SUCCESSFULLY IMPLEMENTING COMMON CORE LITERACY STANDARDS IN THE SCIENCE CLASSROOM: A PHENOMENOLOGICAL INVESTIGATION

by

Summer Lynn Smith

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the degree

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APPROVED BY:

Meredith Park, Ed.D., Committee Chair

Jared Bigham, Ed.D., Committee Member

Faith Simpson, Ed.D., Committee Member

ABSTRACT

The purpose of this qualitative transcendental phenomenological study was to understand how veteran sixth-, seventh-, and eighth-grade science teachers in Northeast Georgia implemented the Literacy Common Core Performance Standards into their discipline. Legislation introduced many standards reforms in the past 15 years, and this newest change directly corresponded with achievement expectations in the content areas. This study looked at experienced teachers who integrated the Common Core Literacy Standards into their science curriculum and explored their experiences in this implementation. A transcendental phenomenological method was used for 12 teacher interviews over a six-month period. In addition, student work samples, science literacy assignments, and teacher planning documents were analyzed. Upon bracketing personal understandings, I sought a thick, rich description of self-efficacy and motivation of science teachers as they integrated the Common Core Literacy Standards into the content area. The phenomenological analysis determined three themes across the co-researcher participants that centered upon professional development, teacher collaboration efforts, and time management with literacy standards in the content area. Implications for the research suggested specified in-depth professional development, nurturing collaboration time between peer teachers, and ongoing school- or system-level support with integrating literacy standards in science. Recommendations for future research could branch out to other geographic locations, focus upon specific professional learning designs or literacy resources, and concentrate in-depth on professional learning communities' practices.

Keywords: literacy integration, middle school teaching, motivation science content area, self-efficacy, veteran teachers

Dedication/Acknowledgments Page

First and foremost, without my Lord and Savior, none of this would have been possible. I dedicate this work to my loving family. My husband, Chad, has always been my encourager and biggest cheerleader. My children, Grayson, Gentry, and Grantley, have endured many hours without my presence so that I could work. My parents, Polly and Bryant Shedd, are steadfast supporters in all my educational endeavors. Thank you for your confidence in me, especially when mine was failing.

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List of Abbreviations

Cognitive Evaluation Theory (CET)

College and Career Readiness Performance Index (CCRPI)

Common Core Georgia Performance Standards (CCGPS)

Common Core State Standards (CCSS)

Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (ELACCGPS)

Council of Chief State School Officers (CCSSO)

English Language Learners (ELL)

Georgia Standards of Excellence (GSE)

Leader Effectiveness Measure (LEM)

Leader Keys Effectiveness System (LKES)

National Governors Association Center for Best Practices (NGA Center)

Next Generation Science Standards (NGSS)

Organismic Integration Theory (OIT)

Self-Determination Theory (SDT)

Self-Efficacy Theory (SET)

Teacher Assessment on Performance Standards (TAPS)

Teacher Keys Effectiveness System (TKES)

CHAPTER ONE: INTRODUCTION

Overview

Middle school science teachers in Georgia encountered a new era with the implementation of the Common Core Standards in the 2012-2013 academic year and accountability measures that included science achievement data in the 2014-2015 academic year. Common Core Georgia Performance Standards (CCGPS) place greater emphasis on literacy, science, and math. The College and Career Readiness Performance Index (CCRPI) developed by the Georgia Department of Education (2018) now includes science as an indicator of success for Grades 6 through 8. The science indicator shows the percentage of students who meet or exceed the standards. The Georgia Department of Education formed study groups in January 2013 to consider the adoption of the Next Generation Science Standards (NGSS), which would provide a national K-12 science framework (Cardoza, 2013). Despite the pressures and changes, many experienced teachers were able to implement the literacy standards successfully while ensuring high science achievement from their students.

Through this qualitative phenomenological study and with the assistance of school administration, I endeavor to identify veteran teachers who are successfully integrating the literacy standards in the science content area and explore what these teachers are doing to increase student achievement in science. The overall goal of this study was to determine whether science scores were improving as a result of new standards integration as well as to interview experienced teachers to identify what worked successfully for them as they integrated the literacy standards into the science curriculum. Chapter 1 will cover the background of the study,

introduce the problem statement, explain the purpose and significance of the study, present the research questions guiding this study, and provide definitions pertinent to the study.

Background

State and local administrators expect content area teachers in middle school and high school to address the literacy standards of the Common Core Curriculum as they continue teaching the content standards of their assigned curriculum (Schoenbach et al., 2010). Common Core State Standards (CCSS) are a K-12 framework designed to ensure that students graduate from high school with the skills needed to enter an institution of higher learning or the workforce (Berman & Biancarosa, 2005; National Governors Association Center for Best Practices [NGA Center] & Council of Chief State School Officers [CCSSO], 2010). As of 2015, 42 out of 50 American states, the District of Columbia, the U.S. Virgin Islands, Guam, the Northern Mariana Islands, and the Department of Defense voluntarily adopted the Common Core Standards (Common Core State Standards Initiative, 2017), which are available for English language Arts and mathematics. Nevertheless, the NGA Center and CCSS pointed out that "in addition to content coverage, the Common Core State Standards require that students systematically acquire knowledge in literature and other disciplines through reading, writing, speaking, and listening" (para.2). Common Core State Standards spotlight the attention of literacy as an important tool for student learning across content areas and grade levels (International Reading Association, 2012).

The Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (ELACCGPS) were a new addition to the curriculum in Georgia in 2011 (Georgia Department of Education, 2019). As a result, the

Common Core initiative required significant planning, professional development, and innovation by teachers to achieve student success as specified in the standards (Goldman, 2012). The Georgia State Board of Education renamed the Common Core English Language Arts and Mathematics standards in 2015 as the ELA and Mathematics Georgia Standards of Excellence (Georgia Department of Education, 2019). Despite the name change, the literacy standards remained within the content standards for teacher implementation. According to the Georgia Department of Education website, the Georgia Performance Standards (GPS) for Science were required during the 2016-17 school year. The Georgia Standards of Excellence (GSE) for Science were implemented beginning during the 2017-18 school year (Georgia Department of Education, 2019).

Teachers are an integral piece in the puzzle of school reform (Darby, 2008). Change creates challenges that educators must address before the implementation of new standards and initiatives can be successful. Teacher attitudes and years of professional experience play a crucial factor in educational reform (Hargreaves, 2005). Expectations associated with change can alter levels of efficacy, or teachers' self-perception of their abilities (Ross & Bruce, 2007). Resilience during challenging times is closely tied to self-efficacy and motivation to teach (Gu & Day, 2007). Teacher success in the realm of educational reform is dependent upon these factors, especially when teachers need education and training to integrate literacy standards into the content area curriculum.

Incorporating literacy in content areas is not a new topic, but integrating reading and writing in the content areas, especially at the middle and high school levels, is often difficult to achieve. O'Brien, Stewart, and Moje (1995) cited three reasons that teachers have difficulty with

reading integration: the confrontation of values and practices; the competition of reading with the content; and a lack of knowledge, resources, or support. Insufficient literacy knowledge, not a lack of content knowledge, can contribute to emotions that detract from the focus and discourage motivation (Cantrell & Callaway, 2008; McCoss-Yergian & Krepps, 2010). Insufficient teacher preparation in content literacy is an issue (International Reading Association, 2012; Schoenbach et al., 2010), and professional development is a topic often identified as a necessity when addressing standards reform, especially as related to content area literacy (International Reading Association, 2012). Despite these challenges, many teachers persevere and integrate reading, writing, and speaking into academic content areas.

Middle school teachers, like high school teachers, complete more content-specific teacher preparation programs. Middle school preparation is unlike elementary level teacher preparation as the latter is more prepared to teach multiple subjects. However, students need continued literacy support at the middle school level because they leave elementary school without having learned all of the reading skills needed for the future. Middle school students "need to continue to develop their reading ability in order to deal with the more specialized and complex texts of secondary content areas" (Fang & Wei, 2010, p. 263). Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (ELACCGPS) address this need for teachers to support students as they develop their literacy skills. The International Reading Association (2012) described adolescent learners as "disengaged and disinterested" (p. 10) with regard to content issues; therefore, teachers must know how to address the needs of adolescent learners whether they are struggling readers or not.

The characteristics of middle school learners create a need for understanding how teachers are effectively integrating content area literacy standards.

Situation to Self

The topic of content area literacy is intriguing to me as I have an interest in middle school practices and literacy. My undergraduate and master's degrees are in middle school education, and I have taught language arts at the middle grades level for the past 18 years; however, I have never taught science. As a result, the epistemological assumption with this study is that I will learn more through involvement with co-researchers and garner more information about their lived experiences (Creswell, 2007). Curriculum and instruction are areas that appeal to me as a former middle school academic coach in that I was able to assist with professional development for teachers. I will be a human instrument in the study (Lincoln & Guba, 1985).

As a language arts teacher, I have axiological assumptions about literacy implementation in the content areas (Creswell, 2007). To fully integrate reading and writing into content areas, teachers must understand the reasons for including literacy instruction in lessons that go beyond having students read or write simply because it is a mandated expectation. Additionally, I feel that successful teachers are those who genuinely care for the students just as much, if not more, than the energy they devote to teaching the content area. I must report those axiological assumptions through *epoche* as I obtain information from my co-researchers.

Change in the curriculum creates a stressful time for teachers. I must use ontological assumptions with quotes as confirmation of their perspectives in order to relay the co-researchers' experiences (Creswell, 2007). Change seems always to occur just when teachers are becoming familiar with the curriculum. Change is necessary over time, especially as the United

States continues to strive for excellence in education. The reform, CCSS, created a "common curriculum frameworks among states to improve the opportunities to learn among students by providing content and performance goals that are explicit guides that determine the focus of instruction" (Harris, 2012, p. 129). The research project provided me with opportunities to uncover the experiences of middle school science teachers from the constructivist approach with rhetorical assumptions that are rooted in the co-researchers' experiences with literacy standards implementation (Creswell, 2007).

Problem Statement

The problem is that state and local administrators in Georgia expect middle school science teachers to implement literacy standards in addition to science content standards. Furthermore, these administrators hold science content area teachers accountable for student ability in science based on end-of-grade assessments. The call for teachers to incorporate ELACCGPS into science instruction created an immediate change for teachers who have never integrated literacy into this content area in the past. How veteran teachers respond to these curriculum changes, their professional efficacy, and motivational levels throughout implementation are of interest.

With the state of Georgia implementing the CCGPSELA in content areas, teachers have a level of motivation due to the state expectation, but personal morals are motivational factors also (Gu & Day, 2013). Accountability pressures of change and student achievement expectations merge with teachers' professional identities during the implementation of new initiatives, and teachers base their responses largely upon their earlier experiences with change (Buchanan, 2015). The resilience of veteran teachers during periods of change in education is the result of

their professional determination (Gu & Day, 2013). Intrinsic motivation during educational reform is important for educators and their self-determination.

The call by Hen and Goroshit (2016) for additional research on how middle school teachers develop their self-efficacy despite the multiple challenges they face during their professional careers provided the foundation for the study. Additionally, current studies on the resilience of veteran teachers are lacking (Gu & Day, 2013; Mansfield, Beltman, Price, & McConney, 2012). A gap in the research exists regarding the experiences of veteran middle school teachers who successfully integrate literacy into content areas. Veteran science teachers' experiences with implementing literacy standards in the content area are the subject of this investigation.

Purpose Statement

The purpose of this qualitative phenomenological study was to explore the experiences of veteran science teachers at middle schools in Northeast Georgia that are successfully transitioning to the Georgia Standards of Excellence. Science teachers with eight or more years of experience in Grades 6 through 8 were the focus of this study. Many content area teachers successfully implement literacy in the classroom. In this study, self- efficacy played "a central role, for analyzing changes achieved in fearful and avoidant behavior" (Bandura, 1977, p. 193). The theories guiding this study were Bandura's (1977) theory of self-efficacy and Deci and Ryan's (1985) self-determination theory as learning experiences and changes such as implementing academic literacy standards affect a person's level of efficacy and an individual's motivation to learn and succeed.

Significance of the Study

Literacy integration in the science classroom is not a new concept but is now an expectation in the states that have adopted the Common Core State Standards. Educational literature and the Common Core State Standards call for increased literacy instruction in K-12 institutions so that students are successful in obtaining the skills they need for their futures either in institutions of higher learning or the workplace (Calkins, Ehrenworth, & Lehman, 2012; NGA Center & CCSSO, 2010). Many content area teachers successfully implement changes in the curriculum. The significance of this study was that it added to the existing literature about successful academic literacy integration into the content area of science by middle school educators.

Research shows the importance of literacy integration not only in the content area subjects but in the middle school setting as well. Sanacore and Palumbo (2010) pointed out that middle school students need more exposure to reading experiences across the curriculum. The incorporation of a reading concentration provides students with opportunities to significantly improve their literacy skills (Fang & Wei, 2010). In addition to the implementation of the CCGPSELA, administrators in Georgia began holding middle grades science teachers accountable for student achievement scores in 2014 (Georgia Department of Education, 2014). Previously reading and math achievement scores were the only accountability measures on school report cards and Adequate Yearly Progress (AYP) reports. The Teacher Keys Effectiveness System (TKES), the latest teacher evaluation instrument adopted by the Georgia Department of Education (2016b) at the beginning of the 2014-2015 academic year, focuses on supporting teacher growth and development.

The Teacher Keys Effectiveness System serves as an assessment tool for determining teacher effectiveness (Georgia Department of Education, 2016a). TKES provides an avenue for teacher evaluators to assess teacher effectiveness in three areas: professional growth, student growth, and teacher assessment of performance standards (TAPS). TKES reports student growth as a percentile score based on students' performance on standardized tests (Georgia Department of Education, 2016b). Furthermore, TAPS includes 10 performance standards in which administrators assess the quality of teacher effectiveness (Georgia Department of Education, 2016b). The performance standards focus on (1) professional knowledge, (2) instructional planning, (3) instructional strategies, (4) differentiated instruction, (5) assessment strategies, (6) assessment uses, (7) positive learning environment, (8) academically challenging environment, (9) professionalism, and (10) communication.

Professional attitude and teacher identity affect the effectiveness of any school reform (Darby, 2008; Lasky, 2005). If teachers view reforms negatively, their motivation to implement those reforms may suffer due to their attitude. Likewise, teachers' perceptions of their abilities to implement change may affect their motivation. This study provided an avenue to explore the view of veteran teachers on the requirement to incorporate literacy standards into the science curriculum and how they manage those expectations.

Veteran teachers are subject to numerous standards changes throughout their career, and the response of teachers to the changes determines the level of future success for the teachers and their students (Cantrell, Burns, & Callaway, 2009; Darby, 2008; Fisher & Frey, 2008; Putnam, 2012). Teachers with 10 or more years of practice go through several curriculum changes in their careers. Specifically, Georgia teachers have encountered curriculum changes four times in

the last 15 years as the Georgia Department of Education adopted Quality Core Curriculum and then the Georgia Performance Standards, the Common Core Georgia Performance Standards, and finally the Georgia Standards of Excellence.

The research approaches associated with this topic were both quantitative and qualitative; previous studies focused on the effects of integrating literacy in content areas (Fisher & Frey, 2008; McCoss-Yergian & Krepps, 2010; Nielsen, Barry, & Staab, 2008), on scientific literacy strategies (Cahoon & Straw, 2008; Moje, 2015) or on specific literacy professional development initiatives (Cantrell & Callaway, 2008; Fang & Wei, 2010). Furthermore, this study focused on educational reform and content area literacy professional development. Few studies are available that address how content area teachers are able to implement literacy instruction during this era of high-stakes testing. Existing research centered upon teachers who adapt and prove resilience in response to educational reforms (Gu & Day, 2007). Multiple studies investigated preservice and in-service teacher efficacy, but more research could determine differences in teacher efficacy during career stages (Putnam, 2012).

