids in as many ways as possible to master these standards. If one strategy is not working then you use another strategy. Of course, you look to see if that strategy worked. Finding ways to make sure that you implement these strategies correctly....Sometimes we research our own strategies that may help and then if those strategies help then we share those strategies.

Sharing researched strategies was a common practice at Groveton Middle School. The administration allowed time during faculty meetings for teachers to share new strategies or programs they found useful, according to informal discussions the researcher had with the participants.

In short, Mr. Keating really valued all of his professional learning experiences that were offered by Beal County Public Schools District (BCPSD) and Groveton Middle School. Mr. Keating appreciated and fully understood PALS Reading but does not implement the writing strategy. Mr. Keating wants more literacy strategies at his disposal and does spend time searching for research-based strategies. There are times when he thinks professional learning activities are repetitive, but he always finds them helpful and useful.

Mr. Shoop

Mr. Shoop's first interview happened in his classroom during a planning period at the end of January. The interview lasted about 45 minutes. His classroom was cozy and had student work hung up on the walls. During the interview, Mr. Shoop appeared to be very comfortable with being interviewed about his perspectives. Although he appeared to be comfortable, he was unable to recall many specific details in regard to his literacy-related professional learning activities.

The interview began with Mr. Shoop explaining job-embedded professional learning. He stated, "We will have two or three WOW sessions a week. Sometimes every other week, but we do have them often for a variety of different methods and strategies for teaching instruction." He explained how most of the job-embedded professional learning was about technology. Mr. Shoop credited professional learning activities and WOW sessions for most of his teaching knowledge. He claimed, "Ninety-nine percent of what I have learned has either been a WOW session or some kind of like formal professional learning." Also, he credited learning a lot from having conversations with colleagues. He remarked, "You can walk down the hall and a teacher talks to you and you learn something. I feel like I get a lot from them." During observations, Mr. Shoop had open dialogue about what he was teaching with colleagues.

After praising his job-embedded professional learning experiences, Mr. Shoop became critical of the sessions. He reported,

Most of the meetings that I go to, I feel like there is time wasted. I am not a negative person, but I do think there is time wasted. People are not focused or there [are] too many people talking at one time. And most of the time I leave meetings, whether it is a WOW session or faculty meeting, I just leave with all of these different things going on in my head. It is hard for me to kind of separate them and focus on, you know, the important things.

Although, Mr. Shoop valued WOW sessions, he sometimes found them to be a waste of time and distracting. He felt WOW sessions were not always relevant because they were learning something he already knew. During WOW sessions, Mr. Shoop claimed inconsistency with the strategies they were asked to implement. When asked to provide an example, Mr. Shoop was unable to do so.

Later, the interview shifted to literacy-related professional learning experiences and practices Mr. Shoop implemented in his classroom. He acknowledged his professional learning on PALS Reading and Coded Reading. Mr. Shoop claimed implementing both strategies but by refining them a bit. He was unable to recall the specific professional learning experience. As for his writing-related professional learning experience, Mr. Shoop was unable to explain that experience as well. He commented, “One of the components of some of the professional learning we have had, I can’t tell you specifically, but we were in the meeting for that all day.” It is unclear if Mr. Shoop implemented the writing strategy, but he claimed to have his students write open-ended responses. For vocabulary, Mr. Shoop did not implement a specific strategy. He stated,

I mean games are fun, and I am not saying we don't do that, but we will play games to teach vocabulary or some strategy but I can't even think of them. For me, it is to just best to use those terms in class, in the hallway, at lunch. You know, when we speak to our kids, I don't want my kids to just think this is just a big fancy science word, a big scary vocabulary word. I just use it when we speak and I think naturally it just sticks.

Mr. Shoop was not concerned about implementing specific literacy instructional strategies taught during the professional learning sessions. Perhaps, this is an example of Stage 0 of the Concerns-Based Adoption Model (CBAM) (Hall & Hord, 2011), which is not being interested in implementing the instructional strategy.

In regard to literacy standards, the Common Core Georgia Performance Standards (CCGPS) for literacy in science, Mr. Shoop confessed,

Ah, to be blatantly honest I really just don't think about those things. I just come into the room and I know what the kids need to know. I know what the standards that they need to know and I try, I just teach those to the best of my ability. I try to focus on starting on the low end on the Bloom's and build on that and in the end if I taught well, then every kid that I have can articulate what we have learned at a high level.

During observations, Mr. Shoop never appeared to be stressed about what was being asked of him. Possibly, this is because his perspective on teaching was “I just feel like teaching is teaching. It is just a natural thing.”

When discussing informal professional learning practices, Mr. Shoop discussed surfing the Internet. Searching the Internet is something that Mr. Shoop claimed to be important for teachers. He stated,

I think like most teachers, I am always Googling. I am looking for lessons and thinking about how to tweak a lesson and always thinking about how the lesson went...I don't know, it is just part of your life. You just constantly think about how you can do better.

Mr. Shoop strives to improve lessons by researching strategies online. He discussed how this was part of his reflection process after a lesson or unit. When he thinks a lesson went poorly, he will reteach. If he thinks that strategy helped, he will make a note in his lesson plans.

To summarize, Mr. Shoop appreciated all of the professional learning he received and is “always hip to go and learn,” but at times thought it was a waste of time when his colleagues were not on task. He appeared to be a go-with-the-flow type person. Mr. Shoop had a difficult

time recalling specific literacy-related professional learning activities but credits professional learning for most of his teaching knowledge. He mentioned wanting more input on his literacy-related professional learning opportunities but was unable to articulate his opinions. He commented jokingly to a question about his professional learning needs. Mr. Shoop said, “I don't know because I feel like if I knew then I wouldn't need help. That is kind of a smart aleck way of answering, but I just don't know.” He admitted this is a reason the administration does not ask him for suggestions. Mr. Shoop recognized he could make professional learning recommendations in a suggestion box.

Ms. Norbury

Ms. Norbury's interview was the last of the first round interviews. It occurred at the beginning of February. At this point in the study, the researcher observed several meetings and had several informal conversations with the participants. The interview took place in her classroom around a table. In her classroom, instructional materials lined the back of the room. Ms. Norbury enjoyed joking around with the researcher and was always willing to share her perspectives about various topics.

Before the interview began, the researcher shared what type of questions were going to be asked. Ms. Norbury knew what the study was about but joked about being nervous about the interview. It did not take long for her to get comfortable. Like all of the interviews, the first question pertained to her professional learning experiences. Ms. Norbury began by saying, “They give us professional learning on a variety of things. My personal opinion is that a lot of them are great ideas. So we get a lot of different trainings on a variety of things.” After acknowledging that there are many job-embedded professional learning opportunities, Ms. Norbury became quite critical. She was not shy about sharing her professional learning needs.

She started by criticizing how her professional learning topics changed too quickly and that there was little time to absorb the information. Ms. Norbury admitted,

The WOW session, that's what we call them. It's usually a class period, [but] I don't learn well that quickly. You know what I mean? Like when I'm teaching, I can't just tell [students] one topic that one class period and assume they know it and I kind of work the same way.

Ms. Norbury was concerned with the amount of time she was given to implement a strategy before learning a new one. She continued,

Having the opportunities to learn new things is great, but at the same time there is only so much that I can hold in one period of time. I need to digest it. I need time to implement. I need time to understand it. I don't know if that makes me, inappropriate to be a teacher or if that makes me stupid which sometimes I feel that way. I don't know, it's just too much. It is too much. There is too much being thrown at me at once.

Ms. Norbury claimed many things that she is taught are “one and done unless they specify to [the school administration that] we need more.” Ms. Norbury’s professional learning experiences highlight issues of “educational malpractice” (Sparks, 2013, para. 2) because she expressed her professional learning activities were not continuous.

Ms. Norbury felt that the school administration and district leaders controlled her professional learning too much. She wished she could pick and choose more activities, rather than being told what to do. This frustration stemmed from losing so many of her planning periods to professional learning experiences. She believed too many were taken away from her and this view led to a lack of interest in WOW sessions. She commented, “Then there are times where it's like, that has nothing to do with me. I could be doing something else. I could be planning more.” This is an example of needing more options for personalized professional learning, perhaps through digital platforms (Killion, 2013).

After venting frustrations about her professional learning experiences, Ms. Norbury discussed her experiences with the Common Core Georgia Performance Standards (CCGPS) for

literacy in science professional learning. She recalled PALS Reading and Magnet Summaries.

Ms. Norbury admitted not implementing either at first. She said she plans to use Magnet

Summaries in the future. When discussing PALS Reading implementation, she stated,

Now I use PALS [Reading], but for a very good amount of time after we had the training I did not because I didn't really understand the process. And we told them, we told the administration we really would like a little bit more training or something and so they went into other classrooms and recorded teachers using it.

Being able to see a teacher implement a strategy was imperative to Ms. Norbury's comfort with implementing the strategy. She claimed to be a visual learner. She declared,

I just would like to see how the kids should do it because I know there's a right and wrong way necessarily to do it, but seeing it in action on their level makes more sense to me than me talking to [another teacher] about it.

Demonstrations by colleagues were stressed throughout the interview with Ms. Norbury. She believed she needed more information about the new strategies, which is an example of Stages 1 and 2 in the Concern-Based Adoption Model (CBAM) (Hall & Hord, 2011).

Ms. Norbury made another suggestion for improving CCGPS for literacy in science professional learning. She suggested that the training should be related to teaching science. Ms. Norbury claimed many of her trainings were English language arts (ELA) focused and not specific to science. Once she heard professional learning providers talk about ELA teachers, she "shut it out." This is what Ms. Norbury had to say about many training being ELA focused:

In all honesty there's been several that I will sit there and sadly, PALS, at the time, was one of them because they made the entire thing about ELA and I blocked it out because it didn't make a hill of beans if we used it or not because they only put it in ELA terms ...and the only reason that it came back in my classroom was because [the special education teacher] wanted to use it And I probably would have liked it if I gave it a better shot. I mean I know everyone has literacy standards. I get that, but if you don't show me how to use the literacy standards for my content then I won't implement it.

Ms. Norbury did not see relevancy in the professional learning she was provided. Her view is evidence that professional learning activities need to be aligned with teachers' content areas (Zepeda, 2012). She continued about how things were ELA related,

They kept saying other subjects but they never showed me other subjects. They kept saying, well in ELA they read this passage and then they write on this and they have to demonstrate this, this, this and persuasive and all this. That's great for them, but I need to know how you want me to use literacy in science.... If you want me to use these ideas you've got to make it relevant to me. You can't just pick, well this is a literacy thing so ELA has got to always use it. Well that's great for ELA but what about me who is not ELA?

It became apparent that Ms. Norbury did not feel her time or her content area were being valued.

When asked about her informal professional learning practices, she mentioned talking with the teacher next door who teaches ELA. Ms. Norbury values her suggestions. Like Mr. Shoop, Ms. Norbury spends a lot of time "Googling" or looking things up on "Pinterest." She understood that other teachers in other states were covering similar standards and might have suggestions. Ms. Norbury's use of digital means to improve her teaching is an example of teachers collaborating with one another using different forms of social media (Meyers et al., 2009).

To recap Ms. Norbury's interview, she believed the professional learning opportunities provided by her school and school district became "too stressful" and her "brain hurts." Ms. Norbury relied on colleagues to help her implement new ideas and wanted to see more demonstrations by them. These demonstrations could be videotaped, but she preferred to see her students in the video, not "some teacher from Texas that has 95% perfect scores." Ms. Norbury appeared to be frustrated by her literacy-related professional learning experiences.

In the following section, the end-of-study individual perspectives are described. The purpose for dividing their perspectives into the beginning of the study and the end of the study is

to highlight the nature of temporal change in the participants' perspectives. After the individual perspectives are presented, further analysis is conducted to present the themes that emerged across the group. The chapter ends with a summary of the findings.

End of the Study Perspectives

Perspectives include how the participants view themselves, their understanding of their professional learning experiences, their classroom practices, and the setting of Groveton Middle School. The perspectives of the participants were formed by their principles, decisions, and actions (Kemmis & McTaggart, 2000). The purpose of this study was to examine science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. One research question guided this study: What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

In analyzing the data collected from the end of the study, the researcher noted that some participants' perspectives changed over the course of the study. To present the participants' perspectives from the end of the study, individual interviews, participant observations, field notes, and the collection of artifacts were analyzed. Similarly to the participants' perspectives from the beginning of the study, their perspectives on their professional learning as they implemented the CCGPS in literacy in science were diverse. The presentation of findings from the end of the study is to highlight the nature of temporal change in perspectives. More specifically, temporal change occurred because the time of the school year the study took place.

The study ended in April 2015. The second round of interviews was conducted after spring break and shortly before Georgia's statewide assessments. In 2015, Georgia administered

new assessments called the Georgia Milestones Assessment System (Georgia Department of Education, 2015g). The purpose of the Georgia Milestones Assessment System is aimed “to provide information about how well students are mastering the state-adopted content standards in the core content areas of language arts, mathematics, science, and social studies” (Georgia Department of Education, 2015g, para. 3). For science teachers, the Georgia Milestones meant testing science-literacy skills, which is different from assessments in the past. All students at Groveton Middle School were to take an end-of-grade assessment in each core subject. Potentially, this was a stressful time for teachers and students. During participant observations and informal discussions, the Georgia Milestones were often discussed.

The second interviews began with participants talking about the literacy standards and the implementation process. Many of the participants included specific examples of the implementation process. Participants also discussed professional learning activities they had participated in since the first interview. More specifically, participants commented on their literacy-related professional learning activities or the lack thereof. To conclude the second interviews, the researcher asked participants to talk about the types of professional learning activities they had received the most and least, and their overall viewpoints about their professional learning experiences. The full interview guide for the second round of interviews is presented in Appendix B.

The presentation of findings from the end of the study described the participants’ perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The CCGPS for literacy in science addressed content-related reading, writing, speaking and listening, and language. The researcher analyzed the data collected from the end of the study to uncover the participants’ perspectives.

Ms. Frizzle

Ms. Frizzle's second interview occurred shortly after spring break in mid-March. The interview took place in her classroom after school. She appeared to be a little surprised by the researcher's arrival. Perhaps, Ms. Frizzle forgot about the scheduled interview. Although, she might not have planned on participating in a 45-minute interview that afternoon, Ms. Frizzle was more than happy to be interviewed. Before the interview began, Ms. Frizzle and the researcher discussed how the school year was going, and she asked about the progress of the study. At this point in the study, the researcher had established good rapport with Ms. Frizzle. She was the participant who had made sure to inform the researcher about the timing and location of the various meetings that were to be observed by the researcher.