Science teachers may feel pressure in adding literacy because of the demands associated with their content standards (Schoenbach et al., 2010). Understanding the issues of implementing literacy standards in the content area is one factor that studies must address. Studies must also address the additional accountability inclusions in the College and Career Ready Performance Index that specifically relates to middle grades science teachers in Georgia. If academic literacy is to be efficacious, researchers need to explore this phenomenon further. Additionally, schools will want to retain effective teachers rather than replace those who experience burnout due to the added pressures created by the latest education reform efforts.

Developing an understanding of career teachers' abilities to be effective despite the constant barrage of new effectiveness measures will provide school administrators and professional development planners with insight on what they must emphasize in order to achieve positive outcomes in the areas of student achievement and teacher effectiveness.

Research Questions

One main research question and three subquestions revolve around Bandura's (1977) self-efficacy theory (SET), which is a part of his social cognitive theory (SCT), especially as the theorist considered cognitive, behavioral, and environmental factors. The main research question for the study is "How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?" Educational reform creates more rigors within the curriculum leaving teachers feeling achievement pressure and professionally vulnerable (Lasky, 2005).

Subquestion 1

The first subquestion asks how do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction? Teacher expectations influence student outcomes (Harris, 2012), and teacher efficacy "predicts a host of enabling teacher beliefs, functional teacher behaviors, and valued student outcomes" (Ross & Bruce, 2007, p. 50). Content area teachers may lack background literacy skills but are quite knowledgeable about the content. The teachers' experiences with literacy within the content and the associated feelings pertinent to understanding the effects of educational reform on teachers at different stages in their careers.

Subquestion 2

The second subquestion asks how do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners? Content area teachers who engage in learning through content reading strategies will help students with more complex texts (Cahoon & Straw, 2008). Content literacy is an involved process that "cannot be divorced from sufficient content knowledge to understand the epistemology and philosophy of the field from which the text is drawn" (Gillis, 2014, p. 621). Literacy strategies used by teachers to build knowledge in adolescent learners is of interest to this study especially as the strategies related to what works.

Subquestion 3

The third subquestion asks how do veteran middle school science teachers feel they could best be supported when implementing literacy standards in the content area? Without meaningful professional development and training, content area teachers may not fully understand the significance of reading instruction (Ness, 2009) or have knowledge of effective strategies to improve student writing skills (Jimenez-Silva & Gómez, 2011). Teacher support is integral for any change in educational standards and expectations. Educator feedback regarding professional development or support promotes collegial discussions about implementation.

Definitions

The following terms are important in understanding this study:

1. *Accountability*—Accountability is educators' responsibility for their own professionalism and students' academic achievement (Clements, 2013).
2. *Adolescents*—Adolescents are youths ranging in age from 10- to 15-year-olds (Jackson & Davis, 2000).

3. *Cognitive Evaluation Theory*—This theory is a subset of self-determination theory, and it focuses on how personal competence and autonomy regulates intrinsic motivation (Deci & Ryan, 1985; Ryan & Deci, 2000).
4. *College and Career Readiness Performance Index (CCRPI)*—The CCRPI is Georgia's yearly school accountability indicator, which measures each school and district on achievement, progress, the closing of gaps, readiness, and high school graduation rates (Georgia Department of Education, 2018).
5. *Common Core State Standards (CCSS)*—CCSS is the framework for content standards focused on preparing students for college and career readiness (NGA Center and CCSSO, 2010).
6. *Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects (ELACCGPS)*—ELACCGPS are the literacy standards for reading and writing included within history, science, and technical subjects (Georgia Department of Education, 2015).
7. *Content area literacy*—Content literacy is reading and writing instruction in the content areas of mathematics, science, English, and history and social studies (Heller & Greenleaf, 2007).
8. *Council of Chief State School Officers (CCSSO)*—The council collaborated with the National Governors Association Center for Best Practices in creating the Common Core State Standards for English Language Arts and Literacy in content area subjects (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

9. *Emotions*—Teacher emotions are "the experiences that result from teachers' embeddedness in and interactions with their professional environment" (Kelchtermans, 2005, p. 996).
10. *Georgia Standards of Excellence (GSE)*—The GSE are the teaching standards for the subjects of English language arts, fine arts, mathematics, science, social studies, physical education, and literacy in social studies, science, and technical subjects (Georgia Department of Education, 2015).
11. *Identity*—Professional identity is a teacher's dynamic self-understanding based on their experiences and situations (Kelchtermans, 2005).
12. *Leader effectiveness measure (LEM)*—Georgia's leadership accountability is the Leader Effectiveness Measure, which is an overall score based upon performance standards, student growth, school climate survey, and additional data (Georgia Department of Education, 2016a).
13. *Leader keys effectiveness system (LKES)*—LKES is the overall system that holds school leaders accountable based upon Georgia's leadership expectations (Georgia Department of Education, 2016a).
14. *Motivation*—Whether intrinsic or extrinsic, motivation deals with intention and action (Ryan & Deci, 2000).
15. *National Governors Association Center for Best Practices (NGA Center)*—This organizational group worked with the Council of Chief State School Officers to create the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

16. *Next Generation Science Standards (NGSS)*—The NGSS is a national framework for K-12 science education (Cardoza, 2013).

17. *Organismic integration theory (OIT)*—OIT is a subtheory of the self-determination theory that features a scale from zero motivation to intrinsic motivation (Ryan & Deci, 2000).

18. *Reform*—Reform is the shifting of mandated educational changes and policies (Stone-Johnson, 2011).

19. *Resilience*—Resilience is the ability to persevere through difficult circumstances (Gu & Day, 2007).

20. *Self-determination theory (SDT)*—This theory centers on human motivation development and sustainability (Deci & Ryan, 1985).

21. *Self-efficacy*—Self-efficacy for a teacher is a personal belief that one can affect student learning (Cantrell & Callaway, 2008).

22. *Self-efficacy theory (SET)*—This theory postulates accomplishments, experiences, persuasion, and physiology drives a person's self-efficacy (Bandura, 1977).

23. *Teacher Assessment on Performance Standards (TAPS)*—The TAPS is one component of the teacher evaluation system created by the Georgia Department of Education (2016b). Evaluators rate teachers on 10 performance standards: professional knowledge, instructional planning, instructional strategies, differentiated instruction, assessment strategies, assessment uses, positive learning environment, academically challenging environment, professionalism, and communication.

24. *Teacher keys effectiveness system (TKES)*—Teacher Keys is the teacher evaluation system used by the Georgia Department of Education (2016b). TKES consists of TAPS, professional growth, and student growth.
25. *Veteran teacher*—A veteran teacher is an experienced midcareer teacher who ranges in years of experience from six to 20 years (Hargreaves, 2005).

Summary

Georgia middle school science teachers experienced a change in state standards in the past several years with regards to literacy implementation. They also went through a change in evaluation accountability. The purpose of this study was to understand the experiences and motivations of effective veteran middle school science teachers who demonstrate success in literacy implementation. The knowledge gleaned from this study highlight the positive and negative aspects of reform, literacy implementation in the middle school science classroom, and teacher efficacy during the processes. Chapter 1 concluded with definitions of important vocabulary in this study. Chapter 2 will cover the literature that encompasses the theoretical framework and the literature related to the study.

CHAPTER TWO: LITERATURE REVIEW

Overview

The adoption of Common Core State Standards (CCSS) requires content area teachers in middle grades to implement literacy standards to prepare students for college and career readiness (National Governors Association Center for Best Practices [NGA Center] & Council of Chief State School Officers [CCSSO], 2010). If students do not obtain the necessary literacy skills while in school, they will face a detrimental challenge in the real world (Biancarosa & Snow, 2006). Moje (2015) posited the importance of disciplinary literacy teaching as an inquiry-based avenue for the whole adolescent learner. Disciplinary literacy involves not only the content understanding but includes reading, writing, thinking, and reasoning abilities within the discipline (Fang, 2014). The need for literacy is critical for students' futures since "the ability to convey knowledge is becoming as important as the knowledge itself" (Calkins, Ehrenworth, & Lehman, 2012, p. 110). Adolescent literacy, in particular, is a major concern related to higher learning and 21st-century skills (Biancarosa, 2012). Literacy is also an integral factor of modern technological communication and the Internet (Biancarosa, 2012; Calkins et al., 2012).

The challenges of modern literacy are (a) not only understanding what the text says, but also what it means, (b) interpreting and analyzing the text, (c) keeping up with ever-changing technology, and (d) comparing and contrasting information from various sources (Goldman, 2012). CCSS created a framework that correlates instruction with content and student goals (Harris, 2012). Knowing how teachers experience and respond to the curriculum change is significant for reform improvement (Hargreaves, 2005) and professional identity (Lasky, 2005).

The purpose of this qualitative phenomenological study was to explore the experiences of veteran science teachers at middle schools in Northeast Georgia that are successfully transitioning to the Georgia Standards of Excellence. The research questions for the study are:

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

Chapter 2 includes a discussion on the theoretical framework guiding this study and a review of the literature on the integration of literacy standards in content based instruction. Bandura's (1977, 1982, 1986, 1991, 1993, 2000, 2007) self-efficacy theory and the self-determination theory of Deci and Ryan (1985) and Ryan and Deci (2000) comprise the theoretical framework. The review of the literature provides information regarding content area literacy, Common Core State Standards, and the more recent standards adopted by the Georgia Department of Education; teacher efficacy as related to middle school teachers; professional learning needs; teacher emotions; teacher identity and self-understanding; resilience; effectiveness; and accountability.

Theoretical Framework

Self-Efficacy Theory

Experiences in the educational environment shape teacher self-efficacy, and the way that teachers respond to change also affects their self-efficacy. Bandura's (1977) self-efficacy theory (SET) posits that teachers develop their self-efficacy based upon information from performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. Individuals process each of those sources of information as part of the self-appraisal process and the experiences drive self-efficacy (Bandura, 1986). Self-efficacy beliefs influence individuals' decisions, goals, perseverance, individual judgments, and emotional reactions to personal and environmental expectations (Bandura, 1986, 1991). Teacher self-efficacy "may be conceptualized as individual teachers' beliefs in their own ability to plan, organize, and carry out activities that are required to attain educational goals" (Skaalvik & Skaalvik, 2010, p. 1059). The viewpoints of Bandura and Skaalvik and Skaalvik would indicate that the implementation of Common Core Literacy Standards will affect veteran science teachers' self-efficacy in some manner.

Performance accomplishments serve as a foundation to establish personal mastery experiences (Bandura, 1977). Mastery experiences raise expectations, and the failure to master experiences lowers expectations. Bandura added that new ventures in implementing literacy initiatives often determine whether individuals master experiences. Furthermore, repeated mastery experiences contribute to increased self-efficacy over time, which limits the influence of occasional failures on individuals' outlooks. Self-monitoring is vital because "people cannot influence their own motivation and actions very well if they do not pay adequate attention to

their own performance, the conditions under which they occur, and the immediate and distal effects they produce (Bandura, 1991, p. 250). Additionally, teachers often criticize their own performances, and their criticism increases when they are trying to implement new teaching standards. Mastery experiences are more likely to influence perceived self-efficacy than other activities because the inferences made from personal performance are more reliable (Bandura, 1986). Bandura (1986) noted that individuals experience self-doubts even when they accomplish something great. He added that the self-doubts increase when individuals face the possibility of repeating a task that originally required great effort. Self-doubt may also affect teachers' self-efficacy perceptions even though they received accolades for their past accomplishments.

Bandura (1977) defined vicarious experiences as performing activities that individuals often perceive as threatening. These experiences are less dependable sources of information because inferences are made during observations of others completing the task, but taking part in these experiences can still produce feelings of efficacy. Vicarious experiences are social influences that shape individuals' personal standards (Bandura, 1991). If individuals observe someone else performing a task, those individuals can then develop feelings of self-confidence for accomplishing goals, especially if the observers see shared characteristics (Bandura, 1977) or identify with the model (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Professional development opportunities offer vicarious experiences and self-monitoring occasions for implementing literacy standards.

Verbal persuasion is another less effective piece of self-efficacy because the experiences are recommendations from other individuals, and those individuals do not observe someone engaging in those experiences (Bandura, 1977). The combination of persuasion with resources

creates an interactive experience, which is stronger for developing personal self-efficacy (Bandura, 1977). Moreover, verbal acknowledgments and encouragement, coupled with supportive techniques, such as demonstration, could develop increased effort toward a new endeavor.

Emotional arousal is the physiological response to threatening situations (Bandura, 1977). High anxiety levels and fear can affect a person's self-efficacy to perform successfully. Individuals "can rouse themselves to elevated levels of anxiety that far exceed the fear experienced during the actual threatening situation" (Bandura, 1977, p. 199). Self-doubt about personal ability is discouraging and demotivating (Bandura, 1991). Perceived self-efficacy is not related to personal skills or available resources to complete a task but "rather the strength of their assurance that they can execute given activities under designated situational demands" (Bandura, 2007, p. 646). Individual performances of goal-oriented tasks depend upon skills, cognitive abilities, and effort toward goal completion (Bandura, 1986). An individual may possess the ability to perform a task, but anxiety can prevent them from attempting or completing those tasks. In addition to affecting individuals' abilities to perform tasks, perceived efficacy affects future goals and expectations (Bandura, 2000). Bandura (2000) proposed the following:

> Efficacy beliefs influence whether people think erratically or pessimistically; what courses of action they choose to pursue; the goals they set for themselves and their commitment to them; how much effort they put forth in given endeavors; the outcomes they expect their efforts to produce; how long they persevere in the face of obstacles; their resilience to adversity; how much stress and depression they experience in coping with taxing environmental demands; and the accomplishments they realize. (p. 75)

Self-regulation of efficacy determines whether individuals possess the confidence needed to repeatedly perform tasks despite situational conditions (Bandura, 2007).

Bandura (2000) noted that individuals' attributes and distributions are not the only determining factors in building self-efficacy levels; collective efficacy also contributes to individual growth. A group's accomplishments "are the product not only of shared knowledge and skills of its different members, but also of the interactive, coordinative, and synergistic dynamics of their transactions" (Bandura, 2000, pp. 75-76). Dependency on others significantly affects group dynamics (Bandura, 2000). He added that perceived collective efficacy depends upon the outlook of the group's impact on goals, which will, in turn, determine how much energy group members will expend attempting to accomplish those goals. Perceived collective efficacy also influences future group endeavors (Bandura, 2000). Teacher collaboration with planning and implementing new standards develops an overall group, or collective, efficacy (Bandura, 2000). Peer groups, whether categorized by grade or subject content, will impact literacy standard implementation within an environment.

Effective coping skills contribute to individuals' feelings of self-efficacy (Bandura, 1977). Individuals with a positive outlook regarding difficult situations possess "self-enhancing bias needed to sustain resilient efficacy beliefs" (Usher & Pajares, 2008, p. 785). Perceived threats lead to defensive behaviors until individuals establish coping skills (Bandura, 1977). Human behavior is a combination of self-motivation and external influences. Personal beliefs and experiences determine and shape self-efficacy. This study focused on these aspects as teachers implement a curriculum change within their content and as they experience the process.

Self-Determination Theory

Deci and Ryan's (1985) self-determination theory (SDT) focuses on the development and sustainability of human motivation and well-being. The authors pointed out that individual motivations are either intrinsic or extrinsic depending on the situation. The Common Core State Standards call for content teachers to include the literacy standards within their curricular content and instruction, whereas previous education reform initiatives did not mandate literacy implementation in content areas. Furthermore, Georgia teachers anticipate the inclusion of achievement scores for all content areas for school evaluation purposes. Many teachers may not have the motivation to pursue reading and writing within the content, or they derive their motivation from mandated standards, standardized testing, and school achievement report cards. Three identified psychological needs for personal development and self-motivation are competence, relatedness, security, and autonomy (Deci & Ryan, 1985). Deci and Ryan separate self-determination theory into two subtheories: the cognitive evaluation subtheory (CET) and the organismic integration subtheory (OIT).