To begin the second interview, the researcher inquired about the Common Core Georgia Performance Standards (CCGPS) and how Beal County Public Schools District (BCPSD) creates science curriculum. Ms. Frizzle confessed,

I guess they are the CCGPS. I don't refer to them. I don't usually refer to the C.C., the Common Core, because I know that the language arts and the math, they have adopted the Common Core standards or the state has adopted for them but as far as science goes, the only part of that that we use is the literacy standards. So, since it's provided for us in our curriculum, through our county curriculum development. I really don't make a distinction that these are G.P.S. and these are CCGPS. To me, they're all just all standards. They are what the state has asked us to do.

According to artifacts collected and informal conversations, science teachers in BCPSD find resources through an online curriculum portal. Within the curriculum portal, teachers find standards, sample lessons, pacing guides, and common assessments.

Ms. Frizzle explained that the curriculum portal was created by a representative group of BCPSD teachers during the summer. She gave more details about how teachers formed curriculum units. Ms. Frizzle stated, "Units are developed on what is being required at the time."

She continued to discuss how BCPSD adopted a new education philosophy. Also, she explained how this process had to be done to incorporate literacy standards across the curriculum. Ms. Frizzle asserted, “Every time there's a mandate, a requirement, it gets incorporated and the content leaders at the district level, they receive this information and then they decide how to disseminate it and how we incorporate it into our current curriculum.” She mentioned that teachers are always consulted during this process. The process of content leaders at the district level responding to state mandates is an example of micro-level educational decisions made in reaction to macro-level educational decisions (Johnson, 2013).

Because Ms. Frizzle mentioned state mandates, the researcher asked questions pertaining to what determined her professional learning opportunities in science. She explained that the science content coach for BCPSD provided professional learning based on what was discussed at the macro-level. Ms. Frizzle elaborated,

There's a big push in the science community with the Georgia Science Teachers Association, the National Science Teachers Association to move toward Next Generation [Science] Standards or at least not necessarily the standards that guide the actual teaching the content but the process scales. There are standards that guide process scales. So not just what you teach in science, but how you teach in science.

She continued to explain that BCPSD provided professional learning to change science classroom instructions. According to artifacts collected, other initiatives the BCPSD implemented were a reading grant and a technology initiative. Also, Ms. Frizzle commented that the Groveton Middle School principal surveyed the faculty for professional learning input.

The conversation with Ms. Frizzle shifted to literacy practices in her classroom. For this interview, Ms. Frizzle was not inclined to discuss reading strategies. In fact, she decided not to attend reading-related professional learning at the Georgia Science Teacher Association (GTSA) Conference. Instead, she attended writing-related professional learning. She mentioned learning

about the C.E.R. (Claim, Evidence, and Reasoning) Framework and R.A.C.E. (Restate question, Answer, Cite, and Example) Framework. She implemented both strategies and thought they were helping. In response to why she attended those sessions, she stated, “Because constructive responses are on the Georgia Milestone for science.” She added, “If a student can write and explain and answer the question then we definitely know they have an understanding of the content.” During observations, the participants constantly discussed constructive responses on the Georgia Milestone. Teaching students to write constructive responses was a concern for all participants. While explaining these strategies and discussing her students’ writing, Ms. Frizzle appeared to be pleased with the progress her students were making. Later, she shared her attempts to get her students to discuss their arguments more but she indicated that her efforts thus far were not going well.

Toward the end of the interview, Ms. Frizzle discussed some of her professional learning needs. She began by saying, “I think [Beal] County is very rich in the amount of professional learning that they provide the teachers...but I still [would] like more content.” Ms. Frizzle continued to praise the content coach and said she helped a lot. Also, she claimed to like all of the technology professional learning, but “what I don’t like is too much at one time...I’m a slow learner.” Ms. Frizzle indicated that she does not like learning a new technology program each year. Also, she requested more hard copy materials for reading instruction. When looking for an article online, she added, “There is a lot of stuff on the Internet....It takes time to look for it. It is on so many different reading levels.” Ms. Frizzle acknowledged that Groveton Middle School recently ordered leveled books, but she did not think they went into too much depth in regard to content. Also in reference to technology, she claimed time is wasted waiting for students to log on to their devices or a lesson can be ruined if multiple students forget their digital device. To

end the interview, Ms. Frizzle jokingly said, “I just want more time in the day. And less testing. That’s a pipe dream.”

In short, Ms. Frizzle is quite knowledgeable about how the district is influenced by macro-level educational decisions. She seemed to be a proponent for the Next Generation Science Standards (Next Gen) because of the process approach promoted by Next Gen, not necessarily because of the standards. There was little concern about the standards, but there was concern for how to teach her students. Ms. Frizzle still wants more content-knowledge professional learning. She also mentioned needing more time to learn and implement strategies in her classroom. Lastly, she appreciated the new materials—the leveled books Groveton Middle School received—but wanted even more non-technology materials. She believed that relying on digital devices created classroom disruptions at certain times because a student may not have charged their device or left their device at home.

Mr. Escalante

Mr. Escalante’s second interview was difficult to schedule. Because of difficulties scheduling the interview, the researcher and Mr. Escalante conducted the interview over the phone in early April. The interview lasted around 50 minutes. During observations, Mr. Escalante always made sure the researcher had access to professional learning artifacts. Often, he apologized for meetings during which the participants did not discuss literacy strategies or anything Mr. Escalante perceived as being relevant to the study. Mr. Escalante expressed interest in the types of findings the researcher was discovering.

The interview began with Mr. Escalante describing the science curriculum and the curriculum portal. He stated, “We have a place where we go, and we know where we can find our standards, and pull them up and it comes with the activities that align with it.” During

observations of planning periods, the participants pulled up the curriculum portal to look at units and activities. Because he was discussing standards, the researcher asked about the literacy standards. Mr. Escalante was unable to identify specific literacy standards. Instead, he explained the purpose of the writing standards:

They teach you how to write precisely about your observation or record keeping. So, it is different from language arts writing where you use a lot of adjectives. This tries to focus on just sticking to the facts and being able to tell a clean and precise story about what you observed, you know, using one or more of your five senses.

He continued to explain why the standards were difficult to implement and how the students have difficulties writing. He claimed,

Science is sort of like learning a foreign language. I mean these are concepts that a lot of kids are not familiar with, you know. You get a lot of new vocabulary words and then you have to communicate those words in your writing.

Mr. Escalante discussed various strategies of how he teaches vocabulary during observations. Often, he talked about trying to show students real-world application through a relevant video or giving real-world experiences by going outside to provide a visual aid attached to the vocabulary term. He claimed to have students write an observation report using vocabulary terms at least once a week.

Later in the conversation, Mr. Escalante discussed his professional learning experiences. He talked about receiving plenty of professional learning opportunities on reading instruction and how to break down standards. As for writing-related professional learning, Mr. Escalante said, “We actually had one at the beginning of the school year that was pretty good.” Mr. Escalante was unable to recall details and said, “Honestly my mind is blank right now.”

Although, he was unable to provide specific details about his writing-related professional learning experience, Mr. Escalante recommended a solution to get his students writing more. He suggested,

To have a writing coach in the class, in a particular classroom for that particular day. Let's say Wednesday could be the day I have my literacy coaches facilitate the writing portion of the lesson for the day. It can be 'Writing Wednesdays.' That way I am not doing it by myself now, and they are not doing it by themselves. It's more facilitated from that person and I get to learn from whoever that person is and it helps us teach writing when they are not there.

Mr. Escalante was asked if he had ever suggested this idea to the administration. He said, "No." When the researcher inquired as to why Mr. Escalante did not make suggestions in Groveton Middle School's anonymous suggestion box, he stated, "I just get caught up in the day-to-day routine and never think about it." Another suggestion Mr. Escalante made was dedicating a professional learning activity to planning field trips related to the content.

The conversation shifted to reading-related professional learning experiences and implementation. Immediately, Mr. Escalante mentioned PALS Reading. He excitedly said, "PALS that is our bread and butter for reading assignments. Kids love it. It's cool. I like seeing them participate in it also. It helps them to read from my [perspective] and we really hit it hard this year." He enjoyed PALS Reading because he saw the impact it had on his students' learning. During observations, Mr. Escalante constantly discussed PALS Reading as part of his lessons.

Next, Mr. Escalante discussed his colleagues and professional learning opportunities. He began by praising the talents of many teachers at Groveton Middle School. He suggested scheduling meetings with other content area teams. According to Mr. Escalante, the main reason they have a difficult time meeting with colleagues is because of everyone's busy schedules. He explained,

The hardest thing to do is have everybody free and available at the times that we're supposed to meet because other things [take] precedent and a lot of times we're supposed to have our team meeting, but it is a waste of time because a member is out.

During several meetings observed, participants often had to leave early or be absent because of other obligations. Sometimes the reason was because of personal matters, but usually they had

another meeting to attend. Mr. Escalante clearly respected his colleagues. He discussed how he could learn from anyone throughout the school. He stated,

You're just around [another teacher] who is on to something and or they actually know they can give professional development and present some new software or something like that or some new program to use. So it is just, you know, throughout the school.

During observations, Mr. Escalante was very friendly towards his colleagues and was curious about different strategies that were being implemented throughout the school. He acknowledged that many teachers at Groveton Middle School have all kinds of strengths and that he can learn from them. Mr. Escalante learning from other teachers' expertise is an example of non-formal learning (Schwier & Seaton, 2013).

The interview ended with Mr. Escalante's recommending some tips to improve professional learning. He mentioned, "Now don't get me wrong, I still feel like we get some good professional development. It is some good stuff, but there is a fear factor." Mr. Escalante elaborated, "You fear not pleasing the district for these requirements that you sort of lack doing things you think are most effective." Because he had many mandated strategies, Mr. Escalante was unsure what to implement and did not feel comfortable asking questions during professional learning activities. Mr. Escalante recommended keeping all professional learning in small groups. He explained,

I think those smaller group meetings like WOW sessions are more effective than those big meetings....People are most apt to ask questions when they really don't understand. The bigger the group is the more likely people are to not really speak up about what they're insecure about in terms of their understanding of what they're trying to implement.

Mr. Escalante mentioned that the structure of a professional learning activity was important to him. But in the end, Mr. Escalante claimed, "Almost all of the professional development opportunities are beneficial if you have the energy to focus on it."

To summarize, Mr. Escalante thought the Common Core Georgia Performance Standards (CCGPS) for literacy in science were difficult to address. More specifically, he believed the standards were difficult to address because the amount of time it took to implement strategies learned from professional learning. When asked about his writing and vocabulary-related professional learning experiences, Mr. Escalante had a difficult time recalling specific details, although he continued to implement PALS Reading. Mr. Escalante valued his professional learning opportunities but felt they could be improved if they were held in small groups because there was a fear to please the district. In small groups, he felt teachers could express their opinions informally. Moreover, he mentioned wanting to meet with his grade level team more often. Lastly, Mr. Escalante believed professional learning focused on co-teaching with an instructional coach once a week would be valuable.

Mr. Keating

Mr. Keating's second interview was impromptu. He planned on meeting the researcher the following day, but he was able to be interviewed a day early. This was no problem because the researcher was already at Groveton Middle School. The interview occurred during his first planning period in Ms. Norbury's classroom. There was no specific reason for the interview to take place in Ms. Norbury's classroom, other than Mr. Keating and the researcher were already there. Ms. Norbury was out of the classroom for the majority of the interview. Another teacher dropped by for a second but realized Mr. Keating was being interviewed and exited quickly. The interview lasted nearly 40 minutes.

Similarly to all of the second interviews, Mr. Keating began by discussing standards and the curriculum portal. He mentioned that science and literacy standards are "already structured together." Mr. Keating continued to rave about how much the access to the curriculum portal

helped with his planning over the summer. He asserted, “You have access throughout the school year and the entire summer to do planning.” According to Mr. Keating, the purpose of the standards was “just supposed to guide instruction in a way to help plan our lessons and implement different instructional strategies.” Overall, he believed the standards “make sure you’re teaching what you’re supposed to teach.” Mr. Keating added that he frequently asked the administration about how much depth he needed to go into in order to address each standard.

When asked about how much professional learning he received about breaking down the CCGPS for literacy in science, Mr. Keating mentioned a recent professional learning experience. He explained how he was taught to dissect the standards to “implement different simulations and technology that will connect to the standards.” He continued to say he received professional learning about implementing technology most, and literacy the least. Additionally, Mr. Keating attended an out-of-state conference about improving school culture, which he found helpful.

The researcher inquired about the process for determining the school’s professional learning experiences. Mr. Keating explained,

I think the staff and I think the administration reacts off what the staff says. You know, we have a suggestion box, and I think the employees say they need help because they are struggling in this area. The administration puts the WOW session in place in order to help teachers address their needs. Of course people complain, but I think it all comes from teachers....Or the administration may see things that the majority of the teachers are struggling with and say, “Hey we need to get a WOW session in there in order to help our employees.”

The suggestion box Mr. Keating referred to is anonymous and digital. A link to the electronic suggestion box is included in the principal’s weekly faculty email containing the week’s schedule, announcements, and other relevant information. The researcher followed up with whether or not Mr. Keating ever made suggestions. He admitted, “No. I’m more of a go-with-the-flow-type person. I don’t have many suggestions....I think the administration is always open

to hear suggestions at any time....I voiced my suggestions during leadership meetings and the administration is there.” Overall, Mr. Keating thought WOW sessions are helpful, but

“sometimes I’m just tired.” He continued,

They are meaningful. Honestly, they really are. I think some teachers are tired. Especially if they have something else on their minds that they need to take care of. Like right now, I can’t think of the last WOW session. It was probably technology. I’m not sure what strategies or tools they were trying to implement. I just can’t remember right now, but I’m sure it was informative.

During the researcher’s observations, teachers appeared to be getting worn out towards the end of the school year.

Next, Mr. Keating discussed literacy-related professional learning and implementation.

First, Mr. Keating discussed vocabulary instruction. He commented, “I can’t think of the particular name, but it’s picking vocabulary out of the context. It is vocabulary word recognition.” Mr. Keating admitted using this quite often in class and believed it works. He mentioned,

I actually saw kids work where they were underlining familiar words in order to write comprehension questions. So I think this strategy has worked and grown on some kids. I think it’s been helpful to them. I didn’t know how much it was working until I actually saw kids work displaying that particular strategy.

Mr. Keating saw the impact the strategy had on his students (Hall & Hord, 2011). In addition to using word recognition, Mr. Keating attempted to associate a picture or experience with the vocabulary word. He recognized that,

A lot of kids don’t have the experiences that some other kids have, so I think it is helpful to show them an illustration on it....Sometimes you may take for granted what a kid knows and they may not. So those images or clips help. You get a lot of “Aha” moments....That is how we introduce new vocabulary.

When asked about his formal professional learning for vocabulary instruction, he said he did not receive any. Mr. Keating learned a strategy from a fellow science teacher.