Intrinsic motivation is a genuine driving force for human behavior (Ryan & Deci, 2000). Cognitive evaluation theory does not assess the causes of intrinsic motivation; the theory, instead, examines whether intrinsic motivation remains constant when taking into consideration the need for personal competence and autonomy (Deci & Ryan, 1985; Ryan & Deci, 2000). Increased autonomy and security in the environment boost intrinsic motivation while pressures lessen it (Gagné & Deci, 2005). Sutton and Wheatley (2003) argued that teacher frustration levels serve as an indicator of teacher motivation when called upon to adopt new classroom strategies. Gu and Day (2007) associated intrinsic motivation with "a strong sense of

professional goals and purposes, persistence, professional aspirations, achievement, and motivation" (p. 1311). Ryan and Deci noted that intrinsic motivation and CET apply to activities that are of interest or value to individuals.

Individual extrinsic motivation range is based upon internalization or integration levels, and the determining factor is the self-value of the behavior (Ryan & Deci, 2000). Additionally, the organismic integration theory, a subset of the SDT, outlines a self-determination scale with categories for motivation ranging from amotivation to intrinsic motivation. Four regulated styles of extrinsic motivation are identified on the continuum from least autonomous to most autonomous: external regulation, introjected regulation, identified regulation, and integrated regulation (Ryan & Deci, 2000). Therefore, the difference between the styles is the level of personal internalization of the outside regulation. SDT is not a stage theory in which people move from one stage to the next; rather, it explains the range of the motivational continuum along with the possibility that individuals can internalize and integrate regulations that were not present before (Gagné & Deci, 2005).

External regulation, the lowest level of extrinsic motivation, is based upon clear external rewards and punishments (Ryan & Deci, 2000). Individuals will act according to a desired external approval or to avoid external disapproval (Gagné & Deci, 2005). Introjected regulation is controlled by an individual's desire to prevent guilt or boost self-importance (Ryan & Deci, 2000), and the regulation appears to control the individual (Gagné & Deci, 2005). Identified regulation adds a higher level of autonomy in that the individual integrates the regulation into his or her values while integrated regulation, the highest level of extrinsic motivation, is evident by an individual acknowledging a regulation into their own views (Ryan & Deci, 2000). The key

factor in integrated regulation is relatedness, which is connected to belonging, choice, and perceived personal competence (Ryan & Deci, 2000). With integrated regulation, individuals "feel greater freedom and volition because the behavior is more congruent with their personal goals and identities" (Gagné & Deci, 2005, p. 334). Furthermore, the value of the work makes a difference with identified and integrated regulation. Valued work determines an individual's output efforts. Recent studies have noted that teaching motivations are considerably more intrinsic than extrinsic because educators' work involves helping students (Chong & Low, 2009; Morgan, Ludlow, Kitching, O'Leary & Clarke, 2010; Sinclair, 2008).

Content Area Literacy and Common Core State Standards

Content area literacy is not a new concept with the Common Core State Standards (Biancarosa, 2012), but educators in the past believed that literacy instruction was the sole responsibility of language arts teachers (Giles, Wang, Smith, & Johnson, 2013; Henk, Mallette, & Waggoner, 2005). The components of literacy, which are reading, writing, listening, and speaking, are opportunities for student learning. New expectations are associated with rigor. Common Core State Standards stress higher level thinking skills, place more emphasis on writing, include increased text complexity, and embed literacy across the curriculum (Calkins et al., 2012). Therefore, science teachers are expected to emphasize informational texts and reinforce student use of academic vocabulary within their speaking and writing of the subject. Brown and Concannon (2016) found that literacy strategies in science instruction have a significant impact on student vocabulary knowledge, student metacognition, and content achievement. Common core literacy standards include reading for determining main ideas,

citing evidence from a text, following procedural steps, interpreting graphic features, and analyzing information from various sources (Common Core State Standards Initiative, 2012).

Although literacy instruction in the content area classroom has been a research topic for many years, resistance from teachers stems from a lack of literacy knowledge and a lack of confidence with their ability to assist struggling readers (Cantrell, Burns, & Callaway, 2009; Fang, 2014; Giles et al., 2013; Gillis, 2014; Mastropieri, Scruggs, & Graetz, 2003; Ness, 2009; O'Brien, Stewart, & Moje, 1995). Content teachers may not be conscious of their own knowledge and experiences with literacy (Alvermann & Phelps, 1998; Giles et al., 2013). The latest standards adoption comes in conjunction with yearly high-stakes testing and in a time when many teachers endeavor to adequately cover the content (Schoenbach, Greenleaf, & Hale, 2010); therefore, content coverage takes priority due to test preparation, and instructional pacing is increased (Mastropieri et al., 2003; Ness, 2009).

Alvermann and Phelps (1998) discouraged a focus upon content coverage as it overshadows the students' opportunities for blending information and applying it to other real-life situations. According to Lacina and Watson (2008), effective content teachers will recognize that "content can be learned through literacy-related processes, such as reading, writing, speaking, and listening" (p. 159). A recent study by Drew and Thomas (2018) indicated that scientific literacy has three aspects: foundational or early literacy, intermediate literacy where students are learning to read and write, and discipline-specific literacy which integrates literacy across disciplines; consequently, teachers require specific knowledge and preparation for literacy practices in the classroom. Literacy development is considered a "shared responsibility" (NGA Center & CCSSO, 2010, p. 4) between all teachers. Regardless of the classroom subject,

teachers are the instructors of reading and writing (Calkins et al., 2012) and facilitate learning and thinking through literacy (Lacina & Watson, 2008).

Rather than directing specific writing process programs, Common Core State Standards provide the achievement goals while expecting teachers "to provide students with whatever tools and knowledge their professional judgment and experience identify as most helpful for meeting the goals" (NGA Center & CCSSO, 2010, p. 4). Just knowing the strategies associated with content literacy is not enough for successful implementation. Teachers require the knowledge of employing the strategies within the content. Each content area "has its own set of characteristic literary practices" (Heller & Greenleaf, 2007, p. 7), so science teachers discover that literacy strategies are not one size fits all. By utilizing their own content reading knowledge, teachers will determine which strategies are acceptable (Giles et al., 2013; Gillis, 2014). While generic strategies for prereading and during reading assignments are adequate starting points, more specialization is needed for scientific literacy (Heller & Greenleaf, 2007; Gillis, 2014). Shanahan and Shanahan (2015) posited that content literacy is not the same as disciplinary literacy in that scientific literacy is more than a reading strategy; it teaches students to address the content as a scientist would. While literacy is acknowledged as both a cognitive and social construct in the classroom, educators must also address the social and cultural influences on content literacy (Henk et al., 2005; Moje, 2015; O'Brien et al., 1995). Successful schools place great value upon literacy across all disciplines (Henk et al., 2005).

Disciplinary textbooks are organized by chapters and are designed for breadth of information rather than depth (Mastropieri et al., 2003). Science focuses on collecting data, analyzing data, and drawing conclusions based upon data (Goldman, 2012), and text includes

prose, diagrams, or even critical thinking activities such as reading scientific measurements (Gillis, 2014). Science texts present challenges to readers as they possess a higher number of content-specific words, which is known as lexical density, and teachers may not have knowledge for helping students with difficult disciplinary vocabulary (Mastropieri et al., 2003; Palincsar, 2013; Shanahan & Shanahan, 2008). A lack of academic vocabulary understanding leads to a lack of reading comprehension (Greene, 2015).

The NGSS were specifically written in support of the Common Core Literacy Standards (NGSS Lead States, 2013). Close reading practices with informational text is a primary reading strategy of CCSS, and "science texts are a good example of the challenging text to which the framers of the CCSS refer" (Palincsar, 2013, p. 10). In addition to the practices associated with reading informational texts, literacy is taken a step further with the NGSS and CCSS in that investigative argumentation in the science classroom is encouraged (Palincsar, 2013). Science laboratories provide an appropriate avenue for inquiry and argumentative writing if teachers provide students with the necessary framework of skills (Sampson, Enderle, Grooms, & Witte, 2013). Science teachers must act purposely with writing instructions by providing exemplary writing as models, guiding and supporting students as they begin writing, and giving essential feedback so students can understand how to improve their writing skills (Sampson et al., 2013).

According to Heller and Greenleaf (2007), content disciplines allow students to develop a better understanding of the subject as it increases in complexity over time. Overall, science knowledge, just like any other discipline, requires rudimentary reading, writing, listening, and speaking skills; however, those skills are significant tools for inquiry and the critical thinking necessary for scientific understanding (Palincsar, 2013). Palincsar pointed out that an inquiry

approach to content literacy "can allow students to learn how to question and be critical of texts rather than to always defer to the text or use texts simply for finding answers" (p. 14) while the teacher facilitates scientific thinking (Tong et al., 2014). Scientific inquiry utilizes the same processing skills required when students are asked to read a nonfiction passage and then practice the reading strategies of prediction, inference, analysis, and evaluation (Tong et al., 2014). In the science classroom, "writing tasks need to be more realistic, embedded in the inquiry process, and engage students in the serious writing practices" (Sampson et al., 2013, p. 666). Students learn how to read, write, and speak like scientists. Changes in content area standards offer students a different method for learning through literacy.

Middle School

Adolescent learners possess unique developmental characteristics that are physical, social, cognitive, and affective that middle school teachers must consider (Booker, 2018; Lacina & Watson, 2008). Students seek acceptance in social settings and the whole schema of life while questioning what they are taught (National Middle School Association, 2003). A developmentally responsive curriculum ensures the needs of all learners are being addressed and is a crucial component for any middle school (Lounsbery, 2010; National Middle School Association, 2003). With research-based teaching strategies, standards instruction, and confidence, middle school educators will prepare students for the future. Delivering an exemplary middle-level curriculum is a challenge for educators.

As early as 1999, adolescent literacy issues began garnering the attention of American educators, and the Alliance for Excellent Education focused on issues associated with older students such as adolescent literacy and high school dropout rates (Snow, Martin, & Berman,

2008). Adolescent literacy challenges were later addressed by the Harvard Graduate School of Education and the National Governors Association Center for Best Practices in 2001 and 2002 with professional development institutes that were attended by representatives from nine states, including Georgia (Snow et al., 2008). Additionally, a large emphasis of these institutes focused upon comprehension, engagement, and content area reading and gave states an opportunity to develop plans for adolescent literacy interventions. Further work toward identifying K-12 literacy needs included work by the Carnegie Corporation of New York in 2003 and the Strategic Education Research Partnership in 2005 (Snow et al., 2008).

Middle and high school texts are more complex than elementary texts, and "experience with texts in earlier grades does little to prepare students for the increasing demands of the texts they must learn from in middle and high school" (Biancarosa, 2012, p. 24). The International Reading Association (2012) stated that adolescent learners need content area teachers who utilize numerous literacy strategies to meet content standards. Because each content area is diverse and more in-depth, disciplines require the use of specific literacy strategies differently (Giles et al., 2013; Lacina & Watson, 2008). Informational texts are the main component of the Common Core State Standards Literacy in History/Social Studies, Science, & Technical Subjects. Furthermore, disciplinary content classrooms involve vocabulary and skills that are specific to the content.

The teacher's role is to construct knowledge through literacy strategies with a variety of print and nonprint materials (International Reading Association, 2012). Middle school literacy requires more use of higher order thinking skills than in lower grades as students are asked to infer and evaluate what they read (Goldman, 2012). Common Core Literacy in History/Social

Studies, Science, & Technical Subjects Standards acknowledge that core teachers other than ELA teachers share the responsibility for literacy development due to the increased amount of informational text utilized in higher learning for college and career readiness (Common Core State Standards Initiative, 2012). Common Core reading standards within the content area are meant to complement the subject content while reinforcing key ideas and details, analyzing various text structures, and assimilating knowledge across various texts (Common Core State Standards Initiative, 2012). Reading is important because it "becomes a tool for knowing" (Goldman, 2012, p. 101). Jackson and Davis (2000) submitted that adolescent learners have a greater aptitude for complex thinking but lack substantial experiences for mastery. As reading concepts increase in complexity, students are expected to have the background reading knowledge needed to master the skills (Goldman, 2012), which many middle school students may not possess the knowledge or the skills (Dickens & Meisinger, 2016).

Middle school teachers are content specific instructors (Goldman, 2012) and may not feel knowledgeable regarding literacy implementation within disciplinary texts (Gilles et al., 2013). Self-efficacy beliefs impact teacher persistence, positively or negatively, during a new implementation (Milner, 2002). Also, until teachers encounter mastery experiences where they accomplish a goal or task, positive reinforcements are necessary for teacher persistence. Heller and Greenleaf (2007) promoted literacy instruction at the middle school level so that struggling readers would not fall further behind. Content area teachers may struggle in understanding how to implement reading and writing, or they may not know which strategies are effective for student ability levels or the discipline (Shanahan & Shanahan, 2008). Adolescent learners have diverse needs, so literacy instruction, even in the content classroom, must take this into

consideration (International Reading Association, 2012). Familiarity with literacy standards and the confidence of familiarity are important factors during reform. Couple these factors with the struggle to help students with reading deficits and high stakes testing and a need for support is great.

All teachers are teachers of literacy, and "literacy stands at the heart of the academic content areas" (Heller & Greenleaf, 2007, p. 6). Students are expected to read, write, listen, and speak in all content areas; however, not every content teacher fully believes he or she is a literacy teacher. Calkins et al. (2012) pronounced writing teaches students "to organize and elaborate on facts and ideas, to decide on priorities, to look at information through different lenses, and to entertain questions and see the answer to one question as leading to yet more questions" (p. 153). Middle school teachers are content experts and must remember that they possess significantly more content knowledge than adolescents, so the content teacher has to facilitate the organization of knowledge for the learner (Fisher & Frey, 2008).

Adolescents seek relevance between the content instruction and their own lives (Guzzetti & Bang, 2011), and relevance increases student engagement. Writing instruction across the curriculum increases student engagement and holds all teachers responsible for improving writing skills (Calkins et al., 2012). Infusing reading into the content area has created a struggle for teachers as they may fear that literacy instruction will overtake the content (O'Brien et al., 1995). Additionally, the approach to content literacy teaching must shift from teacher centered to student-centered instruction; this change affects the role of the teacher in the classroom (O'Brien et al., 1995). Interdisciplinary teaching in middle school is one avenue for peaking

student interest, while disciplinary literacy as a tool for learning leads to increased student knowledge across all content disciplines (Graham, Kerkhoff, & Spires, 2017).

Changing the standards will not increase student literacy development; content area teachers need direction "with what should be their dual emphasis−teaching disciplinary content and disciplinary literacy" (Goldman, 2012, p. 93). Literacy has a specific part to play in the content classroom. When teachers understand the management of literacy for their classroom, then all learners will benefit (Biancarosa, 2012).

Professional Learning

Schools and school systems need dedication to professional development that involves the disciplinary teachers (Giles et al., 2013) and equips those teachers with essential literacy knowledge and resources along with reading strategies (Cantrell et al., 2009; Goldman, 2012; Ness, 2009). The changes associated with Common Core Literacy Standards will require professional learning opportunities, especially for content area teachers (Giles et al., 2013). Effective educational leaders play an important role in creating literacy learning opportunities for teachers (International Reading Association, 2012), and schools must facilitate professional development to encourage lifelong learning and ensure adequate teacher preparation (Polk, 2006). Professional learning for the Common Core State Standards must consider educators' knowledge, attitudes, and feelings about implementation and their work environment while providing necessary support and feedback for effectiveness (Day & Gu, 2007; Paik et al., 2011). Teachers' identities are affected by all experiences, which in turn affect teacher motivation and commitment (Day & Gu, 2007).