After explaining his vocabulary instruction, Mr. Keating explained how he taught writing skills in his classroom. Mr. Keating confessed to having difficulty with getting his students to write. He also mentioned wanting more professional learning on writing strategies, specifically science-content writing strategies. He stated, “The writing strategies I do get, I get them from English language arts.” Mr. Keating believed “science teachers need to collaborate with more language arts teachers to know what they actually do in their classes in order to get kids to write better in science.” After some probing by the researcher, Mr. Keating explained the writing strategy he implemented in his classroom. He said,

I made up a writing strategy to be honest with you. I took something from [a different grade level] language arts teacher and I made up something called Writer’s Workshop. I don’t know if it is research-based and I know that might be a mistake, but I saw kids struggling. So I took something from language arts and kind of implemented how it will work in science.

He continued to explain the writing strategy,

It was more of a restate the question. At least then you have some ink on the paper or some letters on the computer screen. And with science you know after you restate the question, you implement vocabulary words....Then at least try to attempt to answer the questions or to form a question or to rewrite the question.

Mr. Keating admitted to not seeing many students use this strategy on assessments. He believed it was because he was not consistent with the strategy in his instruction. Another possible reason was “language arts may be using a totally different strategy that is more familiar to them, so they may have [gone] with that strategy because they felt more comfortable with it.” After explaining that his strategy might be different than others on his grade level, Mr. Keating suggested, “[W]e should all sit down and discuss how we work across curriculum with writing strategies.”

According to Mr. Keating, they do not talk about cross-curricular strategies in grade-level meetings.

The interview ended with Mr. Keating discussing PALS Reading and his specific professional learning needs. Mr. Keating claimed to implement PALS Reading “at least twice a week” and that “[he] saw an increase in some scores in science.” He credited PALS Reading for the improvement and believed it helped because everyone used the strategy. For next year, Mr. Keating wants to find a couple of more reading strategies to help with differentiated instruction. He stated,

I know it worked for some kids, but I am not sure it works for all kids. If you’re trying to differentiate then you can’t say PALS is for every kid. So we need to have more kids engaged and have more fun in order for them to learn.

Mr. Keating wants more professional learning about writing and reading strategies to reach all of his students. He asserted, “I’ll take a hundred strategies right now on reading or writing and...implement as many as possible to differentiate.” He continued to say that he wants “a variety of reading and writing strategies that must be implemented, kind of like a no-options thing like PALS.” Mr. Keating explained how this encouraged teachers to try something new. The interview ended with Mr. Keating smiling, saying, “Aw man, if you gave me twenty strategies! It’s like a kid in a candy store.”

To recap, Mr. Keating is knowledgeable about the Georgia Performance Standards (GPS) for Science and Common Core Georgia Performance Standards (CCGPS) for literacy in science. He is concerned with whether or not he covers certain standards with enough depth. Mr. Keating recognized the suggestion box for professional learning opportunities but did not use it. Instead, he mentioned his professional learning needs in meetings. Job-embedded professional learning is valued by Mr. Keating, but he sometimes gets distracted or is tired. Also, Mr. Keating valued his colleagues and wanted to meet with the grade level teachers more often so he could learn about

and integrate cross-curricular instructional strategies. Lastly, Mr. Keating wanted more science-literacy-related professional learning opportunities.

Mr. Shoop

Mr. Shoop's interview occurred during one of his planning periods in late March. The interview was conducted in his neighbor's classroom. There appeared to be another meeting in his classroom. As always, Mr. Shoop was quite relaxed and was forthcoming in the interview. During the researcher's observations, Mr. Shoop always filled out paperwork for the school administration and planning lessons for upcoming weeks. The interview lasted around 45 minutes.

This interview, like the others, began with Mr. Shoop describing the curriculum portal and standards. He explained the curriculum portal as "a list of standards, both academic and reading and writing standards. Also, it has links to activities and common assessments." Mr. Shoop said he refined most of the portal activities in his classroom. When discussing the standards, Mr. Shoop talked about both the Georgia Performance Standards (GPS) for Science and the Common Core Georgia Performance Standards (CCGPS) for literacy in science. According to Mr. Shoop, the GPS were his primary focus, and he described them as, "The characteristics we teach, like the habits of mind. Analyzing table and graphs." As for the CCGPS, Mr. Shoop said there was more of a focus on the literacy standards this year, but "It's not often that we sit as a team and really unpack the literacy standards."

Mr. Shoop explained having professional learning about unpacking standards. He added,

We focus on those standards in that we know that we have to [have students] read and write more, especially writing more. So we've had professional learning where we'll look at a standard or two and then we'll just kind of see examples, I guess, and then we come back, and we do those examples. We have not sat as a science team and really looked at those standards and focused on those every time we meet. We do still write a lot in class so we are kind of moving more toward having that as a major focus. But if you were to

ask me to sit and recite the standards to you, I couldn't do it. I don't see them enough to do so. We do [have students] write a lot more than we have in the past, so I don't want to make you think we're not focused on that because we are.

The literacy standards were never talked about during observed meetings; only instructional strategies were discussed.

When asked how he implemented the literacy standards, Mr. Shoop mentioned PALS Reading and Coded Reading. Mr. Shoop liked to use both strategies to “switch it up.” He has not implemented Coded Reading “as much as PALS [Reading], but we used to use it a lot more.” Mr. Shoop fully explained what each strategy looked like in his classroom. He enjoyed both strategies because “it really gives me and the students a chance to take a step back and really look at what we're trying to learn and absorb information. Also, it gives the kids opportunities to read at their own pace.” Mr. Shoop claimed to implement these strategies “at least a couple times a week. I wouldn't say daily.”

As for writing instruction, Mr. Shoop explained that students write a lot but usually during Extended Learning Time (ELT), a class period at the beginning of the day designed to provide enrichment or re-teaching. Mr. Shoop explained,

We do a lot in ELT. We do it in the classroom to give kids a topic and ask them to write and give them choices. Sometimes we'll ask them to write a creative story. “You can write a factual account, you can write lyrics if you like, you can write a poem.” We just give them different opportunities.

He did not explain how he instructed writing during his regular science class.

The conversation shifted to the speaking and listening standards. Addressing these standards is a goal of Mr. Shoop's because of the importance of debate, but he admitted not covering them enough. He confessed,

We haven't been doing them as much as I like to. It's something that I will work on next year because it's something we need to do. Some kids don't want to really debate and argue with each other, and it's hard. I can't do it myself and I haven't had any professional

help to figure out how to get that thing going and to incite argument among kids about science. It happens naturally sometimes and when it does we will go with it, but it doesn't happen that often. That's something we definitely need professional learning on.

Mr. Shoop became energetic when describing the importance of debate. He ended his response about debate with, "Absolutely, it has to happen in a science classroom."

The interview shifted to job-embedded professional learning experiences. First, Mr. Shoop mentioned that most of the WOW sessions were about the Georgia Milestones. Besides the Georgia Milestones meetings, he said, "We haven't had that many since January." When asked about who or what determined his professional learning, he said,

I don't know. In the past I kind of felt like we had input and now not so much. Maybe some teachers are asked for input, but I'm honestly not sure. We have a drop box where we can go and submit anonymously. So maybe some of it comes from there. I'm not sure.

The conversation shifted to literacy-related professional learning, and this is what Mr. Shoop had to say:

This year just feels like it all happened near the beginning of the year and not so much the second half. I can't think of much we've done with literacy in professional learning. Maybe when we came back from the holidays. It's just a cloud right now. I can't really think of what we [did] back then.... It seemed like we had two or three sessions during pre-planning, which seems like light years ago.

Mr. Shoop mentioned that literacy strategies seemed to be stressed a lot more during the year of the study than in years past. Also, he recalled a technology related WOW session about simulations.

At the end of the interview, Mr. Shoop expressed a professional learning need. He began by saying all the professional learning he received is valuable and that it is never a waste of time.

To improve pre-planning professional learning, Mr. Shoop suggested,

I'd like to see the strategy from beginning to end. I want to see it in practice. I think that's what most of my colleagues would say is we'd like to actually see it from the beginning. From planning through a lesson that they planned. See it in action.

Mr. Shoop clarified by saying it did not matter whether it was a video or if it was in real-life. The most important aspect was connecting the strategy from beginning to end and having a visual of how it was implemented.

Overall, Mr. Shoop was not concerned about the standards. He understood the importance of science-related reading, writing, and speaking and listening in his classroom. In fact, his goal for next year is to implement more strategies to encourage debate. PALS Reading and Coded Reading are strategies most used in his classroom. For writing, Mr. Shoop usually has students answer questions in his science class but write creatively in science ELT. Georgia Milestones dominated his WOW sessions, and he did not recall a specific WOW session about literacy. Mr. Shoop does not believe he has much input about his professional learning. He recognized the suggestion box but did not take advantage of it. The need Mr. Shoop identified was seeing the process of planning a lesson with a specific strategy and the implementation process via videotape or in-person.

Ms. Norbury

The second interview with Ms. Norbury was at the end of March and took place around a table in her classroom. Her classroom had numerous projects along the backside of the room. Before the interview began, Ms. Norbury explained that students had handed in their projects that morning. She seemed to be impressed with the amount of work students had put into their projects. During the interview, a few teachers stopped by but it did not disrupt the flow of the interview. There were some school scheduling issues and the bell schedule was incorrect causing minor confusion before the interview. After the confusion was settled, the interview began.

Ms. Norbury started the interview by describing the various standards that were being implemented. She was knowledgeable of the Georgia Performance Standards (GPS) for Science

and the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Ms. Norbury does not split them into the separate categories. She explained,

I incorporate literacy standards in things that we do, but I don't per se say, "OK we're working on literacy standards." In fact I have not really read through them completely, so I'm not sure what applies, but I know based on the different WOW sessions or the professional learning sessions about them that I am incorporating them enough.

Like the other participants, she explained the curriculum portal and how the standards were displayed. She fully explained the purpose of the literacy standards as well. At the end of the discussion about standards, Ms. Norbury commented on the Next Generation Science Standards (Next Gen). She claimed not paying attention to the Next Gen "because a lot of people don't think it's going to go through."

The interview shifted to how Ms. Norbury implements the literacy standards in her classroom. For writing, her instruction is geared toward the Georgia Milestones. She explained, "We get them to write answers a lot because of the constructive responses coming up on the EOG." She clarified that EOG stood for the end-of-grade test, which is now called the Georgia Milestones. To teach how to write constructive responses, she scaffolds writing assignments. When discussing reading instructional strategies, Ms. Norbury mentioned PALS Reading and how the new books helped implement the strategy because they are leveled for various readers.

For the remainder of the interview, Ms. Norbury talked about her professional learning needs and experiences. She was quite critical of her literacy-related professional learning experiences. She began,

We do a lot of literacy stuff, but every time I go it's kind of disappointing. It's always about ELA. We don't really talk about literacy just with science. I mean it's not like they don't separate us into subjects. It's "Let's look at the literacy standards you need to do." Then we'll talk about writing paragraphs and, you know getting your introduction, your closing, and you still need that, but I need to be able to get my content too. They'll tell me all these cool things, but they don't tell me how to implement it in my class. They tell me how to implement it in ELA. I'm like, but I want to see examples of how to put it in

my room. Now with the PALS they helped us put it in our classroom and it made sense. Especially with that textbook thing or the workbook they bought us but I've had very, very little science literacy discussions.

Later, she criticized the Writing to Command Attention workshop from the beginning of the year. She claimed, "It was really long and was about literacy and was focused 100% on ELA." Ms. Norbury said similar things about Magnet Summaries and Coded Reading sessions. She said, "It was definitely ELA or at least that's how I took it, and I blocked it out...and I just kept making notes of what I need to do in my classroom." Ms. Norbury made it clear that if the professional learning experience was not related to science, then she did not care for it. When she needed advice on how to implement a strategy, she asked her colleagues.

Professional learning lacking relevancy to her classroom has made her wary of going to meetings. When discussing if she suggests professional learning topics, she confessed,

It seems to me by the time we go to all these WOW sessions that make no hill of beans to us or to everybody that they're just looking at the top of the list of who actually responded because a lot of people—and I won't deny it, I've done it too. When it says, "Is there anything you want to particularly see? I'm like "Nope, I'm good" because we're just tired of meetings. We're meeting'd out and I think a lot of us are meeting'd out because it is non-applicable stuff.

During the researcher's observations of meetings, Ms. Norbury was often pulled into other meetings such as data meetings and was clearly not excited about her planning periods being taken away.

In addition to her frustrations with meetings and the content of the professional learning, Ms. Norbury was critical of the delivery of the professional learning. She claimed to be a visual learner and how it is important for her to see the implementation process. She said, "I will do more literacy, but show me how to use it in my room. Show me using my subject." Ms. Norbury credited a video of PALS Reading for being one reason she implemented the strategy. For Ms.

Norbury, it is important that the video example is of a teacher from Groveton Middle School.

She made it clear that she prefers real-life examples rather than videos, though. She explained,

I'd prefer to see real life. I would prefer to see someone implementing it in a classroom where it's my kids. We can watch videos all day long, but they always show us the videos of the good kids, and I'm not saying I don't have good kids. I have great kids, but they're different kids you know? You get the ones who are "Yes ma'am," and very pristine and proper, and they're great. That's great for them but that's not going to work for my kid who can't read very well.

She continued to explain that she wants to see typical disruptions that happen every day. It is important to Ms. Norbury that she "see[s] my kind of kids, in my kind of world." Seeing something implemented in person helped Ms. Norbury tremendously. She discussed an off-site professional learning experience about how to implement speaking and language standards and how beneficial it was. She made it clear that she will implement that strategy next year.

Professional learning experiences specific to a teacher's grade level and content area are characteristics of high-quality professional learning (Desimone et al., 2002; Garet et al., 2001). From her perspective, these aspects were lacking in Ms. Norbury's professional learning experiences.

To summarize, Ms. Norbury had a clear understanding of the literacy standards. Ms. Norbury did refer to the Next Generation Science Standards (Next Gen) but said she does not pay them any attention. According to her, the majority of literacy instruction is related to preparing students for the Georgia Milestones. This view was most evident when Ms. Norbury discussed her writing instruction. It seems that job-embedded professional learning has become frustrating to Ms. Norbury. She was tired of going to so many meetings and having her planning periods taken away. Ms. Norbury was further displeased with job-embedded professional learning because literacy-based sessions are more focused on English language arts (ELA) than literacy in science. Lastly, she needed professional learning providers to consider the visual

learner like herself by including visualizations and demonstrations of the strategy being presented. She preferred seeing a teacher in person implement the strategy or concept in a real lesson but thought a video could help, as well.

In the following section, further analysis is conducted to present the themes that emerged across the group. The constant comparative method enabled the researcher to present themes that emerged across the study. The chapter ends with a summary of the findings.