Professional development is a necessary tool for educators to stay abreast of strategies and tools for curriculum and instruction. Maskit (2011) posited three pieces that influence individual teachers' stages regarding professional development experiences: informational component, professional component, and psychological component. The informational component refers to teacher age and experience; professional relates to job proficiency, commitment to the profession, attitude toward students, and perceptions; psychological denotes the teacher emotions in relationship to the other two components (Maskit, 2011).

Brief overviews of curriculum standards, teaching strategies, and learning strategies will not render the appropriate level of change necessary for improvement; teachers need professional learning that supports a deep understanding of the content and activities (Paik et al., 2011), which requires scaffolding instructional practice coupled with teacher reflection opportunities and discussion (Lotter, Smiley, Thompson, & Dickenson, 2016). Wilder and Herro (2016) cautioned literacy coaches against loading content teachers with literacy strategies and expecting positive results. Moje (2015) likened disciplinary literacy professional development to apprenticeships where the teachers are expected to discuss literacy teaching practices collaboratively, self-evaluate their own practices, read research articles, and practice inquiry. Coaches or professional learning leaders must immerse themselves as collaborators with disciplinary teachers and construct the necessary plan for integrating literacy practices (Wilder & Herro, 2016). Providing teachers "an opportunity to engage in role-playing and microteaching experiences with specific feedback can have a more powerful impact on self-perceptions of teaching competence because such exercises more directly address the need for mastery experiences" (Tschannen-Moran et al., 1998).

In order for professionals to experience accomplishments during challenging situations, a sense of self-efficacy is vital (Friedman, 2000). Collegiality during professional learning sessions remains essential as communication and collaborative support are appreciated outcomes for higher implementation of content literacy (Cantrell et al., 2009; Friedman, 2000; Moje, 2015; Paik et al., 2011). Ample practice time is necessary for teachers to buy into literacy strategies and increase their comfort levels. Additionally, coaching opportunities will benefit teachers who need further assistance with instruction or resources (Cantrell et al., 2009). Feedback from others is a beneficial, collaborative component of an individual's new learning opportunities (Bray, 2011). Learning communities and the promotion of collegiality positively impact resilience, especially when school leadership is committed and provides a supportive environment (Gu & Day, 2013). School leaders set the goals for the organization, and leadership style highly influences the levels of teacher effectiveness.

Teachers' motivation is impacted either positively or negatively according to their professional learning experiences (Day & Gu, 2007). Stronge, Ward, and Grant (2011) discerned that "nothing is more fundamentally important to improving our schools than improving the teaching that occurs every day in the classroom" (p. 351). Targeted and well-designed professional learning for educators is a step for improvement.

Teacher Efficacy

Efficacy is defined as "a teachers' expectation that he or she will be able to bring about student learning" (Ross & Bruce, 2007, p. 50) and is an important component of teaching and learning (Moè, Pazzaglia, & Ronconi, 2010; Ross, 1994). Tschannen-Moran et al. (1998) determine teacher efficacy as "the teacher's belief in his or her capability to organize and execute

courses of action required to accomplish a specific teaching task in a particular context" (p. 233). Confidence is a factor that affects one's attitude toward performance, ability, and the influence of other individuals (Bordelon, Phillips, Parkison, Thomas, & Howell, 2012). Expectations also include the perceptions of students' ability levels and the confidence that the students will achieve (Harris, 2012). In addition to student achievement, teacher efficacy levels are associated with additional factors such as classroom management skills, parental relationships, and the utilization of resources (Friedman & Kass, 2002). Efficacy is connected with individual teaching efforts, goal setting, and ambition while influencing persistence and resistance (Tschannen-Moran et al., 1998). The amount of persistence in efforts is the outcome of self-efficacy judgments, and greater determination yields advanced goal accomplishments (Bandura, 1982).

According to Tschannen-Moran and Woolfolk Hoy (2007), teachers' self-efficacy is "a little idea with a big impact" (p. 954). The impact of teacher efficacy levels is noted in several aspects. Personal views about one's teaching skills influence future actions (Putnam, 2012), and self-efficacy is a "motivational construct based on self-perception of competence rather than the actual level of competence" (Tschannen-Moran & Woolfolk Hoy, 2007, p. 946). If the perception of a performance is positive, teacher efficacy levels increase, and future anticipations are optimistic. Conversely, if a performance is deemed poor, future expectations are negative (Tschannen-Moran et al., 1998). Perceptions of how others, such as students and parents, see teachers also impact self-efficacy (Bordelon et al., 2012).

Teachers with high levels of efficacy are (a) more apt to try new strategies, (b) encourage their students' self-sufficiency through management strategies, (c) focus upon low ability students, (d) promote student academic efficacy, and e) demonstrate greater persistence (Ross &

Bruce, 2007). Lacking confidence in the ability to successfully implement standards can seriously deter achievement (Harris, 2012). Consider a teacher who "is aware of deficits in his or her capabilities in a certain circumstance but has a belief about how those deficits can be addressed will have a resilient sense of teacher efficacy" (Tschannen-Moran et al., 1998, p. 233). For an individual to continue with a task despite the pressures associated with failure and success takes a great sense of efficacy (Bandura, 1993). One facet of this study focused upon veteran teachers and their sense of self-efficacy during the implementation of literacy standards within the content area.

Efficacy depends upon personal expectations and confidence levels. Situations also affect teacher efficacy as teachers may feel more or less efficacious depending upon the circumstance or context (Goddard, Hoy, & Hoy, 2000; Tschannen-Moran et al., 1998). According to Kelchtermans (2005), teachers' self-esteem balances between self-perception and task awareness. In other words, how a teacher perceives his or her competence is weighted against the expected teaching practice, and the outcome is a self-efficacy judgment which could affect future efforts and actions (Tschannen-Moran et al., 1998). Tschannen-Moran et al. referred to the personal assessment that each teacher measures against the required action as the analysis of the teaching task. The authors added that personal attributes that are credited to success would augment efficacy levels. Factors that increase teacher efficacy are coping strategies such as professional development opportunities and education and collaboration with peers (Cantrell et al., 2009; Ross & Bruce, 2007). Additional factors are the students' abilities, student motivation, classroom management, availability of effective instructional materials (Tschannen-Moran et al., 1998), and relationships with parents (Skaalvik & Skaalvik, 2010).

In addition to the previously mentioned factors, "contextual factors include the leadership of the principal, the climate of the school, and the supportiveness of other teachers" (Tschannen-Moran et al., 1998, p. 231). School environment and organizational factors such as climate and leadership affect teacher efficacy (Bandura, 1993; Lotter et al., 2016; Tschannen-Moran et al., 1998). Principals who demonstrate strength in leadership will rally the school faculty toward achieving originally believed unreachable goals (Bandura, 1993). Modern teachers do not work in isolation but instead create a collaboratively working system (Bandura, 1993). Collective efficacy within the school is a shared perception of teachers, which ultimately directs experiences within the school setting (Tschannen-Moran et al., 1998), and collective efficacy could expound upon the variances of student achievement among schools (Goddard et al., 2000).

Friedman and Kass (2002) introduced organizational efficacy, which encompasses an educator's views of his or her useful contributions within an organization toward mutual goals and his or her abilities to garner support from colleagues and administration. School leadership relationships and the levels of support and trust affect collective teacher efficacy (Skaalvik & Skaalvik, 2010). Decreased efficacy of faculty within a school could potentially spread throughout and result in diminished morality (Bandura, 1993; Tschannen-Moran et al., 1998). Equally, increased collective efficacy levels are not impossible with "the acceptance of challenging goals, strong organizational effort, and a persistence that leads to better performance" (Goddard et al., 2000, p. 486). Middle and high school teachers could experience decreased efficacy "when the complexities of academic demands increase, and scholastic deficits become increasingly salient" (Bandura, 1993, p. 141). Bandura also posited teacher longevity, or "total number of years teaching, years teaching in the same school and same grade, and the

number of different grades taught" (pp. 142-143), as an indicator of collective efficacy. Participants in this study are chosen not only because of effectiveness but also because they have at least eight years of teaching experience.

Teacher efficacy levels are powerful because of the recurring cycle between teacher-perceived performance and future efficacy expectations (Tschannen-Moran et al., 1998). Higher efficacy will produce increased efforts, greater performance, and ultimately further increase efficacy levels, while lower efficacy leads to decreased efforts, lesser performance, and diminished efficacy (Bandura, 1993; Tschannen-Moran et al., 1998). Tschannen-Moran et al. advised educators to expect a loss of efficacy during the implementation of a new initiative. Higher efficacy levels provide teachers enough assurance to continue through challenging changes (Ross, 1994). Additionally, each teaching experience influences efficacy levels, so nurturing teacher efficacy is vital, especially when new strategy implementation or change occurs in the professional environment (Tschannen-Moran et al., 1998). Tschannen-Moran et al. added that teachers need proof of increased student achievement before an increase in efficacy. The authors noted that high teacher efficacy improves motivation, effort, persistence, and resilience during the educator's career.

Emotions

Emotions play an integral role in the teaching profession as they are "the experiences that result from teachers' embeddedness in and interactions with their professional environment" (Kelchtermans, 2005, p. 996). Education is an emotional occupation that requires the teachers' substantial investment (Day & Gu, 2007). Educators are held to a high standard of professionalism with regards to interactions with all stakeholders. Teachers participate in both

surface and deep emotional acting while displaying emotions based upon their professional identities and their conceptualization of the ideal teacher (Brown, Horner, Kerr, & Scanlon, 2014). The emotions of both teachers and students influence the environment and outcomes. Educators fall under a largely unspoken professional expectation regarding behavior (Brown et al., 2014).

Sutton and Wheatley (2003) suggested that emotions affect teacher motivation in that teachers who are frustrated with teaching situations might possess less intrinsic motivation for implementing new strategies or ideas in the classroom. Conversely, teachers' moral obligations to their students are identified as motivational factors during challenging times (Gu & Day, 2007; Santoro, 2011). Gu and Day (2013) described an emotional commitment to students and an ethical desire as intrinsic motivations for resilient educators. Teachers who understand the importance of the social and academic development of students value emotional elements of the teaching profession, such as making personal connections with students (Lasky, 2005). The education system needs passionate teachers who remain dedicated to their profession while staying satisfied with their career (Moè et al., 2010; Phelps & Benson, 2012).

Educational reform, such as Common Core State Standards, is a challenge because teachers may be asked to reevaluate teaching methods or try new strategies. These challenges bring forward teachers' moral and ethical beliefs along with associated internal rewards (Santoro, 2011). Every teacher responds to change differently (Hargreaves, 2005) and a teacher's attitude toward change is critical (Phelps & Benson, 2012). Phelps and Benson have identified four qualities of teachers who remain in the profession despite challenges. They are a willingness to change, continuing education, collegial support, and professional self-reflection.

Change can be difficult for some individuals even when a routine is deemed effective and established for a period of time (Tschannen-Moran et al., 1998). When veteran teachers become cognizant of new, effective teaching strategies, a confidence loss in teaching skills can occur (Guskey, 1984). Guskey further explained that positive student learning results may encourage emotional changes in teachers. Flexibility with change can prevent a loss of passion for the profession (Phelps & Benson, 2012). Emotional exhaustion also factors into the teaching profession as many educators have chaotic school days with additional after-school hours devoted to the educational workload (Skaalvik & Skaalvik, 2010). How teachers and schools respond to these challenges was of interest to this study.

Identity and Self-Understanding

Teachers have professional identities, which is how teachers see themselves and how they appear to others in the professional environment (Bordelon et al., 2012; Day & Gu, 2007; Lasky, 2005), but the teacher is always considered the center of education (Kelchtermans, 2005; Santoro, 2011). Teacher identities are shaped by a combination of personal beliefs, professional beliefs, and school environment beliefs, which are constantly changing with experiences and environmental dynamics (Bower, Parsons, & Carlton, 2016; Buchanan, 2015; Day & Gu, 2007; Kelchtermans, 2005). Teacher roles and self-perceptions are important identifying factors in teacher self-efficacy (Bordelon et al., 2012; Buchanan, 2015). Individuals with a strong sense of identity are more likely to be highly self-directed (Bandura, 1991).

Professional vulnerability during school reform involves taking risks and working outside of the individual's professional comfort zone. Cantrell et al. (2009) identified teacher discomfort during new strategy execution as the main obstacle of content literacy implementation. Teachers

associate their professional identity with effective teaching methods, both academic and social, relationships with students, and the goals of education for students (Coulter & Lester, 2011; Kelchtermans, 2005; Lasky, 2005).

Darby (2008) found that the fears associated with teacher self-understanding during reform can create incentives for teachers to not only help themselves but provide better instruction for student success. Public service motivation is a large impetus for teachers to push forward in challenging settings and situations (Mintrop & Ordenes, 2017). Teachers value their students; therefore, motivation for improvement comes from that value. Educational reforms involve professional identity in that teachers evaluate their commitment, and self-direction is necessary during professional performance self-reflection (Le Roux, 2011). Once teachers realized that previous practices were not boosting students' skills, this produced lowered self-esteem but created motivation for improving teaching methods. Le Roux determined that teacher self-direction during reform is a critical professional advancement feature.

Teachers' actions and decisions are under constant scrutiny by others, which makes them more vulnerable (Kelchtermans, 2005; Le Roux, 2011). Personal judgment of one's performance or actions creates either a positive or negative outlook (Bandura, 1991) and is directly linked to teacher efficacy (Day & Gu, 2007). Teachers measure themselves against their model teacher identity; the measurement may or may not compare, and teacher confidence can suffer (Wilson & Deaney, 2010). Accountability pressures in education are either motivational or breaking factors for teachers. Bower and Carlton Parsons (2016) concluded that teachers encounter reform initiatives with some level of resistance for self-preservation of their teacher identity. Le Roux concluded that maintaining a positive teacher identity during reform involves

coping through "the discourse of vocational commitment and the discourse of possibility" (p. 313). Education is a demanding and dynamic profession that requires advancement through learning, change, and experience.

Midcareer Stage

Teachers in mid- and later-career stages would be apt to encounter multiple curriculum initiatives throughout their professional careers. Consequently, numerous career teachers are skeptical regarding new educational reforms (Guskey, 1989). Typically, each individual handles reform differently. According to Hargreaves (2005), many later career teachers are positive influences and diligent toward imparting knowledge to younger generations, while others are negative focusers who are more absorbed in personal interests than concentrating on students' needs. Experienced teachers impart more personality into teaching, which strengthens the learning process (Polk, 2006), and years of practice and familiarity create more authentic teaching skills (Coulter & Lester, 2011).

Midcareer teachers have enough experiences with change to know that it is an imminent component of the future of education. As a result, many experienced teachers adapt as "they were challenged to expand their understanding of what teaching and learning meant for both them and their students" (Coulter & Lester, 2011, p. 11). Career teachers value commitment to the education system (Gu & Day, 2007). The acceptance of educational reform is a common characteristic of midcareer teachers, and they are more resilient to the stresses of change (Hargreaves, 2005). Increased expectations are challenging for all teachers, even those with many years of experience (Tschannen-Moran et al., 1998). A research study by Stone-Johnson (2011) suggested that midcareer educators possess "control over their work, that the changes

being asked of them at worst do not negatively impact them, and at best focus and hone their teaching work" (p. 236). Positive working environments with supportive leadership and collegiality have a remarkable impact on sustaining midcareer teacher resilience and motivation (Coulter & Lester, 2011; Gu & Day, 2013). Also, experienced teachers are able to realize the impact they are making upon students and experience rewards associated with the profession (Coulter & Lester, 2011). The addition of high-stakes testing and rigorous content has the capability of impacting teacher satisfaction, but many midcareer teachers successfully experience reforms through resilience and adapting to the circumstances.

Resilience

Gu and Day (2007) defined resilience as "the capacity to continue to 'bounce back', to recover strengths or spirit quickly and efficiently in the face of adversity" (p. 1302). Reform initiatives that create change, such as Common Core, require resilience from teachers if they perceive adversity. Resilience is fueled by a combination of strengths, values, emotions, and efficacy (Gu & Day, 2007). A recent study of early career teachers by Mansfield, Beltman, Price, and McConney (2012) determined four dimensions of teacher resilience: emotional, motivational, profession-related, and social. Resilience is a complex construct with multiple characteristics that differ among individuals (Mansfield et al., 2012). Even teachers who are considered resilient have experienced periods of negative feelings towards their ability to stay resilient and withstand professional pressures (Williams, 2003). As mandated educational initiatives are unlikely to disappear, educators are relied upon for their resilience and their commitment to their students (Day & Smethen, 2009).

The affective component of the teaching profession involves the relationships between the teachers and their students and the relationships between the teachers and their peers. Not only are teaching professionals expected to have pedagogical competency, but educational situations now demand that they are also psychologically resilient enough to use professional understanding in resourceful ways (Duffy, 2002). Gu and Day (2007) connected the professional identity of educators with their interactions, feelings of efficacy, and professional situations as contributing to overall resilience. Gu and Day (2013) noted:

> The nature and sustainability of resilience in teachers over the course of their professional lives is not a static, or innate state, but influenced, individually and in combination, by the strength of their vocational selves, the commitment of those whom they meet as part of their daily work and the quality of leadership support within the school as well as their capacities to manage anticipated as well as unanticipated personal events. (p. 40)

Outstanding teachers find ways to recreate experiences for students and discover several ways to integrate content into the curriculum (Duffy, 2002). Adapting to change is not easy, but many teachers are able to continue the pursuit of excellence because "they adjust, modify, adapt, and invent; they do not emulate" (Duffy, 2002, p. 333). Flexibility is crucial as teachers experience changes in the profession (Williams, 2003). Passion for teaching is a key factor among effective teachers (Duffy, 2002), especially during the age of high stakes testing and accountability expectations for student achievement. Persistence and passion help influence educator resilience during change while helping them to push through difficult experiences (Coulter & Lester, 2011).

Teacher Effectiveness

Numerous characteristics can be applied to effective educators; however, no one depiction or definition of the effective teacher exists. Day and Gu (2007) attributed good teaching to "intellectual curiosity and emotional investment" (p. 428). Polk (2006) identified 10 characteristics shared by educators who achieve results: "good prior academic performance, communication skills, creativity, professionalism, pedagogical knowledge, thorough and appropriate student evaluation and assessment, self-development or lifelong learning, personality, talent or content area knowledge, and the ability to model concepts in their content area" (p. 23). Stronge et al. (2011) acknowledged the difficulty of defining teacher effectiveness and whether the judgment should stem from teacher credentials, classroom instructional strategies, or student achievement data. Regardless, one single source is not recommended as the sole determination of teacher effectiveness (Stronge et al., 2011). Day and Gu (2007) identified performativity as a hazard to teachers' identities, a disruption of student-teacher relationships, an obstacle to teachers' resilience, a hindrance of teacher control over teaching, and a roadblock to teachers' ability to maintain efficacy.

Administrative assessments are another measure of teacher effectiveness. Principals subjectively identify teachers who are the most effective and the least effective performing teachers within their schools (Harris, Ingle, & Rutledge, 2014; Jacob & Lefgren, 2008). Administrative evaluation of teacher effectiveness is regarded as a combination of characteristics and reflects the qualities that principals believe are the most effective (Harris et al., 2014). Teacher evaluation systems are undergoing revisions with initiatives such as Race to the Top

where a large portion of the teacher evaluations include value-added measures that provide evidence of student achievement (Harris et al., 2014).

Learning through professional development is a significant opportunity for teachers. Stronge et al. (2011) determined through their research study that the most significant aspect of school improvement is what occurs daily in the classroom. Professional development further strengthens teacher content knowledge, which in turn benefits the student content knowledge. When teachers can probe deeply into the subject matter with the understanding of common student misconceptions regarding subject content, they anticipate an action plan before and during instruction (Sadler, Sonnert, Coyle, Cook-Smith, & Miller, 2013). Education is not a stagnant profession; therefore, it is the professional responsibility of educators to remain apprised of current trends and research-based methods, which in turn can affect student achievement (Polk, 2006). Even educators who are considered experts have more learning to accomplish, have developed a cognizance of knowledge deficits, and react positively to learning opportunities (Day, 2012). The concept of the lifelong learner is one that many educators encourage for their students; therefore, teacher professional learning is a model for students to follow (Day & Gu, 2007; Polk, 2006).

Communication skills are important for educators whether they are dealing with students, peers, parents, or administrators. Effective classroom management and time efficiency with regard to routines, procedures, and dealing with disruptions are leading indicators of effective teachers (Strong et al., 2011). Polk (2006) identified communicative clarity as a teacher's expressive ability by delivering concepts and knowledge to students. Additionally, positive communication is noted with veteran teachers and is considered more effective, while an

enthusiastic teacher grabs students' interest (Polk, 2006). Effective teachers make a concerted effort to reach each student regardless of the outcome, and this exercise requires significant emotional effort for making personal connections and creating positive relationships with students (Day & Gu, 2007; Stronge et al., 2011).

Accountability

In recent years, teacher accountability has developed around standardized testing data (Buchanan, 2015), and teacher effectiveness is situated according to yearly student achievement scores. As a result of efforts to raise student achievement, teachers' workloads are "increased, intensified, and expanded in response to federal, state, and local policies" (Valli & Buese, 2007, p. 520). Reform initiatives, high-stakes testing, and teacher accountability measures "have combined to place strong 'performativity' and increased workload pressures and have affected the motivation, morale and commitment of many" (Day & Gu, 2007, p. 424). Student achievement scores and the gains or losses associated with those scores are now embedded in teacher evaluations, which will fuel future debates regarding high stakes testing (Stronge et al., 2011).

Accountability changes require educators to place greater attention on yearly assessments. Greene et al. (2008) conducted a study of middle school teachers and concluded that middle school concepts and best teaching practices are now replaced by testing preparation. Musoleno and White (2010) submitted that test preparation coupled with the concern with student achievement deter from the traditional middle school focus, which is based upon whole student growth. Testing accountability has pushed schools to change schedules, increase

remediation-level classes, and prioritize high stakes subjects to keep up with the student mastery demands of accountability measures (Gonzalez, Peters, Orange, & Grigsby, 2017).

The pressures of standardized testing and student achievement prevent science teachers from having the time or the resources to focus on overachieving and underachieving students; they place most of their efforts on the average student (Aydeniz & Southerland, 2012). Aydeniz and Southerland's research indicated that science teachers were concerned that the focus of high-stakes testing on multiple choice assessments discourages inquiry-based instruction. They added that the connotation of standardized testing for accountability measures is critical because some see student scores as indicators of teacher effectiveness while others see the data as a reflection of student motivation.

The state of Georgia implemented the updated teacher evaluation system, known as Teacher Keys Effectiveness System (TKES), for the 2014-2015 school year. Under the TKES evaluation, middle school science teachers' evaluations are based upon three pieces that complete a Teacher Evaluation Measure (TEM): Teacher Assessment on Performance Standards (TAPS), professional growth, and a Student Growth Percentile (SGP) based upon (Georgia Department of Education, 2016b). Following TAPS orientation, a teacher self-assessment, and a pre-evaluation conference, school administrators begin the formative teacher assessments known as TAPS, which consists of five domains and ten standards (Georgia Department of Education, 2016b). In detail, the five domains are: Planning, Instructional Delivery, Assessment Of and For Learning, Learning Environment, Professionalism and Communication. Specifically, the ten TAPS Performance Standards include Professional Knowledge, Instructional Planning, Instructional Strategies, Differentiated Instruction, Assessment Strategies, Assessment Uses,

Positive Learning Environment, Academically Challenging Environment, Professionalism, and Communication. Feedback is given through an online platform, and a midyear conference allows administrators to share feedback responses based on each standard; the cycle of TAPS is completed with a summative evaluation and a summative conference (Georgia Department of Education, 2016b).

The Student Growth Percentile of a student is determined as "a student's growth relative to his/her academically similar peers" (Georgia Department of Education, 2016b, p. 17). When available, up to two consecutive years of testing data are utilized as pretest scores. As a result, students in Grades 4 through 8 are the only ones that receive growth data. SGP addresses four areas, and scores for each area can range from 1% to 99%. Furthermore, not only is the SGP 30% of the Teacher Effectiveness Measure score, but it is also 40% of the Leader Effectiveness Measure of the Leader Keys Effectiveness System.

Since 2014, TKES has undergone a major overhaul. With the 2016-2017 school year, changes regarding the state summative assessment for grades 3 through high school, the Georgia Milestones, alter the evaluation method of middle grades science educators. The student growth data in science no longer comes from the Georgia Milestones standardized test in Grades 6 and 7; instead, each Local Education Agency (LEA) has one of three options for determining student growth in the content areas of science and social studies. According to the most recent Georgia Teacher Keys Effectiveness System Handbook (Georgia Department of Education, 2016b), "this component is comprised of LEA Determined Measures which may be Student Learning Objectives or a similar pre- to post- measure, the School or District Mean Growth Percentile, or

another measure identified or developed and implemented by the LEA" (p. 16). Grade 8 science students participate in the Georgia Milestones.

According to Faulkner and Cook (2006), teachers believe that the accountability pressures require more focus on standardized testing, and the result is a restricted curriculum that reflects content breadth rather than content depth. Test-score expectations, whether placed by the teacher or the school administration, may drive the methods of instruction toward standardized testing. The outcome of this instruction will promote teaching to the test rather than instructing for the purpose of learning and retention.

Summary

The importance of adolescent literacy integration in the content area classroom is evident in the literature. Disciplinary literacy has been an ongoing issue and remains at the forefront of American educational policymakers. Middle school teachers have a responsibility of integrating more complex literacy skills within disciplines. Additionally, high-stakes testing now places accountability on content areas such as science for student achievement data. Many states, including Georgia, are placing student achievement growth as an integral piece of teacher evaluation systems. Resiliency is necessary for teachers to remain in the educational field while challenges abound. During educational reforms, teacher efficacy and motivation are challenged, but resilient teachers remain dedicated in their professional roles. Next, Chapter 3 covers the procedures, research design, and analysis for this research study.

CHAPTER THREE: METHODS

Overview

This study was conducted through a phenomenological investigation of experienced middle school science teachers in Northeast Georgia. Transcendental phenomenology (Moustakas, 1994) contributed to a rich description and different perspective (Creswell, 2007) of teachers' experiences and motivations regarding the implementation of the Georgia Common Core State Standards. The plan sought the co-researchers' viewpoints regarding literacy within their content discipline and how their perspectives impacted the implementation.

Georgia middle school science teachers were expected to incorporate literacy Common Core standards in conjunction with the content standards. Experienced, or veteran, teachers in Georgia have gone through several standards reforms in recent years. Given the importance of literacy integration in the content areas, this qualitative study was intended to determine why veteran teachers are successful in integrating the Common Core Literacy Standards into the content area of science. The purpose of this qualitative phenomenological study was to explore the experiences of veteran science teachers at middle schools in Northeast Georgia that are successfully transitioning to the Georgia Standards of Excellence. The research questions for the study are:

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area? The following subsections outline the research study with regards to design, setting, participants, procedures, data collection, and data analysis.

Design

A qualitative transcendental phenomenological (Moustakas, 1994) study was conducted to uncover the experiences of middle school science teachers in implementing the Common Core literacy standards. Qualitative research is used when a "complex, detailed understanding of an issue" (Creswell, 2007, p. 40) warrants further investigation. Transcendental phenomenology is intentional and objective in nature and looks at a phenomenon in a way that is free of judgment (Moustakas, 1994). Furthermore, the co-researchers' experiences of an issue are described in detail so the issues of literacy teaching practices based upon the Common Core Literacy Standards in the science classroom are best understood when coming from the teachers. Experiences of teachers during Common Core State Standards for Literacy Implementation (CCGPSELA) can be thoroughly understood and represented through qualitative research.

Phenomenological research is a fitting approach to the integration of Common Core Literacy Standards in the science content area which was experienced by veteran teachers. Phenomenology searches for meanings and essences of the experiences (Moustakas, 1994). Moustakas added that data collection of a phenomenological study focuses upon the experiences associated with the phenomenon, leads to a textural and structural description and provides an

interpretation of the lived experiences of the participants, who serve as co-researchers throughout the study. The research purpose is to determine the "essence and meaning of human experience" (Moustakas, 1994, p. 105) and ascertain common themes as effective science content teachers successfully integrate CCGPSELA standards into the curriculum. This research design was chosen to provide a thick, rich description of the phenomenon and the experiences of the co-researchers.

Social constructivism is the worldview lens for this qualitative research study because the study will depend upon the co-researchers' perceptions and views about the implementation of the Common Core State Standards (Moustakas, 1994). My goal was to understand those experiences and make meaning from them. Interview questions were open-ended, and a semistructured protocol allowed for co-researchers to freely discuss their experiences while allowing the researcher the option of asking follow-up questions. This protocol permitted me to discover the true thoughts and feelings regarding the co-researchers' implementation accounts.

As a veteran English language arts and reading teacher, I was highly interested in content area literacy, but I pursued knowledge through the lived experiences of the co-researchers. The transcendental phenomenological approach to research begins with the *epoche* process that allows the researcher to address prior judgments regarding the phenomenon so that the experiences are authentic and so that the researcher "may see with new eyes in a naïve and completely open manner" (Moustakas, 1994, p. 86). I recorded my perceptions and judgments regarding content area literacy implementation before collecting data so that I was ready to objectively observe, record, and analyze the co-researchers' experiences.

Research Questions

This study had one main research question and three subquestions that revolve around Bandura's (1977) self-efficacy theory. This theory is a part of his social cognitive theory with regards to cognitive factors, behavioral factors, and environmental factors.

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

Setting

Middle school science classrooms in Northeast Georgia were the setting for this qualitative study. This setting was chosen because the researcher was not only located in the region, but numerous middle schools were available for securing potential co-researchers. The Pioneer Regional Educational Service Agency (RESA) for the area represented 15 public K-12 school systems. The 15 public systems included a total of 21 middle schools. Three systems granted approval for five schools. According to the Georgia Department of Education 2018 College and Career Readiness Performance Index (CCRPI), the student population within those five schools ranged from 501 students to 1849 students with three of the five schools qualifying as Title I schools with economically disadvantaged students. Additionally the CCRPI indicated

the percentage of ELL students ranged from two percent to 41 percent within those five schools. Each Georgia middle school science teacher was expected to begin applying the Common Core State Standards or shared phenomenon beginning in the 2012-2013 school year.

Participants

Purposeful sampling of experienced teachers identified co-researchers for this study. Criterion sampling determined the teachers who share the phenomenon (Creswell, 2007). Participants are known as co-researchers in phenomenological studies because researchers interview those subjects or conduct conversations with them (Moustakas, 1994). Northeast Georgia public school superintendents were contacted to receive permission for conducting research within the school system. Then, middle school administrators were contacted to gain permission to use teachers from their school. Middle school administrators were asked to assist in identifying and purposely selecting science teachers; the only requirement was a minimum of eight years of teaching experience regardless of gender, age, or ethnicity. I anticipated having 10 to 15 co-researchers to participate voluntarily in this study. A greater number of co-researchers will ensure a significant amount of data for analysis and saturation (Moustakas, 1994). Once possible co-researchers were identified, the researcher made contact and sent a consent form and questionnaire to be filled out before the interviewing process began.