Emergent Themes

The purpose of this study was to examine science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. One research question guided this study: What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science? The type of professional learning the participants received was job-embedded. Job-embedded professional learning is when teachers are engaged in their work and actively think about how to support their students (Zepeda, 2015). For instance, Mr. Shoop stated, "I am always Googling....It is just part of your life. You just constantly think about how you can do better." During the researcher's observations, participants surfed the Web during meetings to discuss how they were going to implement specific content. Therefore, their perspectives reflected job-embedded professional learning experiences as they implemented the CCGPS for literacy in science.

In analyzing the data, the researcher combined all of the data from the beginning of the study and the end of the study. Then, the researcher applied the constant comparative method. The constant comparative method is defined as the act of making constant comparisons between different pieces of data to understand if the pieces of data are the same or different (Corbin &

Strauss, 2015). After the researcher developed categories that cut across each participant’s data, the researcher then compared categories between the participants to develop themes. The researcher also wrote memos about the data. Memo-writing was the final stage of data analysis. Figure 4.1 is an example of how the constant comparative method and memos were applied to develop themes.

Figure 4.1

Example of Constant Comparative Method and Memos to Develop Themes

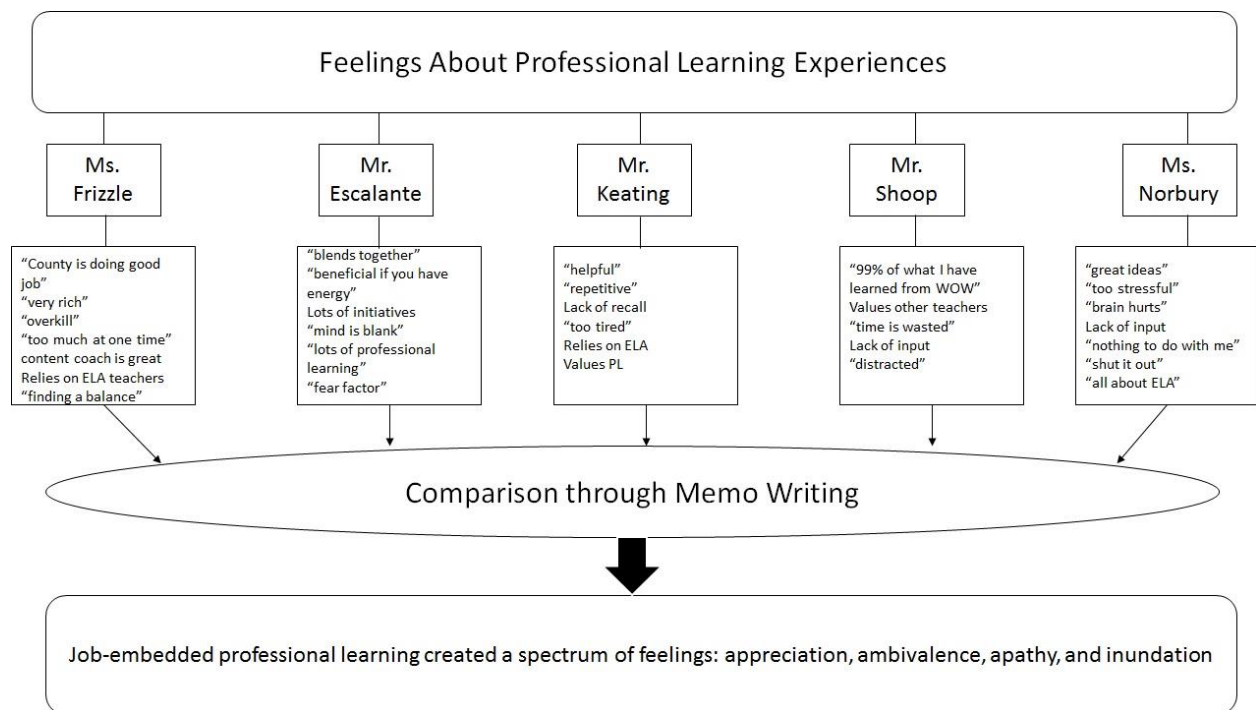


Figure 4.1 is visual example of how the researcher compared data between participants. All themes were constructed through coding and memo writing, and then tables were created in Microsoft Excel. The identified themes are:

1. Job-embedded professional learning was determined by macro-level educational decisions and micro-level reactions.

2. Job-embedded professional learning created a spectrum of feelings: appreciation, ambivalence, apathy, and inundation.
3. Job-embedded professional learning allowed opportunities for different types of adult learning to occur.
4. Job-embedded professional learning pertaining to the CCGPS for literacy in science focused more on reading than writing, speaking and listening, and language.
5. Job-embedded professional learning often lacked coherence.

In the remainder of the chapter, each emergent theme is briefly discussed. Lastly, the chapter ends with a summary. A discussion of the themes in relation to the literature is provided in Chapter 5.

Theme One: Job-Embedded Professional Learning was Determined by Macro-Level Educational Decisions and Micro-Level Reactions

For clarification, macro-level educational decisions reference the decisions made by federal and state entities. Micro-level reactions refer to decisions made by school districts and schools to satisfy desired macro-level outcomes. According to the participants, their professional learning opportunities are determined by state and district educational policies and initiatives. For example, Ms. Frizzle discussed how the district had “pressure coming down from the state” to perform certain tasks. Because of the pressure coming from the state, the district coaches “funnel information” to the teachers through professional learning activities. The participants’ classroom practices were a result of what “trickles down” from the state.

Although the participants did not mention Georgia’s Race to the Top reform plan specifically, their professional learning was related to implementing this plan. According to documents collected, the state of Georgia and Beal County Public Schools District (BCPSD)

adopted various initiatives and received grant funds to carry out the reform plan. For example, to address teacher accountability, Georgia implemented the Teacher Keys Effectiveness System (TKES). Ms. Frizzle stated teachers receive professional learning based on what “is introduced by the legislature.” Another example is the Georgia Milestones, which is the new student assessment system. Nearly all of the participants discussed the Georgia Milestones. For example, Mr. Shoop mentioned most of the WOW sessions he attended since January were about the Georgia Milestones. BCPSD personnel prepared their teachers for the new assessment system.

In addition to new accountability systems, BCPSD received grant funds to address literacy standards and STEM (Science, Technology, Engineering, and Mathematics) education. According to documents collected, BCPSD received a reading grant from the state after writing a successful proposal for how the district would use grant funds to promote literacy. The reading grant funded the PALS Reading and Writing to Command Attention professional learning sessions to which the participants referred during the interview. PALS Reading was mentioned and explained thoroughly by each participant. Writing to Command Attention was vaguely recalled as a professional learning activity at the beginning of the year. Mr. Keating stated that the writing-related professional learning activity was a “four-hour training” during pre-planning. According to Ms. Frizzle, Magnet Summaries was provided during pre-planning as well. All of these professional learning opportunities were in reaction to state-level emphasis on enhancing literacy in the content areas. The strategies funded by the grant were evaluated during the “Impact Check,” a district-level accountability session held in early spring of the year of this study, according to Mr. Escalante. During researcher observations, the participants gathered and analyzed data about instructional strategies and student assessments to share with the district during the Impact Check.

The technology initiative implemented by BCPSD was to address the push for STEM education. BCPSD prided itself on providing each student with a digital device. Mr. Keating discussed how he received professional learning about technology the most. Mr. Shoop recalled a recent professional learning session about simulations using digital devices. Ms. Frizzle discussed how tired she was of all the technology-related professional learning. She also mentioned the professional learning she received through the “Teach2Learn Grant, which is funding my attendance to the GSTA, Georgia Science Teachers Association.” Mr. Escalante stated that he implements “what the district wants...at the time and what they are looking for.”

Participants also understood Groveton Middle School teachers had input in their own professional learning. All participants discussed being able to recommend professional learning topics, but only Ms. Frizzle took advantage of this opportunity. Ms. Norbury commented on how teachers voiced their concern with their original PALS Reading training. Because teachers expressed their opinions, the school administration offered more professional learning opportunities for PALS Reading. In providing a variety of professional learning opportunities, Groveton Middle School teachers, school leaders, and BCPSD leaders were reacting to multiple macro-level educational decisions.

Theme Two: Job-Embedded Professional Learning Created a Spectrum of Feelings:

Appreciation, Ambivalence, Apathy, and Inundation

Because Beal County Public Schools District (BCPSD) personnel and Groveton Middle School leaders and faculty were reacting to multiple macro-level educational decisions, their job-embedded professional learning experiences created a wide range of feelings. Throughout the interviews, participants discussed how much they valued their professional learning experiences and how much they enjoyed learning from their colleagues. For example, Mr. Escalante stated all

professional learning was “beneficial” and Mr. Shoop claimed, “Ninety-nine percent of what I’ve learned” is from professional learning activities. Furthermore, the participants mentioned how much they appreciated their colleagues and the knowledge others had to offer. Ms. Frizzle, Ms. Norbury, and Mr. Keating commented on how they talked to English language arts (ELA) teachers regularly for literacy instruction tips. Mr. Escalante talked about the different teachers he could ask for help. Each of them expressed great gratitude toward their fellow teachers. Additionally, the teachers praised the science content coach, especially Ms. Frizzle. These comments suggest that participants appreciated the support provided by the BCPSD personnel and Groveton Middle School leaders and faculty.

In addition to feelings of appreciation, the participants shared mixed feelings about their professional learning experiences. For example, Mr. Keating complained about their WOW sessions being too “repetitive” but understood the importance of having a refresher session on a strategy. Mr. Shoop thought WOW sessions “wasted time” and how he “leave[s] with all of these different things going on in [his] head” but stated that professional learning was where he gained his teaching knowledge. Many times the participants contradicted themselves in meetings and during interviews. Ms. Frizzle stated the district did a great job offering professional learning in comparison to the past but believed that sometimes it was “overkill.” Ms. Norbury thought WOW sessions included some “great ideas” but was sometimes “too much” and made her stressed. In this study, when a participant made a negative comment, it was often followed by an appreciative statement or vice versa. Therefore, the participants’ job-embedded professional learning experiences created feelings of ambivalence.

When participants discussed writing-related professional learning experiences and the various science standards being implemented, and suggested professional learning topics,

feelings of apathy surfaced. Each participant remembered a pre-planning writing-related professional learning session but none was able to recall specific details about the strategy. For instance, Mr. Escalante attempted to recollect the strategy, but could not “recall the specifics.” The lack of enthusiasm for this writing strategy was evident. Ms. Frizzle referred to it as “an essay” strategy but said her students needed to write only a paragraph or a report, not an essay. Ms. Norbury “blocked it out” because it was “all about ELA.” The participants seemed apathetic about the writing strategy presented to them at the beginning of the year, partly because pre-planning was “light years ago” and no follow-up on the use of the writing strategy was provided. Also, feelings of apathy were evident toward their vocabulary-related professional learning experience. Professional learning focused on Magnet Summaries, a vocabulary strategy, was recalled only by Ms. Frizzle. Mr. Escalante believed it was too time-consuming.

Participants were not concerned about the various standards, nor any professional learning associated with standards being implemented during the time of this study either. Mr. Shoop couldn't recite the literacy standards because he did not “see them enough,” although he did recognize that the school's faculty is focused more on writing instruction this year. As for Mr. Shoop's grade-level team, “It's not often that we sit as a team and really unpack the literacy standards.” Ms. Frizzle and Ms. Norbury discussed how they do not separate the standards into Georgia Performance Standards (GPS) and Common Core Georgia Performance Standards (CCGPS). Also, Ms. Norbury did not care about the possibility of Next Generation Science Standards (Next Gen) being adopted and implemented “because a lot of people don't think it's going to go through.” Whereas, Ms. Frizzle believed the Next Gen was being “trickled down to [them].” From Mr. Shoop's first interview, he best summed up the participants' responses about

standards: “Ah, to be blatantly honest I really just don't think about those things. I just come into the room and I know what the kids need to know.”

As for suggesting professional learning topics, only Ms. Frizzle recommended ideas. She claimed that the science content coach was always willing to help. As for the other participants, Mr. Keating was a “go-with-the-flow-type person” and Mr. Escalante “just get[s] caught up in the day to day routine and never think[s] about” suggesting topics for future professional learning sessions. Although Mr. Shoop expressed a desire for more input in his professional learning experiences, he did not make suggestions for such. He was just “always hip to go and learn.” When Ms. Norbury discussed WOW sessions, she admitted that “When it says is there anything you want to particularly see, I'm like nope, I'm good because we're just tired of meetings.” There was a lack of enthusiasm for suggesting professional learning topics, mostly because these teachers seemed either too busy or too tired to think about it.

At some point during the study, each participant expressed being in a state of inundation. Each participant commented on being overwhelmed by all of the professional learning opportunities they received. Ms. Norbury expressed being overwhelmed because “there is too much being thrown at [her] at once.” Mr. Keating said, “Sometimes I'm just tired” because there were other things on his mind, which often lead to his not retaining information delivered during WOW sessions. Mr. Escalante discussed “getting caught in the shuffle” and doing his best to get through the day. Mr. Escalante also mentioned not having the energy to focus on his professional learning. Ms. Frizzle talked about being stressed out about all of the technology-related professional learning opportunities and joked about not having enough time in the day. Ms. Norbury felt she did not have time to process or “digest” what she had learned during WOW sessions, which meant that she often did not implement the new strategy or pedagogy in her

classroom. The abundance of professional learning focused on multiple programs and initiatives being implemented resulted in a spectrum of feelings being experienced by the participants.

Theme Three: Job-Embedded Professional Learning Allowed Opportunities for Different Types of Adult Learning to Occur

For the participants, job-embedded professional learning created a culture of learning. Teachers constantly thought about improving their practice. Each participant discussed at length the formal learning that took place. Ms. Frizzle referenced the various ways professional learning was offered by the Beal County Public Schools District (BCPSD). She referred to “pre- and post-planning days,” “workdays,” “planning periods,” “faculty meetings,” and “WOW sessions” as types of formal professional learning. Mr. Keating commented on how a guy “led the all-day training [which was] eight hours.” Mr. Keating and Ms. Norbury discussed going to an off-site school for professional learning. Ms. Frizzle attended the Georgia Science Teachers Association (GSTA) Conference.

Because teachers were given time to collaborate during the workday, there were many opportunities for informal learning to take place. During observations, the structure of meetings enabled the participants to discuss instructional strategies and students. Mr. Shoop said, “You can walk down the hall and a teacher talks to you and you learn something.” Mr. Keating, Ms. Norbury, and Ms. Frizzle discussed relying on English language arts (ELA) teachers for literacy instructional practices. Ms. Frizzle used one their writing rubrics as well. Mr. Keating created his own “Writer’s Workshop.” Mr. Escalante stated that his colleagues “can give professional development and present some new software or something like that or some new program to use.” The participants valued the knowledge of the other teachers in the building.