Procedures

The initial step for this qualitative study was to receive approval from the Institutional Review Board (IRB) at Liberty University. See Appendix D for the IRB application and Appendix E for the IRB approval letter. For school system approval, I contacted the superintendent's offices using the system permission letter (Appendix F). The next procedure

was to identify middle school administrators from Northeast Georgia public schools and to contact those individuals. Information sent to the middle school administrators included an explanation of the purpose of the study and the necessary criterion for the co-researchers. Appendix G contains the middle school administrator email. Upon receiving feedback from the administrators, contact with individual teachers was made by an email that outlined the study purpose and requirements of data collection for the study. See Appendix C for the consent form. Once consent was obtained, co-researchers were asked to complete a questionnaire to determine demographic information such as age, race, ethnicity, years of teaching experience, level of education, and professional experiences. The questionnaire included probes, such as education level, to collect information to use for any necessary subsequent interview sessions. The questionnaire is found in Appendix B. I also began scheduling interviews with co-researchers. Individual interviews were part of data collection in addition to lesson planning evidence, which provides documentation of literacy in science. I recorded the interviews using a handheld digital voice recorder, and immediate transcription occurred using Transcribe Me!, a web based transcription service.

The Researcher's Role

The topic of content area literacy fascinates me in that I have an interest in middle school practices and literacy. I was a human instrument (Lincoln & Guba, 1985) in the study; while I meticulously attended to details, there was no guarantee of perfection. Curriculum and instruction and professional learning were areas that appealed to me as a former middle school academic coach. Helping teachers become more effective so that they remain in the education field was important.

As a language arts teacher for the past 20 years, I had assumptions about literacy implementation in the content areas. I believed that many content area teachers consider reading and writing as extra work and that the English language arts teachers were the ones responsible for those standards. Not all content teachers feel this way, but they may have frustrations with implementing literacy and still teaching the content standards. From my own experiences, veteran teachers were occasionally seen as set in their ways and were resistant to change; others may have been eager but lacked confidence. Consequently, I bracketed out my own experiences and expectations while I investigated the phenomenon (Creswell, 2007). I paid careful attention to the data and avoided including any of my own biases through *epoche*. Very little literature was devoted to the experiences of successful content area teachers who implement literacy standards, so my role as a researcher was important.

Data Collection

All procedures were piloted, and possible changes were made prior to the research study. No data collection occurred until approval was received from the IRB and the schools that employed the co-researchers. Co-researchers' informed consent was necessary before any data collection could begin. Three methods of data collection were used for this phenomenological study: interviews, documents/lesson plans detailing the integration of literacy strategies in science, observation field notes, and a demographic questionnaire.

Interviews

Individual interviews were conducted with experienced middle school science teachers in Northeast Georgia using a guided interview protocol. A semistructured protocol and interview guide (Patton, 2002) allowed for follow-up questions and verification of information or

elaboration of co-researchers' responses. Audiotaping of each interview ensured accuracy of data. Each audiotaped interview session was transcribed verbatim. Co-researchers had the option of member checking the transcripts for accuracy. The interview questions were reviewed by peers in the qualitative research field and then piloted by a small sample after IRB approval.

The purpose of Questions 1 through 3 was to develop an understanding of the literacy preparation received by the co-researchers. Much research is devoted to early teachers (Chong & Low, 2009; Morgan, Ludlow, Kitching, O'Leary & Clarke, 2010; Sinclair, 2008) and professional development during educational reform (Giles et al., 2013; Maskit, 2011; Moje, 2015; Tschannen-Moran et al., 1998).

. According to Gillis (2014), arming teachers with discipline-specific strategies is more beneficial that imposing general literacy strategies within a content area. Additionally, the experience level of the teachers is an important factor during school reform (Thornburg & Mungai, 2011).

Teacher identity is a component that affects educational reform identity (Darby, 2008; Lasky, 2005) and is addressed by Question 4. Questions 4 through 9 reflected Kelchterman's (2009) term self-understanding, which encompasses self-image, self-esteem, job motivation, task perception, and future perspective. Questions 5 and 6 deal with challenges associated with literacy integration that can hinder success (Ross & Bruce, 2007). These questions were intended to determine issues during implementation and how the participants dealt with those issues. Research studies indicate that curriculum reform or professional development is influenced by teachers' professional identity (Darby, 2008; Lasky, 2005) and self-efficacy (Ross & Bruce, 2007) and is addressed by Questions 7 and 8. It is vital to reflect upon professional

development and how schools worked with veteran teachers in that those educators have valued experience (Levine, 2011). Hopefully, Question 9 will bring the interview full circle as the participants are asked to reflect upon their implementation experiences.

Documents

Documents to be collected were lesson plans or unit plans that contain Common Core literacy standards in the science content area and samples of student work. Each school or district may have its own planning template for teacher use. The purpose of collecting lesson plans was to establish proof of evidence of literacy planning. Literacy strategies noted in the plans will be documented for the design of reading and writing strategies along with the types of strategies. Student work samples were copies of the original works and had no student identification present.

Observations

Observation of the co-researchers provided data through field notes that addressed how literacy is implemented in the classroom setting. While I was not actively participating in classroom instruction or activities, I was a participatory observer because I spoke to the teacher and students as needed. I planned at least one observation for each co-researcher.

Field Notes

Data obtained during each observation session were recorded as field notes. Information on the field notes described the grade level, physical classroom, number of students, the science content of the lesson, and instructional strategies utilized. I reviewed field notes following each observation and added additional information to develop the observation experience further.

Demographic Questionnaire

The questionnaire was used to gather demographic information only. The following information was gathered from the questionnaire: level of education, age, race, ethnicity, years of experience, certification, and literacy background. The questionnaire was piloted by an experienced Georgia science teacher.

Data Analysis

Epoche Process

Data analysis was planned using Moustakas' (1994) modification of the Stevick-Colaizzi-Keen method where each statement is clustered into themes for textural and structural descriptions. Data analysis for this qualitative study began with the epoche process of the researcher's own experiences and expectations (Moustakas, 1994). Since I was a language arts and reading teacher, I kept a record of reflexive notes to address my own biases, assumptions, and experiences with adolescent content area literacy so that those did not interfere with my co-researchers' experiences. Bracketing out my knowledge created a pure view of the phenomenon and prepared me to be a more receptive researcher (Moustakas, 1994). The *epoche* process does not guarantee the identification of all biases, but the pursuit for more knowledge is a secondary goal (Moustakas, 1994).

As far as my knowledge was concerned, I have never been a teacher of middle school science, but I have taught middle school language arts and social studies. I currently teach high school literature along with remedial reading and writing courses. My undergraduate degree is from North Georgia College and State University, now known as the University of North Georgia. I obtained a master's degree in Middle Grades Education from Walden University, an

educational specialist degree from Liberty University, and now I am completing my doctor of education degree in Leadership from Liberty University. My certifications include high school English, gifted certification, and middle grades language arts, reading, science, and social studies.

My 20 years of experience as a Georgia educator led me to understand the importance of student literacy. Also, I have seen my fair share of changes in curriculum, instruction, and evaluation. Some teachers reacted negatively to change, and I remembered many teachers who were close to retirement say that if you taught long enough, you would see initiatives come around again and again. As far as literacy integration in science, I have seen teachers truly attempt to integrate reading and writing for checking student understanding, and I have seen other science teachers do very little by way of additional writing. Depending factors include administrative expectations of the teacher and the amount of professional training or support offered for literacy implementation.

Some science teachers have sought help from language arts teachers regarding literacy implementation. Those science teachers asked for assistance with vocabulary strategies, writing rubrics, or basic writing expectations. Another consideration with the literacy standards is time; I have seen science teachers struggle with including additional reading or writing due to worries regarding finishing their content standards in time aligned with pacing guides or curriculum maps. Other teachers may use time as an excuse to cut literacy building lessons or assignments from their plans. From my previous experiences with literacy expectations, support from literacy coaches or professional development leaders and clear implementation expectations from the administration benefit the teachers and student. Completing this study provided me with a

greater understanding of how veteran science teachers find success in the implementation of literacy standards.

Memoing

Transcription followed audio-recorded interviews of each co-researcher. I utilized TranscribeMe! to turn the audio into transcribed text. Each interview transcript was carefully double checked for accuracy, and as I read the text, I made organizational notes and memos. The memos were reflective thoughts and comments upon the data and the research. I continued to bracket out my feelings through a personal journal to avoid bias. By repeatedly reading the transcripts and field notes, I determined the preliminary themes and color coded each theme using highlighters.

Transcendental Phenomenological Reduction

Textural descriptions provided a detailed account of what happened during the integration of literacy standards into the middle school science curriculum. With the printed transcripts, I listened to the audio, reviewed the transcripts numerous times, and considered each statement as significant (Moustakas, 1994). The transcendental phenomenological reduction period focused upon each experience to develop a complete description of the phenomena under study (Moustakas, 1994) and included the co-researchers' quoted statements (Creswell, 2007). Horizonalization allowed every statement to have equal value initially (Moustakas, 1994) so that I remained consciously aware of the experience. Information that was overlapping or repetitive was removed, and remaining statements were known as horizons or meaning units (Moustakas, 1994). Experiences "take on vivid and essential meanings" (Moustakas, 1994, p. 60) with textual descriptions. After reading through the transcripts multiple times, I identified and listed

significant horizonalized statements and themes. The textural description was then written to describe what the co-researchers' experienced with the phenomenon (Creswell, 2007).

Imaginative Variation

The intention of imaginative variation is "to arrive at structural descriptions of an experience, the underlying and precipitating factors that account for what is being experienced; in other words, the 'how' that speaks to conditions that illuminate the 'what' of experience" (Moustakas, 1994, p. 98). The first step of imaginative variation is the identification of possible structural meanings (Moustakas, 1994). Next, themes are determined from the meanings. Using NVivo qualitative analyses software, I began uncovering and categorizing themes so that universal meanings linked to feelings associated with the phenomenon could be acknowledged (Moustakas, 1994). Finally, I explored the textural meanings for emerging themes that exemplified a structural description of how the implementation of literacy standards occurred in middle school science classrooms.

Synthesis

The assimilation of textural and structural descriptions develops the essence of experiences (Moustakas, 1994). Moustakas (1994) indicated that the "synthesis represents the essences at a particular time and place from the vantage point of an individual researcher following an exhaustive imaginative and reflective study of the phenomenon" (p. 100). As a result, an overall description of the phenomenon for veteran science teachers was produced.

Trustworthiness

Trustworthiness was addressed by triangulation, member checks, thick and rich descriptions, peer debriefing, and an audit trail. Lincoln and Guba (1985) described

trustworthiness in terms of credibility, transferability, dependability, and confirmability. Furthermore, triangulations of multiple data sources ensure strength and credibility of the qualitative research study. Data sources for triangulation included the interview transcripts, the observation field notes, and the documents/lesson plans.

Credibility

Credibility is an integral piece of believability with trustworthiness. Member checks consisted of an examination of the interview transcripts and data analysis; the documents were presented to the co-researchers of the phenomenological study for approval (Lincoln & Guba, 1985). Triangulation of sources, such as individual interviews and observation field notes, further verified the credibility of the research study by rounding out the information derived from those data sources.

Dependability and Confirmability

Dependability is the consistency of findings if the research and participants from this study were used by another researcher (Lincoln & Guba, 1985). Peer debriefing provided a check of the research design. Also, an audit trail consisted of all documents, including all notes and the themes that developed from the data. The audit trail provided evidence of accurate data collection records and confirmability.

Transferability

Transferability is addressed by a thick, rich description of the phenomenon, methods, and participants (Lincoln & Guba, 1985). An extensive account of the phenomenon allowed others to understand fully the research study and implications for future research. Additionally, a thick,

rich description could enable the information in this study to transfer to other participants in different settings (Creswell, 2007).

Ethical Considerations

Ethical considerations began with consent forms for participating adults. Pseudonyms were used for the co-researchers' names and the locations of the middle schools in Northeast Georgia to ensure confidentiality. Data security was guaranteed by locked access to hard copies of data and password-protected computer data. The safety of the co-researchers was taken into consideration, and information was not shared with their administrations.

Summary

This research study was conducted through a phenomenological study of experienced middle school science teachers in Northeast Georgia. The focus centered upon the implementation of literacy standards within the co-researchers' content discipline and how they responded to the changes in the standards. Data collection consisted of interviews, documents, observation field notes, and a demographic questionnaire to provide a thick description of the participants' experiences. Next, Chapter 4 will focus upon the information gleaned from data analysis and a report of the results.

CHAPTER FOUR: FINDINGS

Overview

The objective of this phenomenological study was to glean a deeper understanding of veteran middle school science teachers' experiences with literacy implementation into content area curriculum. As a researcher, I wanted to fully comprehend teachers' experiences and feelings with literacy standards within their science curriculum. This chapter contains demographic and background information regarding the study's participants and presents the findings attained from the interviews. The study results are outlined through the overall central research question and the three subquestions:

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

From the data, identified themes are discussed in terms of the research questions. A textural description and structural description are obtainable from the data. The essence of the coparticipant experience is offered in the conclusion.

Participants

Northeast Georgia middle school administrators from five school districts were contacted to help identify veteran middle school science teachers for a referral. A total of 25 middle school science teachers were contacted via email and invited to take part in the research study. Upon agreement to participate, the demographic survey was sent, and interview scheduling began.

Twelve teachers consented to participate and met the study criteria. Pseudonyms were used for participants' names and the middle schools in which they were employed. The 12 participants worked within four middle schools and one junior high school from four school districts. Three of the middle school housed Grades 6, 7, and 8. Because one district middle school was designated for Grades 6 and 7, Grades 8 and 9 were designated to a separate junior high school building.

The study participants, 11 females and one male, met for individual interviews, which were conducted at their school either during their planning periods or after school. Signed consent forms were collected from all participants (see Appendix C) who were certified Georgia science teachers with a minimum of eight years of middle school teaching experience. Table 1 provides a brief demographic summary of the co-researchers in the study. Following the table is a brief description of each co-researcher.

Table 1

Co-Researcher Demographic Information

Teacher (Pseudonym)	Age Range	Race/Ethnicity	Gender	Highest Degree	Years of Experience
Amy	35-44	White/Caucasian	Female	Ed.S.	14
Beth	35-44	White/Caucasian	Female	Ed.S.	20

Chris	45-54	White/Caucasian	Male	Master's	12
Danielle	35-44	White/Caucasian	Female	Bachelor's	20
Emily	25-34	White/Caucasian	Female	Master's	9
Felicia	25-34	White/Caucasian	Female	Ed.S.	8
Gena	35-44	White/Caucasian	Female	Ed.S.	13
Heather	35-44	White/Caucasian	Female	Master's	17
Isabel	45-54	White/Caucasian	Female	Master's	21
Jennifer	35-44	White/Caucasian	Female	Bachelor's	8
Katie	35-44	White/Caucasian	Female	Ed.S.	16
Laura	35-44	White/Caucasian	Female	Ed.S.	16

Amy

Amy is a middle school science teacher with 14 years of experience. She has a master's and an educational specialist degree. In addition to certification in middle school science, Amy is also certified in middle school language arts and reading.

Due to the vocabulary rich content, Amy previews key vocabulary words prior to reading assignments as many of her seventh-grade students do not read on grade level, and some of her students are English language learners. Her school's language arts department began teaching root words, prefixes, and suffixes; students have the lists in their notebooks, and Amy (personal communication, November 30, 2018) taught students to refer to those for determining word meanings without a dictionary.