Participants also sought out information related to teaching and learning on their own. For example, they surfed the Web to find instructional strategies and materials for lessons. Mr. Shoop said he is always “Googling” to improve lessons. Ms. Norbury talked about using “Pinterest” to find ideas. Mr. Keating and Mr. Escalante commented on searching the Internet for research-based instructional strategies. The use of technology played a large role in the participants’ professional learning. At Groveton Middle School, teachers shared materials on Google Drive.

Theme Four: Job-Embedded Professional Learning Pertaining to the CCGPS for Literacy in Science Focused More on Reading than Writing, Speaking and Listening, and Language

The purpose of this study was to examine teachers’ perspectives about their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Therefore, each participant talked about his/her literacy-related professional learning experiences. During pre-planning, the participants were introduced to PALS Reading. In addition to the pre-planning session, PALS Reading was brought up in a lot of the participants’ meetings, according to Mr. Escalante. Ms. Norbury said that teachers had asked the administration for more training on PALS Reading. This request led to an English language arts (ELA) teacher filming a PALS Reading lesson to use as an example of how to implement the strategy. Because of all the professional learning received, PALS Reading became their “bread and butter for reading assignments.” The participants indicated that they implemented PALS Reading regularly. For example, Mr. Keating implemented PALS Reading “at least twice a week.” Others, specifically Ms. Frizzle and Ms. Norbury, had doubts about the PALS Reading at first but implemented the strategy regularly by the time of the second interview. During observed meetings, PALS Reading was discussed often. PALS Reading was also identified by the teachers

during a district Impact Check as a strategy used to teach reading in their classrooms. The Impact Check was a time for the school to share their progress and the evidence that had led to that progress with district administrators. In addition to PALS Reading, Mr. Shoop used another strategy called “Coded Reading.”

As for writing-related professional learning experiences, the participants recalled very few details or did not find the experiences valuable. Ms. Frizzle was the only participant that attended the Georgia Science Teachers Association (GSTA) Conference and went to writing strategy sessions. As for the writing-related professional learning experiences provided by Groveton Middle School and Beal County Public Schools District (BCPSD), Mr. Escalante claimed that the activity “was a good one,” but “not efficient in terms of what they want us to do in addition to [other] initiatives.” He tried “to help [his students] make complete sentences because they struggle with that the most.” Ms. Frizzle stated, “He taught how to write a complete paper or essay....We don’t need that long of writing.” The lack of appropriate strategies for teaching writing in a science classroom was the reason she sought writing-related professional learning opportunities at the GSTA Conference, where she learned the C.E.R. and R.A.C.E. Frameworks. Mr. Keating recalled few details about the writing-related professional learning experience and said it was “basically, different strategies of writing and how students are supposed to write.” He did not implement the recommended strategies. Instead, Mr. Keating created a “Writer’s Workshop.”

A writing strategy that integrated a vocabulary activity was called Magnet Summaries. Ms. Frizzle fully explained Magnet Summaries and claimed it was introduced at the beginning of the year. Magnet Summaries was valued by Ms. Frizzle because she thought it taught students their vocabulary words and writing skills, but Mr. Escalante thought the strategy was too time

consuming. Ms. Norbury admitted not implementing Magnet Summaries but said she planned to in the future. Mr. Keating claimed not to have received any vocabulary-related professional learning. Mr. Shoop said he did not implement Magnet Summaries but instead attempted to use vocabulary terms in casual conversation to allow the students to learn science vocabulary “naturally.” Additionally, Mr. Keating and Mr. Escalante attempted to provide a visual for each word because some students may not have prior knowledge of a concept. According to Mr. Escalante, vocabulary is difficult to teach because “Science is sort of like learning a foreign language.” Other vocabulary strategies mentioned were TIP Charts and POST, both described by Ms. Frizzle.

As for speaking and listening strategies, the participants mentioned few professional learning opportunities. At the end of the study, Ms. Norbury discussed attending an off-site classroom observation where speaking and listening were the focal point. According to Ms. Norbury, Ms. Frizzle was in attendance as well. Ms. Frizzle was interviewed before this experience occurred so the researcher did not have the opportunity to ask her about it. Ms. Norbury expressed interest in implementing the speaking and listening strategy next year. After the study, Ms. Norbury and Ms. Frizzle presented the strategy to their colleagues during a faculty meeting, according to informal discussions. Mr. Shoop claimed to want to implement some speaking and listening instructional strategies next year. He stated that debate “has to happen in a science classroom.” Mr. Keating and Mr. Escalante did not discuss the speaking and listening literacy standards.

Theme Five: Job-Embedded Professional Learning Often Lacked Coherence

Participants discussed their formal professional learning experiences and identified individual professional learning needs. In doing so, the participants alluded to experiences that

often lacked coherence. To clarify, many characteristics of high-quality professional learning were discussed, but many of the participants' professional learning experiences seemed to be missing characteristics necessary for successful professional learning such as relevancy to the participants' content area.

For example, Mr. Frizzle was adamant about receiving more content knowledge-related professional learning because that is “the one thing we don't get enough of.” Ms. Norbury made it clear that her literacy-related professional learning was not relevant to her content area. Professional learning must be content- and grade-specific to teachers' subject matter (Birman et al., 2000) so that it meets the needs of the teachers who are participating. Both Ms. Norbury and Ms. Frizzle talked about how they did not have enough time to implement one strategy before learning a new one. The literature on effective professional learning indicates that teachers need sufficient time to interact with resources (Hawley & Valli, 2000) if they are to be successful in implementing what they have learned during professional learning sessions.

When Mr. Escalante was asked about follow-up to professional learning, he mentioned “the district only looks at the data during the Impact check, not whether we are teaching [the strategy].” Ms. Norbury claimed most of her professional learning experiences were “one and done.” Mr. Shoop talked about how some instructional strategies were brought up only during pre-planning, “which seems like light years ago.” Furthermore, Ms. Norbury and Mr. Shoop expressed needing more visual learning strategies utilized during their professional learning experiences.

Chapter Summary

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance

Standards (CCGPS) for literacy in science. During the course of the study, the researcher collected data from participants through semi-structured interviews, participant observations of science meetings, field notes, and collection of artifacts. The data were presented for each individual participant. Their perspectives were presented from the beginning of the study and the end of the study. Then, the data were combined and analyzed using the constant comparative method, which revealed themes.

Five themes emerged to address the research question: What are Georgia's middle school science teachers' perspectives about their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science? The first theme was "Job-embedded professional learning was determined by macro-level educational decisions and micro-level reactions." This theme was constructed from data suggesting that state and district policies and initiatives directly influenced formal and informal professional learning experiences. Because of Georgia's reform plan, Beal County Public Schools District (BCPSD) had to take action to provide its teachers with high-quality professional learning. BCPSD and Groveton Middle School received a reading grant and adopted a technology initiative. Additionally, the participants partook in multiple professional learning activities pertaining to new teacher and student accountability systems.

The second theme was "Job-embedded professional learning created a spectrum of feelings: appreciation, ambivalence, apathy, and inundation." This theme was created from participants expressing various emotions or concerns about their professional learning experiences over the course of the study. During interviews and observations, the participants' expressed various feelings about particular professional learning experiences.

The third theme is “Job-embedded professional learning allowed opportunities for different types of adult learning to occur.” This theme was constructed based on data suggesting Groveton Middle School had a culture of learning. All participants attended formal professional learning sessions, were involved in informal professional learning activities, and the use of technology in their professional learning was present. Because the teachers were given ample amount of time to collaborate, multiple types of adult learning occurred throughout the study.

The fourth theme is “Job-embedded professional learning pertaining to the CCGPS for literacy in science focused more on reading than writing, speaking and listening, and language.” This theme came clear through each aspect of data collection. All participants discussed PALS Reading thoroughly but struggled recalling other professional learning experiences focused on literacy. PALS Reading was the only strategy consistent among all of the participants. For writing and vocabulary instruction, participants implemented different strategies. Speaking and listening strategies were strategies the participants wanted to implement in the future. Moreover, the majority of the participants hinted at wanting more common literacy strategies to have in their teaching arsenal.

The final theme is “Job-embedded professional learning often lacked coherence.” To be clear, many characteristics of effective professional learning were present but not all. Through discussion about the participants’ professional learning needs, it became clear that many characteristics were not present. For example, many of the literacy-related professional learning experiences were not relevant to their content area. Instead, these experiences were related to English language arts subject matter. The participants recommended approaches that would help them implement specific strategies and feel more supported.

Chapter 5 provides a summary of the research design for this study. Next, the themes that emerged during the analysis of the data are discussed in relation to the literature. Implications for future research involving policymakers, school district personnel, school leaders, teachers, and professional learning providers are discussed, as well. The chapter ends with concluding thoughts about the present study.

CHAPTER 5

SUMMARY, DISCUSSION, AND IMPLICATIONS

The purpose of this study was to examine middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The scope of this study was focused on middle school science teachers.

The overall research question was

- (1) What are Georgia middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science?

This chapter presents the summary, discussion, and implications of the study. First, a summary of the research design is provided. Next, the five themes that emerged from the case study analysis are discussed in relation to the review of relevant literature. After the discussion sections, the implications of the findings from this study for future research involving policymakers, school district personnel, school leaders, teachers, and professional learning providers are explained. The chapter ends with concluding thoughts about the study.

Summary of the Research Design

A qualitative case study design was used to examine middle school teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. The participants included five science teachers at Groveton Middle School. Case study methodologies were used to conduct this research, and it is

difficult to generalize findings to other populations or settings using this form of research. The data reflected the perspectives of these participants at this particular school in North Georgia.

The theoretical frame for this study was guided by constructivism, including social constructivism and symbolic interactionism, while applying an interpretive analysis. The underlying focus this frame offers is a perspective in which individuals actively construct meaning from lived experiences and through social interactions (Fosnot & Perry, 1996; Patton, 2002). An interpretive qualitative approach was applied to understand the meanings and the nature of the participants' professional learning experiences (Prasad, 2005). The study was designed to examine teachers' perspectives, specifically the participants' feelings, thought processes, and emotions about their professional learning experiences as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science.

Prominent and seminal literature and research was reviewed to ground the study. First, the historical influences of educational policy on teacher professional learning were reported. Second, the current Georgia educational policies affecting science teachers' professional learning were discussed. Specifically, standards-based reform, educational change, and science-literacy related professional learning studies were reviewed. Third, a review of the theoretical underpinnings of professional learning was conducted, including the various types of adult learning. Lastly, successful professional learning practices were discussed. The review of literature helped develop an initial understanding of the type of methodology needed for this study. A qualitative case study was identified as the best method.

Qualitative case study research enabled the researcher to examine and understand the experiences of each participant and to understand fully how individual perspectives come

together to form a whole (Merriam, 2009). Case study research depends on various data sources (Yin, 2009). Data sources gathered and analyzed included:

- (1) Transcriptions from two semi-structured interviews with each participant, totaling 10 individual interviews. Interviews lasted about 45 minutes each. Interviews were conducted at the beginning of the study and at the end of the study.
- (2) Observation notes from 14 science meetings. All meetings lasted roughly an hour.
- (3) Artifacts collected throughout the research, including agendas and minutes from meetings, local school and district initiative plans, weekly school calendars, and district-wide calendars.
- (4) Field notes were taken before, during, and after all interviews and observations.

Throughout data collection and analysis, the constant comparative method was applied (Corbin & Strauss, 2015). During data collection, the constant comparative method determined additional categories that were added to the interview guide if needed. The constant comparative method allowed the researcher to focus on patterns across the participants' comments and actions, including similarities and differences. Also, the constant comparative method assisted in discovering emergent themes across the case. The study began in January 2015 and concluded in April 2015.

Yin's (2013) case study research design was followed. The research design was cyclical. The steps included planning, designing, gathering and analyzing data, drawing conclusions, and sharing the findings. The data represented the perspectives of the five participants at Groveton Middle School. A case study approach was used to examine the perspectives of five middle school science teachers on their professional learning as they implemented the Common Core

Georgia Performance Standards (CCGPS) for literacy in science. The participants' shared insights informed this research study.

To analyze the gathered data, the researcher first disaggregated the data into two parts: the beginning of the study and the end of the study. The purpose of dividing the data into two parts was to highlight the nature of temporal change in their perspectives. The nature of temporal change is emphasized because teachers' perspectives can change during different times of the school year. For example, teachers might be more stressed during the annual district walk-through, so their perspectives might be more negative. Also, this approach made the data more manageable for analysis. Once the data was divided, the researcher applied open coding using gerunds, which broke apart the data into smaller units for each transcript. Memos were written and used to collapse initial codes into categories (Corbin & Strauss, 2015). The initial coding and memos were used, while applying the constant comparative method to compare similarities and differences between each participant's data.

Next, the researcher used priori codes for focused coding purposes (Corbin & Strauss, 2015). Focused coding allowed the researcher to reduce the data (Charmaz, 2014). After much coding and memo writing, the researcher combined the data back together. Then, the researcher created a table for each category to apply the constant comparative method (Corbin & Strauss, 2015). Tables enabled the researcher to compare each participant's comments and actions. After tables were created and the constant comparative method was applied, the researcher wrote more memos. The researcher was able to compare across each participant to check for similarities and differences. This resulted in the five themes presented as findings.

The participants were asked to participate in two semi-structured interviews with the researcher and agree to participant observations during 14 meetings. The participants were asked

to share their personal opinions and perspectives on their professional learning experiences, specifically in regard to the CCGPS for literacy in science. Throughout the study, the researcher took the necessary course of action to establish trustworthiness, validity, and reliability.

Discussion

Referencing the review of relevant literature in Chapter 2, the five themes that emerged from the case study analysis are discussed. For clarification, all themes begin with *job-embedded professional learning* because all participants engaged in job-embedded professional learning practices. Job-embedded professional learning is defined as “teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers’ content-specific instructional practices with the intent of improving student learning” (Croft, Coggshall, Dolan, Power, & Killion, 2010, p. 2). Furthermore, job-embedded professional learning is defined as teachers actively engaging in their work and thinking about how to support student learning (Zepeda, 2015).

Theme One: Job-Embedded Professional Learning was Determined by Macro-Level Educational Decisions and Micro-Level Reactions

For this discussion, macro-level educational decisions are defined as the Race to the Top decisions made by the federal and Georgia governments, and national and state-wide organizations (Brady, Duffy, Hazelkorn, & Bucholz, 2014). Although the Race to the Top Fund grant program was not a federal mandate, the state of Georgia accepted Race to the Top money. In return for the funds, the federal government expected certain results based on specific stipulations from Georgia (McQuinn, 2012). Georgia’s Race to the Top reform plan had many specific stipulations, but for the purpose of this study, the implementation of high-quality science standards was the focal point (Galey, 2015). Georgia’s educational decisions, in turn, directly

influenced micro-level educational decisions (Johnson, 2013). Micro-level educational decisions were made by school districts and schools in reaction to macro-level educational decisions and to produce desired macro-level outcomes (Johnson, 2013). For the purpose of this study, the micro-level educational decisions made were done so by Beal County Public Schools District (BCPSD) personnel and Groveton Middle School leaders and teachers.