When asked about literacy in her life science classroom, Amy explained the weekly blog assignments students use to write about body systems or the new discoveries in science articles she finds to hold student interest. The seventh-grade content area teachers on her team are collaborating on an upcoming thematic unit revolving around the novel, *A Long Walk to Water*, where each subject focuses upon content-related aspects. Amy (personal communication, November 30, 2018) stated, "It's just a huge collaborative project between all four subjects, so I'm excited about that." One wish that Amy has is to have more dedicated time for reading in science, whether the material is a novel, anthology, or magazines.

Beth

Beth is a sixth-grade science teacher with 20 years of teaching experiences. She holds a master's degree and an educational specialist degree. Despite her career experiences, she admitted that she is not entirely comfortable with the literacy standards. When Beth has questions regarding literacy, she feels comfortable directing those toward the sixth-grade language arts teachers on her hallway. She also has spoken with them regarding student writing expectations with sentences and paragraphs. Beth indicated that her lack of literacy knowledge is frustrating; however, she does not speak up because she feels doing so would increase the amount of paperwork and training time when she already feels overloaded with work (personal communication, January 25, 2019).

With implementing the literacy standards, Beth admitted to some nervousness and hesitancy, but she continues to adapt and push herself out of her comfort zone. Beth creates lab stations and includes the reading portion of STEMscopes as a small group station where she works with five to six students at a time. The grouping stations allow her to work through and

discuss the reading with students. Beth said that not only is she more comfortable with the small groups, but her students are more at ease, and it helps build her confidence with literacy (personal communication, January 25, 2019).

Chris

Chris teaches sixth-grade science and has a master's degree and 12 years of experience. Chris conveyed some confusion regarding literacy expectations over the past several years in that when literacy standards were introduced, teachers were expected to include more short-answer essay assignments or assessments and shy away from multiple choice, matching, and true/false questions. He added that a shift occurred in which only multiple-choice assessments are used on benchmark testing. As this discussion thread continued, Chris (personal communication, January 25, 2019) said that we have to do the literacy writing and stuff on some of our quizzes and tests, then it makes me wonder, why do we do our state testing multiple choice and all that? It is kind of confusing."

Chris's goal with literacy is to check for student understanding of the science content. Rather than relying solely upon multiple-choice questions, Chris expects students to study and explain the content through their writing. He soon learned that his students disliked the pressure associated with essay questions. Chris worked with his sixth graders over the course of the year by providing expectations, examples, and feedback. While most of the writing assigned by Chris was short-answer paragraphs, he learned to balance grading student writing and stated (personal communication, January 25, 2019), "You can work yourself to death trying to grade these things and having 130 kids–I mean, that's a lot of papers." Chris typically assigns shorter writing tasks to check student understanding. Occasionally he asks students to trade papers, to underline the

key vocabulary words in the student writing, and then to trade back for partner or small group discussion of the writing assignment. If his students are able to convey information effectively, then Chris fulfilled his obligations as a teacher.

Danielle

Danielle is a seventh-grade life science teacher with a bachelor's degree, and her certification is middle grades education in all four content areas: language arts, math, science, and social studies. After 20 years of teaching, Danielle (personal communication, February 1, 2019) feels that middle school students' reading abilities have declined. She attributed lower reading levels to a lack of literacy in students' homes, which leaves teachers responsible for more than teaching content. Danielle noted that students do not possess basic vocabulary knowledge to understand questions. She said:

> I find that words that you would expect kids to know—compare, contrast, evaluate, infer—that they need to know to be able to do the science labs and do the science content, I find myself teaching those types of vocabulary words as well as the content.

As a result, vocabulary is a focus in Danielle's science classroom. She posts key verbs typically used in question stems along her classroom wall as a reference for students.

Although Danielle admitted to struggling with the literacy standards, she proudly mentioned that the seventh-grade science and language arts teachers collaborated in some cross-curriculum literacy activities this year. Danielle (personal communication, February 1, 2019) expressed that literacy was a weakness of the school's science department as the focus was "more content-driven than literacy-driven."

Emily

Emily teaches both mathematics and science to seventh graders but exudes a high level of confidence in implementing literacy within her classes. She has a master's degree. Emily (personal communication, February 7, 2019) is in her ninth year of teaching and has seen the focus upon literacy increase as the state standards progressed from the Georgia Performance Standards to the Georgia Standards of Excellence. One challenge experienced by Emily with the literacy instruction is student aversion to science-related writing assignments. She provided reasonable responses to convey value when her students complained about scientific writing. Emily told her students:

> Scientists need to write down what they're doing so that way it can be repeated. I just cured cancer, but I didn't write down what I did, and now I can't do it again. We talk about why it's important for scientists to write down what they're doing and think things through, so that helps.

Felicia

Felicia completed an educational specialist degree and taught for eight years. As a science teacher of eighth and ninth graders, Felicia works in a junior high setting since her system designated the sixth and seventh grades at the middle school level. The varying grade and content levels spread across the four science teachers at her school creates a challenge for collaboration efforts with her cohorts. Although the science teachers meet once weekly, Felicia (personal communication, February 18, 2019) concluded, "Our department meetings are kind of unique—I mean, useless because there's not really many people to collaborate with because you're doing different things."

Felicia admitted some unsureness with reading and writing implementation in science. Felicia mentioned a particular question that she assigned to students. It contained a paragraph and a chart that students used in addition to their prior knowledge to construct a three-sentence response. Upon grading the assignment, she believed that she failed the students because only three out of 34 students answered the question correctly as directed. Felicia stated:

> I didn't count the question, but I wanted to go back and help them, and I don't really know how. I don't really know what to do. I don't know when I'll put another writing question on there. It'd hurt my soul.

Gena

Gena is a seventh-grade science teacher with 13 years of teaching experience, and she is eager to incorporate literacy into her lessons. She has an educational specialist degree. Vocabulary is problematic for Gena's students, but the science content vocabulary is not the only problem she sees. Her students struggle with vocabulary words that she expects them to already know by the time they reach the seventh grade. To address this, Gena previews vocabulary prior to starting a unit and reviews question-stem vocabulary because as she says (personal communication, February 22, 2019), "That's why they [students] can't answer a question correctly because they don't know what the word infer means or even explain." Gena displays question stem words across her classroom walls as a reference.

Heather

Heather teaches eighth-grade physical science and has been teaching for 17 years. She has a master's degree. Heather's collaboration with the other eighth-grade science teacher helps direct the focus as they attempt implementing new literacy pieces; however, she (personal

communication, February 26, 2019) admits a lack of knowledge regarding effective resources and says that they are working through trial and error with what works best for them. When I questioned Heather about the challenges of reading and writing in her classroom, she immediately mentioned the poor quality of student writing and how that has affected student understanding of the science content. She vented some frustration in saying:

> We just sat in a meeting where they were telling us you can't grade for neatness, you can't grade for this, that, and I'm supposed to be grading for that standard right there. But if I can't read it or it's not spelled correctly or it's not grammatically correct, that still affects their science. So if I'm supposed to have literacy standards, shouldn't I also be able to grade that?

Isabel

Isabel is an eighth- and ninth-grade science teacher who has worked with middle school students for 21 years. She has a master's degree. The students have 1:1 iPad technology for academics, but Isabel admitted that she is old-fashioned and could easily keep teaching with an overhead projector and lecture notes that students type or handwrite, but she is easing her way into technology with Schoology, an educational web-based platform. Isabel (personal communication, March 11, 2019) professed that she is not as ready to use new resources, such as Newsela, like other science teachers are using.

As a result of her time working in Georgia schools, Isabel has seen the curriculum transform from what she considers specific skills to more vague expectations with the language of the standards, and the biggest challenge she indicated was her uncertainty with literacy. Isabel said:

> We have no direction really. I can teach a standard, and our standards are so broad, especially for eighth grade. I have no idea where you're going with it to get a question, and what you're doing. So that's making it really hard to figure out how to approach this [literacy].

Overall, Isabel believes that all of the standards, not just the literacy standards, have become fewer and too generalized over the years, but the amount of teaching and learning remains the same.

Jennifer

Jennifer teaches seventh-grade science and has eight years of teaching experience. She has a bachelor's degree. Her students have a wide range of reading ability levels; therefore, Jennifer is working to figure out what works best for her students. She (personal communication, March 21, 2019) finds that whole group reading is more effective than small student groups because they tend to become off task and waste the time she set aside for the reading assignment. With differentiating group readings, Jennifer said:

> I know what to do, but then I'm having to monitor it when I need to be with a group, and my para needs to be with a group. Then those that you think, "Okay, yes, they can handle this. Let's do this," then they don't do it. Then I have to stop what I'm doing and get onto them. Then these get off task, so it's a lose-lose situation.

Katie

With 16 years of teaching experience, Katie is an eighth- and ninth-grade science teacher. Her undergraduate and master's degrees were in science, and her specialist's degree was in curriculum and instruction. Katie feels the time crunch with her 90-minute classes and covering

all of the standards when she said (personal communication, April 10, 2019), “It’s hard to really grade and give feedback and try to get them to improve, other than just exposure and assigning things.” During her interview, Katie mused that she witnessed a decline of student reading, writing, and ability to follow directions. She continued by saying, “I don’t know if that’s technology or just the generation.”

Laura

Laura is a sixth-grade science teacher with 16 years of teaching experience. She has an educational specialist degree. During her career, she has received no additional guidance or instruction with the literacy standards, and that is one of the challenges she specified in her interview; however, Laura is hesitant to request more training due to the planning time factor. She said (personal communication, April 12, 2019), “I kind of just hope we can figure it out on our own, so we don’t have to lose anymore planning.”

Laura’s grade-level science teachers identified a literacy issue for the students with disabilities and English language learners with testing vocabulary this year. She noticed that the students understood the science content but could not pass tests. Instead of changing the wording on the questions, the teachers taught their students how to discern key vocabulary to increase their odds of answering standardized test questions.

Results

Each co-researcher completed a demographic questionnaire and participated in face-to-face interviews. Each co-researcher answered nine open-ended questions. In addition, I observed each teacher for a small period of time during class. Teachers also submitted student

work samples, lesson plans, or sample assignments. Finally, I kept field notes regarding each co-researcher. All data related to the central research questions and the three subquestions:

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

Epoche

The first step of transcendental phenomenology is the bracketing or *epoche*, a process (Moustakas, 1994) where I documented my own experiences as a language arts teacher and assumptions regarding literacy in the content area classroom. The bracketing allowed me to acknowledge my personal feelings and potential bias before collecting data as well as during the data collection. I kept field notes to jot down memos as well as questions. This process was integral for reflecting a true picture of literacy implementation by middle school science teachers.

Face-to-Face Interviews

One-on-one interviews were a major data source for this research study. A semistructured interview protocol design allowed for follow-up questioning throughout the interviews. The interviews were set up before or after the classroom observation and were held

in the co-researcher's classroom or a designated space on campus. Each interview lasted approximately 30 to 40 minutes and was recorded on a digital voice recorder. Audio files were uploaded onto a password-protected computer for transcription.

Documents

Anonymous student work was volunteered by teachers to show literacy evidence in science. The teachers also submitted plans or lessons to show evidence of planning with literacy standards in science. Literacy strategies were documented for the design of reading and writing strategies along with the types of strategies.

Observations and Field Notes

As the researcher, I was a nonparticipant observer within the science classroom. During the observations, I noted information for field notes and any literacy evidence. While brief, this observation time provided a visual snapshot into the science classroom. Field notes provided a means to record basic classroom information during each observation session. The notes described the grade level, physical classroom, number of students, science content, and instructional strategies observed. I also recorded memos for future reference during data analysis and continued logging information that I could include as part of interview questioning.

Horizonalization and Clustering

The data collected through the research of this phenomenological study was examined with the assistance of NVivo qualitative software. All interviews were transcribed with TranscribeMe! and reviewed by the researcher to check for accuracy. Member checks were completed by each co-researcher to check for accuracy. Interview transcripts, observation field notes, teacher planning documents, and student work samples were uploaded into the NVivo

software program and coded. The codes were originally based upon the central research questions and the research subquestions.

As data analysis continued, other codes were developed according to participant responses to the semistructured interview questions. The next step of analysis concerned identifying significant statements pulled from the data. These statements included interesting quotations, repeated responses, and other important points. Data horizonalization involved lifting statements from each co-researcher's interview transcript, and each statement was weighed with equal value. Repetitive and extraneous statements were removed.

The third step of the phenomenological analysis involved reviewing significant statements for commonalities. Each statement was clustered into inferred similar meaning clusters. The clusters were then reviewed. The fourth step of the analysis further divided the cluster into themes. The final analysis divided the themes according to the research questions. The collected data were separated into themes that outlined the experiences of veteran middle school science teachers during literacy standards implementation.

Theme Development

Theme development occurred during the analysis of data in this qualitative study. As codes were separated, themes emerged from the data. A total of four themes unfolded through analysis and addressed the central research question and the three subquestions of this study. Those themes are found in Table 2.

Table 2

Theme Development

Research Question	Theme	Codes

Central Research Question	Teacher Collaboration Supports Learning	• Resources • Strategies • Peer collaboration • ELA collaboration • Administration guidance • Technology
Subquestion 1	Work in Progress	• Positive Feelings • Negative feelings • Literacy is important • Frustrating experiences • Preparedness • Time management issues • Student reading • Student writing • ELL challenges • Technology
Subquestion 2	Literacy for Learning	• Lab reports • Warmups

Table 2 (Continued)

Theme Development

Research Question	Theme	Codes
Subquestion 2 (Continued)	Literacy for Learning	• Student writing • Vocabulary focus • Student-constructed response • Literacy expectations
Subquestion 3	Professional Development Will Bridge the Learning Gap	• Undergraduate experiences • Graduate experiences • Previous literacy training • Current literacy initiatives • No training with literacy standards • Wants to see exemplary lessons • Needs training • Needs collaboration time • Needs resources

Teacher Collaboration Supports Learning

The greatest resource point with literacy implementation in teacher interviews was collaboration within the school building. In-house support of peer teachers, coaches, and the

administration accounted for the greatest combined resources for teachers at 48%. Regardless of the amount of previous literacy training and education or the number of years teaching, teachers sought assistance or guidance from other educators within their building.

Five co-researchers directly cited peer teachers as resources for literacy standards. Laura (personal communication, April 12, 2019) mentioned a helpful colleague, a fellow science teacher who previously taught language arts, as a resource. She stated “She’s really helped us understand the standards a little bit better.” Heather (personal communication, February 26, 2019) collaborates with another science teacher at her grade level and said, “We help each other, and we bounce ideas off of each other.” Jennifer (personal communication, March 21, 2019) had another science teacher to turn to and revealed, “I talk to her a lot, so she helps me with everything, the content and bringing the reading in” When Chris (personal communication, January 25, 2019) needed assistance, he turned to a trusted peer teacher, and his reasoning was that “sometimes we do that more so than go to the admin because you know you are going to get an answer right away and going to get help.”

Science content teachers indicated language arts teachers as a literacy resource. Five co-researchers deemed language arts teachers as trusted guides for literacy questions or concerns. Danielle (personal communication, February 1, 2019) goes to the language arts teachers when she has an issue with understanding the literacy standards. She said, "They have really helped me by going to them and saying, ‘Okay, explain to me exactly what this is saying and how to do it.'" Amy (personal communication, November 30, 2018) mentioned language arts teachers as a literacy resource when she stated, "If I have any questions, I just go to them; they will break it

down." This collaborative practice shows a level of comfort among peer teachers when assistance is needed as well as a motivation for increasing their knowledge of literacy.

Administrative colleagues at the school and system levels were resource supports described by five co-researchers. Emily (personal communication, February 7, 2019) had this to say about her school's academic coach: "She offers a lot of good advice, especially because her degree is in math and science, so that's definitely her strong suit. That helps." The academic coach at Felicia's school is considered a technology coach. In discussing the academic coach, Felicia (personal communication, February 18, 2019) felt that "his strength, personally, is in English, but his job is in technology; he's helpful if you ask questions, and he leads some of our trainings."

Teachers participate in mandatory professional learning communities within their school, and literacy integration is a small part of those meetings. When I questioned whether literacy is a usual topic of discussion at those meetings, Emily (personal communication, February 7, 2019) said, "When we're doing just seventh-grade standards, we do, of course, discuss the literacy piece because we have to incorporate that into our daily work." Jennifer (personal communications, March 21, 2019) discussed vertical training where "we'll be working on our curriculum maps, which will help us include those literacy standards also." While the professional learning communities provide literacy opportunities, literacy was a lesser focus during those times.

Work in Progress

Co-researchers were asked to reflect upon their abilities with literacy implementation as well as their feelings associated with those abilities. Overall, teaching efficacy remained the same or greater for eight of the twelve co-researchers since the literacy standards were included

in the science curriculum. Having the science knowledge helped teachers deal with the unknowns of reading and writing. Initially, Gena (personal communication, February 22, 2019) stated, "I don't know that it makes me feel one way or the other. Maybe I don't feel as prepared to do that or as qualified to do that." When prompted further, Gena said:

> I think as long as the literacy elements in my content, as long as the kids are expressing that they understand my content and can do that through writing or whatever, through projects or whatever I give them, then yeah, I'm pretty confident.

Other co-researchers felt that they are doing the best they can with the training they have. Emily (personal communication, February 7, 2019) said, "We're all kind of just struggling through and doing the best we can and learning as we go."

Three co-researchers indicated a lack of confidence with the literacy standards was dependent upon their preparedness. Felicia (personal communication, February 18, 2019) stated:

> I can imagine if I was a first year; it would be even more overwhelming than when I was a first year because it's so much. I don't know about teacher training programs right now, but I didn't learn anything about teaching literacy or implementing literacy at all. So I imagine that would just be a new level of overwhelming, but for me, I'm not very confident.

Despite lower confidence, Felicia's veteran teaching experiences helped her manage the implementation in science. She further explained, "I know what I'm doing otherwise, so I'm like, 'Yeah, I can try this.'" According to Amy (personal communication, November 30, 2019),

her self-efficacy was affected, "A little bit because you have to self-reflect, and you have to grow because if you don't, you're not going to be a very good teacher."

Co-researchers took this opportunity for general reflection on the literacy standards in science. As for Laura's teaching efficacy, she accounted (personal communication, April 12, 2019):

> I actually feel like more of a real teacher. I feel like I'm not just teaching them random unrelated facts…cute stuff to know trivia night. I feel like maybe it will help them be more interested in learning how to be a better reader, a better writer.

Jennifer's feelings about the literacy standards do not reflect her efficacy levels, but her enjoyment of teaching middle school science changed. Jennifer stated (personal communication, March 21, 2019):

> I know this sounds awful, but it doesn't help me like teaching. I mean when I went from being able to do more hands-on . . . I hate sitting behind a book. I hate sitting behind a desk. I like getting up; I like taking them outside. I can't do it with these new standards, bringing them into science, I mean. I just want to go back to the old ways so these kids can actually enjoy science because they don't enjoy it anymore.

To continue the thread of teacher feelings in regard to literacy, co-researcher responses were varied with positive, negative, and neutral answers. When Felicia initially began adding reading and writing, she realized that it was more involved than just giving the assignments to students. Felicia (personal communication, February 18, 2019) said she initially felt confident and said she thought, "I'm killing it with literacy. No, they need a lot more support than I would ever imagine." Felicia progressed with experience and assistance from language arts teachers at

her school. She stated, "I'm a beginner, but I know who to ask now. That's the big difference. Used to be a beginner who was just floundering." Gena (personal communication, February 22, 2019) said, “I think the strengths that I have would be using writing as a tool for students to show understanding, even if it is just a simple ticket out the door or a three-two-one.” Gena displayed sample student work in her classroom as evidence of literacy for student understanding.

Three co-researchers indicated a disconnect between science and literacy with the content as the main focus. Jennifer (personal communication, March 21, 2019) bluntly said, “I’m not a literacy teacher. I will never be a literacy teacher, and I don’t like it.” Jennifer further explained:

> I didn't go to school to be a literacy teacher. I know it does help around the board, but to me, science is hands-on, less reading, less writing, more experimenting, and figuring things out. Since they want us to do these literacy standards, it pushes back those hands-on labs that we can't do as many, and now we’re having to do more writing and reading, which to me, is another language arts class.

Sample student work shows the hands-on aspect Jennifer uses with science. Her students wrote on popsicle sticks and glued them together as a summarizing activity (student work artifact, March 21, 2019).

The process of implementing the literacy standards came with challenges for the co-researchers. The largest challenge noted in interviews at 47% was student reading and writing with regards to ability and motivation. When students do not read on grade level, the science teachers experience frustration with teaching the content. Jennifer voiced a concern with student

reading levels. She said, "They're levels are on a second-, third-grade level, and I'm having to teach them seventh-grade words that they will never understand on this level."

Amy (personal communication, November 30, 2018) echoed Jennifer's sentiment by stating when a student is, "on a second-grade reading level, and you're reading seventh-grade material, sometimes tenth-grade material, that's very difficult." Amy's middle school is in the process of adding writing components to classroom assessments, whereas those formerly required only multiple-choice questions. She sees the students struggling with this expectation because "they can't write a complete sentence." These impediments were compounded by student negativity toward literacy in the science classroom. Felicia (personal communication, February 18, 2019) stated, "They don't like reading anything, not even with the content. I think they just don't see the allure." Emily (personal communication, February 7, 2019) expressed a similar frustration from her students. She said, "The biggest complaint that I hear is, 'Oh, we have to write again?'"

Student demographics was another challenging component addressed in interviews. Four co-researchers brought up student demographics in their response to the literacy challenges they faced. Emily (personal communication, February 7, 2019) said:

> A lot of our demographic struggles with reading, in general, so that could be just literally struggling with reading or the comprehension piece. So I can read verbally, but I can't understand anything I just read. So that is a huge struggle, especially with the content, because these are new words they don't know, and so it's a higher vocabulary. That makes literacy difficult when you need to teach them how to read first. So that's the biggest struggle.

Even with student supports in place, Laura (personal communication, April 12, 2019) pointed out frustration with mandatory unit assessments and two subgroups of students. She said,

> Our students with learning disabilities and our English language learners really struggled in the beginning, and their teachers were upset about it. They're like, 'This isn't fair.' My students are getting poor grades because they can't read, not because they don't understand the science.

As teachers implemented the literacy standards, time was a factor for several different reasons and accounted for 23% of the challenges identified through teacher interviews. Time was also indicated as a priority for class time and planning time. Katie (personal communication, April 10, 2019) stated time is an issue with literacy assignments, and she would "like to do more, but how do I do that? If I slow down, how do you ever cover all the standards?" Planning and collaboration time with the specific intent of working with literacy was addressed by teachers. Katie mentioned an obstacle with teacher collaboration time. When asked what is needed to better serve teachers implementing literacy, she said, "I guess maybe more time. Again, not just the teaching, but the collaboration, the planning." Laura, on the other hand, was not in favor of losing any teacher planning time for literacy training. She stated, "I'm not about to say we need more training because then that's less planning. I kind of just hope we can figure it out on our own so we don't have to lose anymore planning."

Three co-researchers identified time for grading student writing as a challenge. Gena (personal communication, February 22, 2019) said:

> I would say a weakness is having the time to sit down and really grade the literacy part of it. I mean, if I could hand it to a language arts teacher would be nice, but I know I'm just looking for content, not necessarily literacy.

Literacy for Learning

When science teachers find what works for them, they are enthusiastic about that strategy or resource. This enthusiasm was the evident in this study; however, even when most teachers are unsure, they are still showing effort towards implementing literacy with student reading and writing in science. Some teachers were fulfilling school or system requirements, and others were trying new reading and writing activities. In fact, teachers included more informal literacy than they probably realized. Instructional resources or strategies were the leading response to literacy implementation.

Warm-up assignments were common literacy activities for teachers. As students entered the room, the teacher had a warm-up assignment ready for them to immediately begin. Amy's students were given a body system scenario with the immune system to read and formulate a brief written response (observation, November 30, 2018). Danielle posted her warm-up writing assignment on the overhead projector (observation, February 1, 2019), while Katie handed her students an assignment paper with questions as they entered the room (observation, April 10, 2019). Felicia (personal communication, February 18, 2019) said, "With my last warm-up, students had to write a paragraph explaining the difference between ionic and covalent bonding, which is hard because you can fake it on a multiple choice. You can't fake it if you're writing a paragraph."

The web-based programs STEMscopes, Newsela, and Quizlet were most often referenced by teachers as a primary literacy tool in their science classrooms. Three co-researchers lauded STEMscopes, a subscription-based resource, for the teacher materials organization with step-by-step information and lesson guidance. Beth (personal communication, January 25, 2019) praised STEMscopes because "this is the first thing we've had in 20 years for science reading and writing." Beth continued with the positive aspects of STEMscopes as it assisted her with lesson planning and implementation. In regard to STEMscopes, she said:

> It tells you exactly, as a science teacher, step by step. I like it because I don't always know how to do the steps right. It tells me the prereading instructions, what to do with the kids; it lays it out for you during the reading. We just started it this year, and I love it because it helps my lower level kids.

Katie (personal communication, April 10, 2019) liked the time she saved by using STEMscopes and stated:

> We also do STEMscopes, which has some articles in it; having resources that already have question prompts and the multiple-choice questions makes it easier because there's less searching and having to find the sources for them. I think that's been a help.

The STEMscopes training focused upon science vocabulary. Felicia (personal communication, February 18, 2019) said she received "strategies to help the kids with that so we have some understanding of where we start using the vocabulary."

Newsela, a web-based reading resource with both free and paid features, was mentioned by three co-researchers. It provided teachers with the differentiated reading levels necessary for the diverse student reading abilities in their classrooms. Felicia praised Newsela articles when

she has to differentiate but doesn't want students to know or worry about the variance in reading levels. She stated, "Newsela has the same article at different levels, and they don't notice because their peers are their main focus, so if their peers don't know they're different, that's the goal."

For vocabulary instruction and practice, three co-researchers incorporated Quizlet, a free and paid online resource. Chris (personal communication, January 25, 2019) purchased the extended version of Quizlet for his classes himself because he said that "kids get excited about it and love the competition, and it still works on vocabulary skills." This resource is used for independent practice or whole classroom review.

Five co-researchers indicated lab reports as part of their science lessons. Laura (personal communication, April 12, 2019) explained student lab reports are "pointing out the cause-and-effect relationship in that lab between your variables, but it's more piecemeal writing because it has sections, and they just plug it in." Emily (personal communication, February 7, 2019) broke down her process with science labs and reports. She said:

> We use the literacy piece at the end for writing up our journal reports, and we have prompts or questions that the kids have to write about what they have just done. We do the lab first, then we ask questions about ‘How do you process this or what steps did you take?’ They have to really analyze what they’ve done.

Gena (personal communication, February 22, 2019) gave an example of a lab writing assignment that was a follow-up for a frog dissection exercise ; the students had to describe how the body systems inside the frog were working together Students are reading and writing in

concentrated amounts, which shows that science teachers are using literacy supports for student learning.

Professional Development Will Bridge the Gaps for Literacy in Science

The literacy knowledge of veteran science teachers differed largely due to the amount of training or professional learning in their school or system. The teachers received sporadic literacy instruction during their college coursework. In addition, middle school science teachers have not received comparable training with the literacy standards. Because the greatest challenges for teachers involved student reading and writing, deeper understanding about literacy and tools for helping students master the standards is needed. Danielle (personal communication, February 1, 2019) stated, “I didn't take anything about writing aspects which, I believe, is the one area that we really need, especially for me whose content is science.” When I asked Amy if there was anything that could have better prepared her with the literacy standards, she (Amy, personal communication, November 30, 2018) stated, "Yeah, but it would probably have taken about two years' worth."

Teachers generally lacked confidence with the reading and writing aspects of science as a result of being unprepared. Grading student writing was a concern for science teachers; though they are grading for content, they needed further clarification on grading the writing aspect. Katie (personal communication, April 10, 2019) said, “I don’t feel like I do a good job as far as teaching, and it’s hard to really grade and give feedback, and try to get them to improve.” Chris (personal communication, January 25, 2019) would like more guidance with grading student writing in science. He stated, “There’s got to be a set guideline that helps us see basic things that we’re looking for because, if not, I think we’re just beating a dead horse.” Danielle (personal

communication, February 1, 2019) said, “So I feel pretty good teaching kids how to read the question, go back, read the paragraph, underline, find those key details to those reading comprehension questions, but the writing aspect, yeah, I struggled with components.” Isabel (personal communication, March 11, 2019) brought up an interesting aspect with professional development and middle school literacy by saying, “I don't think I've ever had any kind of training a lot on upper-level literacy and what to do. It's always kind of like, ‘What to do when they don't know how to read,’ or that kind of thing.” After she made that statement, I realized that many teachers have students with varied literacy levels in the classroom and could use further assistance with reading and vocabulary strategies.

Five of the 12 co-researchers felt that an effective part of professional learning with literacy is observation. Rather than hearing what she should do with the literacy standards, Emily said, "I'd really like to see it in action" (personal communication, February 7, 2017). Amy (personal communication, November 30, 2018) wanted the opportunity to observe teachers in life science content. She further stated that “you can tell someone something, but if you can see it, it might help, or it might trigger you thinking ‘Oh, okay, well, I could do something similar,’ in your brain.”

Beth (personal communication, January 25, 2019) was particular about what she wants to see in a sample science lesson incorporating literacy. She said:

> I would like to see someone as a science teacher with real kids. Not a video with a perfect classroom, high-level kids. I would love to see either in person, or I don’t mind if it was a video. Some kind of training with real people, real kids, different level kids,

showing me how to do it, that's a science teacher. Not a science teacher that's a language arts teacher. I need to see somebody where I'm at and in my level.

When asked what would help her with literacy, Felicia (personal communication, February 18, 2019) responded that watching an exemplary lesson explicitly designed for students like hers seems beneficial. She reasoned, "I can write a heck of a lesson; I've been in college long enough, but how do I do it with my kids, so it's actually helpful?" Danielle (personal communication, February 1, 2019) suggested, "Some basic, [pause] maybe here's a good way of presenting this standard." Teacher comments suggested that with some guidance and instruction, confidence with literacy in science will increase. Teachers have the literacy standards and know they have to include those within the science curriculum, but for some teachers that is the extent of their knowledge.

Four of the co-researchers worked in schools or a system with a current literacy focus, and this focus generally seemed to have a positive influence on those science teachers. This year, Emily's (personal communication, February 7, 2019) middle school brought in a consultant and designated four meetings for the teachers to work through the literacy standards. The first two meetings focused upon breaking down the literacy standards and then concentrate upon unit test questions with regards to the language and wording; the last two sessions directed attention to the literacy pieces of major content projects. When asked if the consultant meetings were beneficial, Emily replied, "It's very helpful because now we can see—of course, it's literacy, so it's tying the ELA piece in, but also, of course, science lends itself to math, so it's all wrapping in together now, so that's nice."

Since the literacy standards were introduced, Felicia received more system-level professional development with reading, writing, and vocabulary. She stated (personal communication, February 18, 2019), "The training has been centered on the fact that we have so much vocabulary in science and so just strategies [are needed] to help the kids with that." Furthermore, Felicia added that her current principal is literacy focused. She said, "We definitely do more now. There's more expectations of literacy."

Katie's school included a literacy goal this year, so changes have occurred with literacy expectations. She (personal communication, April 10, 2019) stated, "We've been encouraged. We adopted Newsela, and they paid for a subscription. So we've had some training on that and how we can incorporate that into the classroom."

The school administration at Jennifer's middle school began a literacy push