Over the last three decades, the federal government has attempted to reform teacher professional learning (Wynne, 2010). Immediately entering the Oval Office, President Barack Obama presented Congress with an economic stimulus package called The American Recovery and Reinvestment Act of 2009 (Public Law 111-5). Within this Act, the Race to the Top Fund grant program was presented. In support of Race to the Top Fund grant program, in 2010, the U.S. Department of Education (2010) published *A Blueprint for Reform: The Reauthorization of Elementary and Secondary Education*. Essentially, this document reviewed the criteria for Race to the Top Fund grant program and suggested professional learning necessary for each aspect. The U.S. Department of Education (2010) recommended restructuring the school day for job-embedded professional learning, so that teachers had time to collaborate and improve their practice.

The participants never mentioned when their professional learning became job-embedded at Groveton Middle School. That being said, Ms. Frizzle explained how often professional learning occurred during the workday. For example, she stated the BCPSD offered professional learning “during our pre- and post-planning days...teacher workdays...planning periods.” According to documents collected, WOW professional learning sessions occurred weekly. All of the professional learning experience formats Ms. Frizzle mentioned above are considered job-embedded professional learning. According to participant observations, the science teachers met

twice a week to discuss data and lesson planning. Groveton Middle School has implemented job-embedded professional learning as suggested by the U.S. Department of Education. Job-embedded professional learning is also supported by nationally recognized scholars and researchers (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Huffman, Hipp, Pankake, & Moller, 2014; Zepeda, 2015).

To reiterate, the state of Georgia received \$400 million from the federal government to fund their reform plan (Georgia Department of Education, 2015a). The priorities of Georgia's reform plan included:

- (1) Set high standards and rigorous assessments for all students – leading to college and career readiness;
- (2) Provide great teachers and leaders;
- (3) Provide effective support for all schools, including the lowest achieving schools; and,
- (4) Lead the way in science, technology, engineering, and mathematics (STEM). (p. i)

The implementation of the Race to the Top funding affected professional learning for middle school science teachers at Groveton Middle School.

Implementation of science standards was the focal point for this study. Participants discussed the Georgia Performance Standards (GPS), Common Core Georgia Performance Standards (CCGPS), and the Next Generation Science Standards (Next Gen). Mr. Keating, Mr. Escalante, and Mr. Shoop mentioned receiving professional learning about “breaking down standards.” For example, Mr. Keating talked about professional learning set forth by the district and how he was trained to “[break] down the standards, how to recognize the power standards.” Calkins, Ehrenworth, and Lehman (2012) presented a four-step process to implement the Common Core State Standards (CCSS): (1) introduce the standards, (2) study the standards, (3)

assess where you are with the standards, and (4) plan to implement the standards. The participants received this type of professional learning, but the participants were not concerned about the different sets of standards. Ms. Norbury admitted, “I have not really read through [the literacy standards].” Additionally, Ms. Frizzle attended the Georgia Science Teachers Association (GSTA) Conference pertaining to the Next Gen and was in support of them, whereas Ms. Norbury did not “think it’s going to go through” legislation.

In reaction to the standards set forth by the state, Beal County Public Schools District (BCPSD) and Groveton Middle School received a reading grant to improve literacy instruction. According to documents collected, the reading grant provided the funds for PALS Reading and Writing to Command Attention professional learning. PALS Reading professional learning was mentioned most by all participants. Writing to Command Attention was rarely recalled by its name but was recognized as a professional learning session by the participants. Additionally, the grant funds purchased leveled reading books mentioned by Ms. Frizzle and Ms. Norbury at the end of the study.

As for new assessments, the participants discussed the Georgia Milestones Assessment System (Georgia Department of Education, 2015g). The Georgia Milestones were being implemented during the time of this study. Mr. Shoop mentioned recent WOW sessions focusing on the Georgia Milestones. Moreover, writing instruction was greatly influenced by the Georgia Milestones. For example, Ms. Norbury claimed, “We get [students] to write answers a lot because of the constructive responses coming up on the [Georgia Milestones].” Ms. Frizzle discussed why she attended writing instructional strategies sessions at the GSTA Conference, and stated, “Because constructed responses are on the Georgia Milestone for science.” Learning

how to teach students how to write constructive responses was brought up often in observations and informal conversations with the participants.

In 2012-2013 Georgia created and implemented a new teacher evaluation system, Teacher Keys Effectiveness System (TKES), as part of their plan for providing great teachers (Georgia Department of Education, 2015f). According to documents collected by the researcher and comments made by Ms. Frizzle, TKES was a topic for professional learning. When discussing what or who determined her job-embedded professional learning experiences, Ms. Frizzle stated, “[BCPSD] provides professional learning based on new things being passed in legislation like TKES.” As part of TKES, teachers identify their specific professional learning goals, which provides teachers an opportunity to take control of their own professional learning (Georgia Department of Education, 2015f).

Lastly, the BCPSD reacted to Georgia’s reform plan by implementing a technology initiative to address STEM (Science, Technology, Engineering, and Mathematics) education. In recent years, BCPSD had made a strong push to provide each Groveton Middle School student with a digital device. Participants frequently discussed receiving professional learning on the use of technology in their classrooms, technology-related professional learning that was related to classroom instruction and assessments. Mr. Keating remarked that most of the professional learning he had received was focused on technology and referred to a recent session about computer-based simulations. Ms. Frizzle, however, said there has been too much technology-related professional learning and said she needed more time to implement each strategy before focusing on another.

All of the examples provided above demonstrate how macro-level educational decisions influence micro-level reactions, in turn, influencing teacher professional learning. Johnson

(2013) believes micro-level reactions to macro-level educational decisions leads to “educational turbulence,” which is created by multiple sets of standards and assessments being advocated for by different entities and being implemented by teachers simultaneously. Because there are multiple initiatives and programs being implemented at Groveton Middle School, participants felt that their professional learning “sort of blends together.” Teachers were just “grabbing the stuff that is the most important” to them and implementing the instructional strategy that most appealed to them or that they understood the most while they ignored professional learning focused on other strategies and initiatives. The interplay of components between macro- (state and federal) and micro-levels (district and school) can facilitate or impede educational change because different groups may want different outcomes (Johnson, 2013). For example, the state wants to see student growth in mathematics and science, whereas schools may put more emphasis on arts that are not tested.

Theme Two: Job-Embedded Professional Learning Created a Spectrum of Feelings: Appreciation, Ambivalence, Apathy, and Inundation

To understand educational change, characteristics of change, types of change, and barriers to change were reviewed in Chapter 2. Additionally, Hord, Rutherford, Huling-Austin, and Hall’s (1987) Concerns-Based Adoption Model (CBAM) was discussed. For example, a characteristic of change is that it is incremental (Hord, et al., 1987). Ms. Norbury discussed how she did not implement PALS Reading until she was influenced to do so by the special education teacher. This marked the time Ms. Norbury began to trust and respect the new instructional strategy as being one that might work for her students.

An example of a barrier to change is insufficient resources (Zepeda, 2012). Ms. Frizzle and Ms. Norbury both commented on the lack of time set aside for implementing technology

instructional strategies proficiently. Another example of a barrier to change is underrepresentation in the decision-making process. Some of the participants felt they had very little input in determining their professional learning or in the sessions themselves. Mr. Shoop commented on the fact that the administration did not ask him about his professional learning needs. All of the participants discussed different professional learning needs, so they often did not “buy-in” to a particular program because they did not believe it was important or relevant to their teaching situations. For example, Ms. Norbury “blocked out” instructional strategies because she believed them to be “all about ELA” and not related to her content area.

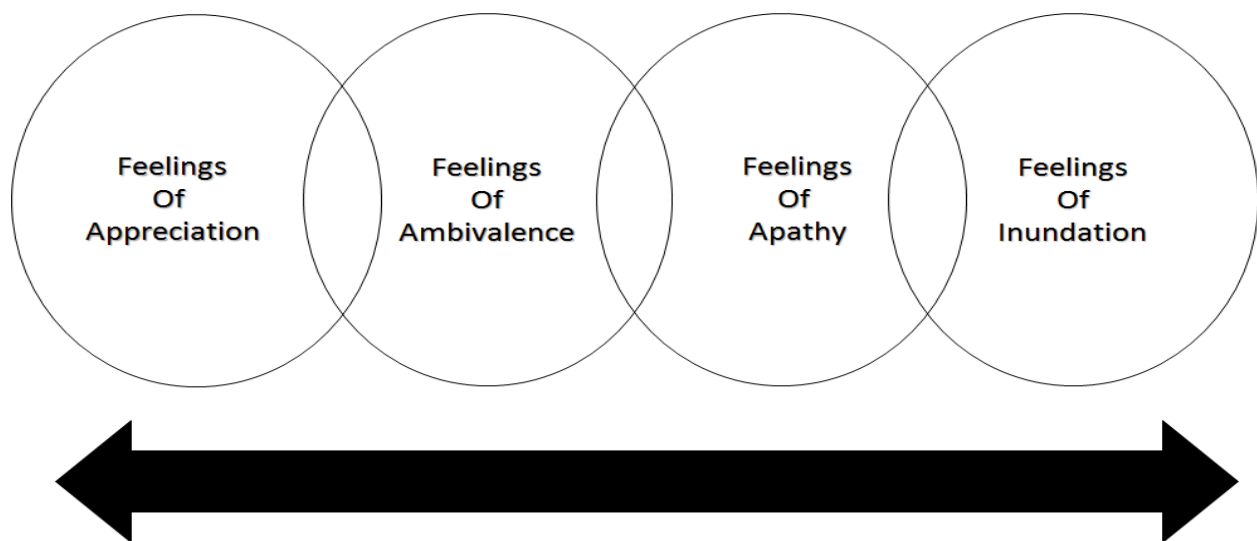
To discuss CBAM in relation to this study, the researcher thought the framework needed to be altered for a perspective-seeking study because not all constructs of CBAM could be investigated. CBAM has three constructs: Stages of Concern, Innovation Configurations, and Levels of Use (Hord et al., 1987). First, Levels of Use cannot be confirmed in this perspective-seeking study. Classroom implementation of innovations were not observed. The implementation process was discussed only in interviews. Therefore, implementation claims had little validity. Second, Innovation Configurations is a tool that provides clear actions for people involved in a program. This tool helps school leaders understand how someone might implement a strategy. Again, classroom instruction was not observed as part of data collection in this study; only meetings were observed. The next construct—Stages of Concern—addresses participants’ feelings and perceptions as they implement a new strategy. Analysis of participant feelings about strategy implementation can be beneficial in a perspective-seeking study but complicated to dissect when multiple programs are being implemented simultaneously. It may not be possible for teachers to completely separate their emotions about one aspect of their professional learning from another professional learning experience.

Although, the purpose of the study was to examine teachers' perspectives about their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science, all participants shared perspectives about various job-embedded professional learning experiences. For example, participants attended professional learning sessions related to technology, assessments, and teacher evaluations. The amount of professional learning the participants received created a spectrum of feelings: appreciation, ambivalence, apathy, and inundation.

Multiple changes occurring simultaneously influenced various feelings felt by the participants. Additionally, the perspectives were presented from the beginning of the study and the end of the study. Therefore, a spectrum of feelings has the potential to highlight the nature of temporal change in their perspectives. Figure 5.1 illustrates the spectrum of feelings the participants felt about their professional learning experiences.

Figure 5.1

Spectrum of Feelings Felt about their Professional Learning Experiences



Each participant expressed multiple perspectives when discussing various professional learning experiences and activities. At times, participants shared multiple viewpoints about the

same innovation during an interview. For example, participants commented about how much they valued or appreciated their professional learning experiences, but in most cases, these feelings of appreciation were followed by different and contradictory feelings. Mr. Escalante stated, “I still feel like we get some good professional development. It is some good stuff, but there is a fear factor.” The fear factor occurred when professional learning activities were in large groups and teachers felt they could not express their professional learning needs. Ms. Frizzle thought the BCPSD did a good job “responding to the requests and needs of the teachers, but sometimes I almost think [the professional learning experiences] are overkill.” Ms. Norbury said, “My personal opinion is that a lot of [the professional learning experiences] are great ideas” but moments later was quite critical of her experiences. In short, participants began by complimenting the BCPSD for providing multiple professional learning opportunities and understanding the importance of professional learning, but were simultaneously disapproving of their professional learning experiences.

At times, there was a lack of enthusiasm for an instructional strategy because it was considered to be too time consuming or irrelevant to implement. For example, Mr. Escalante talked about how the writing and vocabulary instructional strategies were not practical because of the amount of time they took to implement. Ms. Norbury claimed all of her literacy professional learning experiences were “all about ELA;” therefore, she would “block it out.” Throughout the study, there was a constant shift of feelings being reported by the participants. The spectrum of feelings felt by the participants were result of multiple professional learning experiences occurring simultaneously.

Theme Three: Job-Embedded Professional Learning Allowed Opportunities for Different Types of Adult Learning to Occur

Formal learning—one type of adult learning—occurs when adults learn in a controlled environment (Mocker & Spears, 1982). Formal learning experiences were reported most during this study. Ms. Frizzle mentioned, “The district provides professional learning during our pre- and post- planning days and throughout the year, as well.” In addition to pre- and post-planning days, the participants attended weekly WOW sessions. The majority of these sessions were planned and led by Beal County Public Schools District (BCPSD) personnel, Groveton Middle School leaders and faculty, and hired trainers, and all of them occurred during teachers’ workday, according to documents collected. For example, Mr. Escalante recalled a male professional learning provider leading the Writing to Command Attention seminar, which is an example of a teacher or trainer being responsible to teach a specific curriculum (Hager, 2012).

Although a lot of formal learning took place at Groveton Middle School, informal learning occurred as well. According to Beckett and Hager (2002), informal learning is based on adults’ interests, experiences, and engaging with colleagues. These informal learning experiences, also referred to as non-formal learning (Hodkinson & Hodkinson, 2004; Illeris, 2009; Schwier & Seaton, 2013), are examples of adult learning. Throughout the study, the science teachers collaborated with one another during meetings. Teachers discussed students, assessments, lesson plans, and instructional strategies during observations. For example, the participants discussed how they asked other teachers about literacy instructional strategies. As evidence of these collaborative discussions, Mr. Keating said of the writing strategies he was using, “I get them from English language arts [teachers].” During faculty meetings, according to Ms. Frizzle, teachers were encouraged to share a strategy they came across or used in their

classrooms. The teachers at Groveton Middle School learned to rely on each other's expertise and helped one another out.

During observations, the participants engaged in learning through digital platforms, which provided opportunities for adult learning experiences (Killion, 2013). In meetings, the participants constantly navigated the Internet for instructional strategies. During interviews, Ms. Norbury mentioned looking up strategies on Pinterest, and Mr. Escalante discussed how he "look[s] things up on the Internet." Mr. Shoop said, "I am always Googling." Furthermore at Groveton Middle School, teachers were able to access all formal professional learning materials on their Google Drive, which provided opportunities for teachers to be self-directed in their learning.

Theme Four: Job-Embedded Professional Learning Pertaining to the CCGPS for Literacy in Science Focused More on Reading than Writing, Speaking and Listening, and Language

According to the Georgia Department of Education (2015c), the Common Core Georgia Performance Standards (CCGPS) for literacy in science is defined as:

- (1) Building knowledge through reading content-rich nonfiction;
- (2) Reading, writing, and speaking grounded in evidence from text; and,
- (3) Regular practice with complex text and its academic vocabulary. (para. 1)

During each interview, participants frequently discussed their reading-related professional learning experiences. PALS Reading was mentioned most. For example, Mr. Escalate stated that "They mention PALS a lot in our meetings. It is constantly brought up in our data team meetings." According to interviews and collected documents, PALS Reading was a strategy implemented often in the participants' classrooms. Coded Reading was another reading strategy teachers learned about through job-embedded professional learning. These reading strategies

were used to help students read content-rich nonfiction. To support the school's emphasis on reading, Groveton Middle School science teachers received leveled books to use in their classrooms.

All participants mentioned needing to teach students how to write constructed responses, so they wanted professional learning focused on writing-related strategies. For writing-related professional learning experiences, all participants recalled a session during pre-planning. According to documents collected, this specific professional learning session was called Writing to Command Attention. Participants remembered the session, but struggled to recall specific details about the strategy. Ms. Frizzle mentioned the strategy was for writing essays, not paragraphs, so she didn't see how it was relevant for teaching students how to write constructed responses in science. Mr. Escalante enjoyed the professional learning activity, but couldn't remember the actual strategy, rather than it was time consuming. Ms. Norbury complained about the strategy being focused on English language arts (ELA) classrooms, saying that no explicit examples were provided on how to use the strategy in a science classroom. As a result of participating in formal writing-related professional learning that was either not relevant or memorable, the participants relied on informal professional learning practices to address writing instruction in science classrooms. Mr. Keating discussed creating a "Writer's Workshop" he learned from conversations with an ELA teacher. Ms. Frizzle used a writing strategy she learned about in a professional learning session she attended at a state-level science conference. Mr. Keating suggested that it would have been helpful to the teachers to have a common cross-curricular writing instructional strategy. Perhaps that was the goal of the writing-related professional learning in which the science teachers participated during pre-planning, but the way in which it was presented lacked science-specific examples for implementation.

For academic vocabulary-related professional learning experiences, the participants did not mention any recent WOW professional learning sessions. When Mr. Keating was asked about vocabulary-related professional learning experiences, he admitted not having one for teaching vocabulary. Mr. Shoop admitted the same. Ms. Frizzle discussed various strategies she had learned in the past (e.g., TIP Charts and POST). Mr. Keating and Mr. Escalante claimed to associate vocabulary words with a picture or video as their strategy. Mr. Escalante thought teaching vocabulary was difficult because “Science is sort of like learning a foreign language.” Also, Mr. Escalante mentioned attending a TIP Chart session in the past. Ms. Norbury observed a teacher in a different school who used a strategy in which students used academic language in the classroom and said she intended to share this with the faculty and implement this strategy next year, although the researcher does not know whether that happened or not. While the school appeared to have placed emphasis on literacy-based strategies for all content areas, from the perspectives of this study’s participants, it seemed that professional learning focused mostly on reading strategies, with little or no attention given to writing or vocabulary-related professional learning.

Although participants discussed being overwhelmed by the expansive professional learning offered at Groveton Middle School and in BCPSD and often were tired or distracted during the sessions, four out of the five participants mentioned needing more science-literacy related professional learning experiences. Mr. Keating claimed to want “a hundred strategies...on reading or writing,” Ms. Norbury expressed wanting more science-literacy discussions, not English language arts discussions. Mr. Shoop, Mr. Escalante, and Ms. Norbury all wanted more visual examples of implementing the literacy strategies they learned about in professional learning sessions. Mr. Keating wanted to learn more about more cross-curricular

literacy strategies, like PALS Reading. Ms. Frizzle was the only participant completely confident in teaching literacy skills in her classroom. These comments are similar to the literature about implementing literacy skills in science classrooms (e.g., Murnane, Sawhill, & Snow, 2012; Stewart-Dore, 2013). The participants understood the importance of integrating literacy instruction into their subject matter but lacked the confidence in doing so.

Theme Five: Job-Embedded Professional Learning Often Lacked Coherence

To be clear, many characteristics of successful professional learning practices were described by the participants. For example, the participants' professional learning was embedded into their daily work (Fullan, 2007). The professional learning received did provide knowledge, skills, and practices to improve student learning (Learning Forward, 2015a). Participants were given time to collaborate with colleagues to discuss student work and assessments (Darling-Hammond & Falk, 2013). However, theme five addresses the characteristics that were not present in their professional learning experiences according to participants' perspectives.

The participants were offered professional learning opportunities that lacked characteristics of high quality professional learning provided in a review of the literature in Chapter 2. According to the literature on professional learning, professional learning experiences need to extend over a period of time and allow teachers sufficient time to interact with resources (Darling-Hammond & McLaughlin, 2011; Guskey, 2003; Hawley & Valli, 2000). However, time to implement a new strategy and reflect on its use was not often provided, according to the participants' perspectives. Ms. Norbury complained about not having enough time to implement a strategy or "digest" what was learned. When discussing technology-related professional learning, Ms. Frizzle mentioned not having enough time to implement a strategy before learning a new one. The PALS Reading strategy seemed to be the exception. PALS Reading professional

learning extended over the year and the participants reported having efficient time to implement the strategy.

Another characteristic of successful professional learning is that professional learning experiences must be continuous, ongoing, and contain follow-up (National Research Council, 2000; Corcoran, 1999). Mr. Escalante hinted that no one followed-up on whether or not the strategy was being implemented. He added that school district personnel would be looking at data during an “Impact Check.” Ms. Norbury claimed many of her professional learning experiences were “one and done unless they specify [they] need more.” Ms. Frizzle discussed how they could ask for help, and the district would follow-up or the teacher can review professional learning materials on the Google Drive, but rarely did participants ask for help. Therefore, relying on teachers to ask for help as a follow-up strategy was unsuccessful. Once again, PALS Reading was the exception. There appeared to be ongoing sessions for PALS Reading as a reminder or a “refresher,” according to Mr. Keating.

According to the literature on effective professional learning, professional learning sessions must be specifically targeted to teachers’ subject matter and grade levels (Birman et al., 2000; Corcoran, 1999; Garet et al., 2001; Desimone et al., 2002). This practice of successful professional learning appeared to be absent from Groveton Middle School professional learning activities, according to participants’ perspectives. Ms. Frizzle continually discussed wanting more content-based professional learning, not technology or literacy. Mr. Keating hinted that most of the literacy-related professional learning was English language arts-based, not relevant to science classrooms. Ms. Norbury seemed to be the participant most bothered by the lack of attention paid to providing science-specific professional learning. She claimed the literacy-related professional learning was never about science. She mentioned that all examples were for

English language arts (ELA) teachers, with the presenter only hinting at how the strategy could be implemented in a science classroom. Mr. Shoop wanted more science-focused professional learning, as well.

Another practice of successful professional learning is the use of a variety of learning strategies (Garet et al., 2001; Joyce & Showers, 1995). According to the participants' comments, their professional learning incorporated various learning strategies. Teachers were given time to listen to the presenter, discuss with colleagues, and manipulate the materials. However, the missing learning strategy was the use of visuals that demonstrated how the strategy was to be implemented, specifically visuals connecting to real world experiences. According to Ms. Norbury, videos that were shown did not help because the students in the video were not representative of the students she taught. She claimed to be a visual learner and was unsatisfied with how few visual examples were used during professional learning sessions. Mr. Shoop indicated wanting to see more videos, as well. Mr. Escalante suggested that demonstrations of the implementation of a strategy would be helpful, such as having a literacy instructional coach co-teach lessons with him. By co-teaching writing-based lessons, teachers may get more comfortable teaching writing instructional practices. When the teachers asked, an English language arts teacher filmed herself implementing PALS Reading, which helped the participants implement the strategy in their own classrooms. This video eliminated one of the barriers to change (Basom & Crandall, 1991) that participants were experiencing.

In the following section, the researcher discusses implications for future research involving policymakers, school district personnel, school leaders, teachers, and professional learning providers. More specifically, the implications offer suggestions for Beal County Public

Schools District (BCPSD), and Groveton Middle School leaders and teachers. The chapter ends with concluding thoughts about the study.

Implications for Future Research

The findings of this study have implications for future research involving policymakers, school district personnel, school leaders, teachers, and professional learning providers. The literature involving teacher professional learning and teachers' perspectives is plentiful, but research on professional learning practices of teachers is significant because of the current political arena surrounding educational reform. While policymakers continue to push for educational reform, teachers need to have a voice. Professional learning is looked at as the "silver bullet" to implementing educational policies and initiatives. If professional learning is going to continue to be used as the primary tool for implementation, there is a need to capture diverse perspectives about professional learning experiences in multiple contexts to try to understand how teachers conceptualize and implement these educational policies and initiatives.

This study attempted to examine the perspectives of five science teachers who worked at Groveton Middle School, a Title 1 school in North Georgia with nearly 700 students. This study was limited to the perspectives of five participants. The educational climate at Groveton Middle School allowed for job-embedded professional learning to take place. No two school districts or schools are the same, so another case study of teachers' perspectives about their professional learning may not have the same results. Other contexts could be explored to see if the feelings, beliefs, and experiences of this study's participants are commonly held feelings and beliefs about professional learning related to standards implementation or other educational reform policies.

Although much can be learned from the findings of this study, the case study approach examined the perspectives of only five participants and was conducted only at one school. The

implications for future research surround the ideas of applying different research methods and a broader number of participants to discover further the impacts of professional learning on teachers in the era of the Race to the Top Fund grant program. The findings in this study illustrated that teachers have an abundance of professional learning while implementing the Common Core Georgia Performance Standards (CCGPS), which can hinder the implementation of multiple policies, initiatives, and/or programs. If this study had been conducted with more faculty members at Groveton Middle School, would the results have been the same? Would the results have been the same across the Beal County Public Schools District (BCPSD)? What about with educators across the state of Georgia? Would the results be comparable to other states implementing the Common Core State Standards (CCSS)? Most likely the results would not be the same as other studies with a broader scope; therefore, the presented case study cannot be generalized.

The study was grounded in constructivism, including social constructivism and symbolic interactionism, while applying an interpretive analysis. It is possible that if different methods had been used for collecting and analyzing data that the results would have been different. For example, the researcher did not observe classroom implementation, so would observations have informed the study to render different results? What if perspectives of professional learning providers, administrators, and/or students had been included as well? What if student-literacy scores had been collected and evaluated? Or perhaps instead of using the constant comparative method, what would the results be if a discourse analysis (Creswell, 2013) had been applied?

At the time of this study, much of the Common Core State Standards (CCSS) professional learning research did not address the literacy standards for science. Hopefully the

findings of this study will help guide and facilitate future research on the CCSS literacy for science and better inform how to support science teachers during standards-based reform.

Implications for Policymakers

This perspective-seeking study shed light on how multiple initiatives being implemented at once creates a feeling of inundation for teachers. An implication for policymakers is to listen to teacher voices to help inform policy. The participants were quite explicit about being stressed because multiple initiatives were implemented simultaneously. The teachers felt there was not enough time in a day to accomplish what was being asked of them. Policymakers must make a greater effort to seek teacher voices about what affects their professional learning experiences. In this study, the abundance of professional learning caused certain programs and initiatives to be put on the back burner by the participants. For example, teachers explained how the technology initiative was focused on more than some literacy instructional programs (e.g., Writing to Command Attention). Therefore, the participants were more inclined to implement technology-related instructional practices than Writing to Command Attention instructional strategies.

As reauthorization of No Child Left Behind (NCLB) continues to be discussed by Congress (U.S. Department of Education, 2015b), policymakers need to be aware of the amount of time teachers need to implement a reform plan. Georgia policymakers changed the name of the state standards from Common Core Georgia Performance Standards (CCGPS) to Georgia Standards of Excellence after the study. However, the language of the standards remained closely the same (Georgia Department of Education, 2015e). In the opinion of this researcher, policymakers should be less concerned about the name of the standards and more concerned about the implementation of them. Political debates about the name of standards should not be a

distraction. Policymakers need to make a greater effort to hear the needs of teachers and understand their professional needs.

Implications for School District Personnel

Based on the findings from this case study, the Beal County Public Schools District (BCPSD) does a fine job of supporting its teachers. Each participant mentioned receiving plenty of professional learning and expressed feelings of being supported. Furthermore, the science content coach was praised throughout the study. BCPSD was implementing multiple initiatives because of Georgia's reform plan and is "probably trying to figure out that balance of professional learning." The district was reacting to the decisions made at the macro-level. The BCPSD gave opportunities for their teachers to voice their concerns and appeared to take their comments under advisement.

A suggestion for the BCPSD is to provide more opportunities for district personnel to assist teachers in implementing strategies in classrooms after they have received professional learning. According to Mr. Escalante, the school district personnel do not follow-up on professional learning. The district personnel only looked at data during Impact Check. According to documents collected, the participants recorded literacy strategies they implemented in their classroom on paperwork for the Impact Check. During an observation, some participants had a difficult time recalling the strategies that had been written down for an Impact Check. For instance, many participants could not explain Magnet Summaries. Ms. Frizzle mentioned implementing the strategy, but no one else had. Because Ms. Frizzle implemented Magnet Summaries, it was written on the documents they reported to the district, although the majority of the participants did not implement this strategy.

School district personnel should seek ideas from teachers about how they can provide support that is informative and instructional rather than evaluative and punitive. Perhaps before district walk-throughs, district personnel and teachers can discuss why a specific instructional strategy should be altered during implementation. Possibly, teachers having more opportunities to have open dialogue with district personnel about instructional strategies will improve classroom instruction and provide district personnel more understanding about why teachers refine or ignore specific instructional strategies. Open dialogue between teachers and district personnel may reduce certain instructional strategies being reported to the district that are not being implemented by most teachers.

Implications for School Leaders

The study indicated the participants appreciated the amount of support they were given from school leaders, but at times the professional learning was “overkill.” The amount of professional learning received by the participants appeared to be overwhelming. Ms. Norbury discussed how WOW sessions did not allow enough time to learn a new strategy. Ms. Frizzle talked about how she got frustrated about learning a new strategy before implementing the one from the previous WOW session. Mr. Escalante said, “We get a lot of professional learning. It sort of blends together sometimes.” These comments are evidence that participants viewed the amount of professional learning in which they were required to participate was overwhelming.

To reduce teachers feeling overwhelmed, Groveton Middle School leaders should focus on fewer instructional strategies provided in professional learning. The strategies should be cross-curricular instructional practices. By focusing on a few cross-curricular instructional strategies, teachers will less likely feel overwhelmed and feel like they have had enough time to implement a strategy. For instance, technology-related instructional practices professional

learning frustrated participants, but teachers enjoyed PALS Reading because the instructional strategy was mentioned often during WOW sessions and meetings. PALS Reading was considered a success because it was a common cross-curricular strategy implemented by Groveton Middle School teachers, according to Mr. Keating.

Another suggestion for Groveton Middle School leaders is to begin exploring avenues for lesson study professional learning. Lesson study is a type of professional learning that promotes year-long teacher collaboration and inquiry through the use of planning, observation, discussing, and evaluating sessions (Lewis, Perry, & Hurd, 2004). The researcher suggests lesson study professional learning because participants discussed wanting to see a lesson planned and implemented using a specific instructional strategy. However, lesson study can be quite time consuming and like Ms. Frizzle said, “time is our enemy as teachers.” Therefore, a possible avenue for lesson study professional learning the Groveton Middle School leaders can explore is creating a video library of instructional strategies in the curriculum portal.

For example, Ms. Frizzle can videotape a lesson implementing the C.E.R. Framework for writing in a science classroom. She can upload the video and the other science teachers can watch it at their convenience. Moreover, the teachers can provide feedback and have open dialogue in an asynchronous chatroom (Killion, 2013). As more videos are uploaded to the library, teachers will be able to “pick and choose” their professional learning experiences. Videos can be attached to the suggested activities in the curriculum portal. Additionally, the video library can be monitored and provide the school leaders with data about which professional learning topics the teachers explore most. The suggestion box in place is not being utilized by all teachers.

In addition to having more cross-curricular instructional strategies and creating a digital database for lesson study to occur, Groveton Middle School leaders need to improve their follow-up strategies. Through informal discussions during observations, the researcher was informed that instructional coaches observe classroom instruction. Also, the instructional coaches help with reporting data. Rather than observations and chiming in at times during classroom instruction, instructional coaches should co-teach literacy-oriented lessons, as Mr. Escalante suggested. These supports may help teachers feel more comfortable teaching literacy skills in their classrooms.

Implications for Teachers

Based on the findings of this study, teachers need to be more proactive about expressing their professional learning needs. The majority of participants commented about how the school district personnel and the school leaders listened to their recommendations, but few provided suggestions in the anonymous suggestion box. Mr. Shoop believed the administration did not ask him about his professional learning needs, but recognized there is a suggestion box. Mr. Escalante recognized the suggestion box, but does not make recommendations because he gets “caught up in the day to day routine and never think about it.” Mr. Keating said, “We have a suggestion box and I think the employees say they need help because they are struggling in this area. The administration puts the WOW session in place in order to help teachers address their needs.” When asked if he does, he said, “No.”

When the researcher asked the participants about their professional learning needs, each participant made a suggestion. Ms. Frizzle expressed wanting more content-based professional learning. Mr. Keating recommended more common literacy-related instructional strategies. Ms. Norbury and Mr. Shoop talked about the need to see relevant demonstrations. Mr. Escalante

suggested having instructional coaches co-teach literacy lessons. All of these suggestions are good recommendations and can easily be addressed by BCPSD personnel and Groveton Middle School leaders. When teachers are given the opportunity to voice their concerns, they need to speak up. There are many policies and initiatives influencing their daily work. There is a need to raise teacher voices to create educational change (Lupton, 2014).

Implications for Professional Learning Providers

Researching the perspectives of teachers is extremely useful in planning professional learning for teachers. Teachers, like students, come to the classroom with various degrees of knowledge and experience; therefore, teachers have different professional learning needs (Gamrat, Zimmerman, Dudek, & Peck, 2014). For instance, Ms. Frizzle wanted more content-based professional learning experiences and less technology and literacy-related professional learning opportunities. She stated, “I feel more confident when I am strong in my content.” Later, Ms. Frizzle discussed how she is comfortable with literacy instructional practices and is still improving integrating technology into her lessons. Mr. Escalante commented about wanting more writing and reading-related professional learning and on planning field trips. When asked about the science curriculum, Mr. Escalante appeared to be quite comfortable with his content knowledge. Mr. Keating wanted more reading and writing-instructional strategies that can improve differentiation in his classroom. He seemed to be very comfortable with breaking down standards. Both Mr. Shoop and Ms. Norbury wanted to improve debate and the use of academic language in the classroom. Ms. Norbury wanted more literacy-related professional learning that was aligned with her subject matter. Although the participants’ professional learning needs had many similarities, some were different.

The researcher recommends that professional learning providers consider teachers' needs when selecting professional learning opportunities. Teachers' learning goals and school improvement plans need to be aligned. Professional learning studies need to explore more personalized learning models. For example, models like Cator, Lathram, Schneider, and Vander Ark's (2015) new approach to teacher professional development in "Preparing Teachers for Deeper Learning" should be explored to a certain extent. This approach enables teachers to have a deeper understanding about a particular topic of interest or need. Teachers should have a greater say in what their professional learning is. Professional learning should be customized to the teachers' needs.

Concluding Thoughts

The purpose of this study was to examine five middle school science teachers' perspectives on their professional learning as they implemented the Common Core Georgia Performance Standards (CCGPS) for literacy in science. Through a case study design, five participants in a middle school from North Georgia described their professional learning experiences. These participants were from the same school and partook in many of the same job-embedded professional learning experiences. Some of the participants participated in additional professional learning experiences on their own. Their perspectives were analyzed using the constant comparative method, as defined by Corbin and Strauss (2015). The participants' perspectives were investigated to gain insight into their formal and informal professional learning experiences and to understand their professional learning needs. The themes discovered through this study are relevant to the current educational climate and have important implications for the impacts of professional learning during standards-based reform. More specifically, the

implications are relevant to Beal County Public Schools District (BCPSD) personnel, and Groveton Middle School leaders and teachers.

Related literature discussed the historical and current influences of how educational policy affects teacher professional learning (Wynne, 2010). The participants experienced an abundance of professional learning. Also noted in the literature were the difficulties of implementing educational change and the lack of Common Core State Standards (CCSS) related professional learning pertaining to literacy instruction in science classrooms (Jagger & Yore, 2012). Hopefully, the present study guides future CCSS science-literacy related professional learning research. Many of the high-quality characteristics for professional were mentioned by the participants (Borko, 2004; Corcoran, 1999; National Research Council, 2000), but some of their professional learning experiences lacked successful practices. When high-quality characteristics were not present, teachers were less likely to implement the instructional strategy. The participants' perspectives confirmed and validated literature about different types of adult learning occurring through job-embedded professional learning practices (Meyers et al., 2009; Zepeda, 2015).

The perspectives of the participants in this study present a unique finding related to teachers' feelings when encountering an abundance of professional learning. Several participants expressed great gratitude for the amount of support they received from the school district personnel and school leaders. After expressing appreciation, the participants expressed mixed feelings about their professional learning, then conveyed a lack of concern or enthusiasm for some experiences, and eventually felt overwhelmed. Participants noted examples such as "Ninety-nine percent of what I've learned" is from professional learning or professional learning can be "overkill" and it makes my "brain hurt." In addition to their perspectives covering a wide

range of feelings, it is possible some of the participants' feelings changed because of the time of year of the study. During the school year, teachers can experience more stressful periods (e.g., testing) than others. More research is needed to understand how the nature of temporal change occurs in perspective-seeking studies.

The limits of this study—including five science teachers from one middle school—make it nearly impossible to generalize the findings beyond the scope of the study and the research setting. However, this research provides insight for Beal County Public Schools District (BCPSD) personnel and Groveton Middle School leaders. This research encourages BCPSD personnel and Groveton Middle School leaders to provide more common literacy-content-related professional learning experiences. Hopefully, this study leads to further discourse surrounding opportunities for lesson study and personalized professional learning opportunities to occur. More specifically, professional learning opportunities via videotape and other digital platforms should be explored. Furthermore, the study allowed teachers to express their professional learning needs because the “fear factor” was eliminated. Hopefully, the BCPSD personnel and Groveton Middle School continue to seek the perspectives of their faculty.

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APPENDIX A

FIRST SEMI-STRUCTURED INTERVIEW PROTOCOL

1. Tell me about your formal professional learning experiences that are provided by the district and school.
2. Tell me about your formal professional learning activities as they relate to the Common Core State Standards.
3. Tell me about your perspectives on your formal Common Core State Standards professional learning.
4. Tell me about your informal professional learning experiences as they relate to the Common Core State Standards.
5. Tell me about your perspectives on your own professional learning activities as they relate to the Common Core State Standards.
6. Tell me about the types of professional learning activities you have learned and have implemented in your classroom.
7. Tell me about the types of professional learning activities that you will not try in your classroom.
8. Tell me about you the professional learning activities you value the most.
9. Tell me about you the professional learning activities you value the least.
10. Tell me about your professional learning needs.

APPENDIX B

SECOND SEMI-STRUCTURED INTERVIEW PROTOCOL

1. What are the different set of standards science teachers have to address?
 - a. What are the CCGPS for literacy in science?
2. What types of professional learning have you received to address these standards?
3. Can you walk me through how you implement the CCGPS for literacy in science in your classroom?
 - a. Vocabulary? Reading? Writing? Speaking and Listening?
4. Can you tell me about how you implement argumentation and inquiry-based lessons in your classroom?
5. Can you tell me about any CCGPS for literacy in science professional learning activities since we last talked? Conferences? Group or individually?
6. Who or what decides the types of formal professional learning you receive?
7. Tell me about the CCGPS for literacy in science professional learning you have received.
 - a. How often?
8. What types of professional learning activities do you receive most? Least?
9. What types of professional learning activities do you want more of? Less of?
10. What do you think about the formal professional learning opportunities that are provided to you?

APPENDIX C

PARTICIPANT OBSERVATION PROTOCOL

Location: Date: Time: Page ____	
Participants:	Type of Meeting:
Descriptive Notes	Reflective Notes
What are you observing? What is happening in the room? Who is doing what? What type of professional learning?	What are your impressions/questions?
Diagram	

APPENDIX D

PROJECT CONSENT FORM – OBSERVATIONS

Middle School Science Teachers’ Perspectives: Professional Learning and Implementing the Common Core State Standards

Dear Participant,

You are invited to participate in a research project conducted by Michael Cassidy from the Department of Educational Theory and Practice at the University of Georgia. For this project, I will be observing science meetings at Groveton Middle School. I will be collecting data to examine middle school science teachers’ perspectives on their professional learning as they implement the Common Core State Standards (CCSS) at Groveton Middle School. Dr. Kathy F. Thompson, Professor in the Department of Educational Theory and Practice will supervise the research.

The purpose of this study is to conduct a case study to understand science teachers’ perspectives on their professional learning as they implement the CCSS because it provides insight into what science teachers are understanding and implementing from their formal professional learning activities. Furthermore, their perspectives can lead to an understanding of what science teachers do to satisfy their own professional learning needs. Ultimately, the proposed study is an effort to understand the Groveton science teachers’ individual CCSS professional learning needs.

For this project, I will be observing 14 science meetings. Each observation will last approximately one hour, which is the regularly scheduled time. During the observations, I will be collecting physical artifacts such as agendas and minutes of the meetings. Furthermore, I will be taking notes in my researcher’s journal about what is occurring during the meetings and informal conversations. You will be given the opportunity to discuss my interpretations of the meetings to make sure I did not misinterpret conversations and/or actions.

All information shared with the researcher by study participants will be kept strictly confidential and names will not be included in the final analysis and write-up of the data.

There is no risk to you in participating in this study. Your participation is voluntary. You are free to withdraw your participation at any time for any reason. If you have any questions or concerns, feel free to contact me at XXX-XXX-XXXX. I hope you will enjoy this opportunity to share your experiences and perspectives. Thank you so much.

Sincerely,

Michael Cassidy, Doctoral Student, Department of Educational Theory and Practice, Middle School Education Program

Dr. Kathy F. Thompson, Professor, Department of Educational Theory and Practice

Signature of Researcher

Date

Signature of Participant

Date

Please sign both copies, keep one copy and return one to the researcher. For questions or problems about your rights please call or write: Chairperson, Institutional Review Board, University of Georgia, Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

APPENDIX E

PROJECT CONSENT FORM – INTERVIEWS

Middle School Science Teachers' Perspectives: Professional Learning and Implementing the Common Core State Standards

Dear Participant,

You are invited to participate in a research project conducted by Michael Cassidy from the Department of Educational Theory and Practice at the University of Georgia. For this project, I will be conducting interviews with the science Groveton Middle School. I will be collecting data to examine middle school science teachers' perspectives on their professional learning as they implement the Common Core State Standards (CCSS) at Groveton Middle School. Dr. Kathy F. Thompson, Professor in the Department of Educational Theory and Practice will supervise the research.

The purpose of this study is to conduct a case study to understand the science teachers' perspectives on their professional learning as they implement the CCSS because it provides insight into what science teachers are understanding and implementing from their formal professional learning activities. Furthermore, their perspectives give an understanding of what science teachers do to satisfy their own professional learning needs. Ultimately, the proposed study is an effort to understand the Groveton science teachers' individual CCSS professional learning needs.

For this project, you will participate in two audio-recorded interviews where you will be asked questions about your CCSS professional learning experiences, both formally and informally, your perspectives on your professional learning as you implement the CCSS, and what you types of professional learning you are transferring into practice. Each interview will last approximately 45 minutes. You will be given the opportunity to read the transcriptions of the interviews to make sure I did not misinterpret anything you said.

All information shared with the researcher by study participants will be kept strictly confidential and names will not be included in the final analysis and write up of the data.

There is no risk to you in participating in this study. Your participation in this study is voluntary. You are free to withdraw your participation at any time for any reason. If you have any questions or concerns, feel free to contact me at XXX-XXX-XXXX. I hope you will enjoy this opportunity to share your experiences and perspectives. Thank you so much.

Sincerely,

Michael Cassidy, Doctoral Student, Department of Educational Theory and Practice, Middle School Education Program

Dr. Kathy F. Thompson, Professor, Department of Educational Theory and Practice

Signature of Researcher

Date

Signature of Participant

Date

Please sign both copies, keep one copy and return one to the researcher. For questions or problems about your rights please call or write: Chairperson, Institutional Review Board, University of Georgia, Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu.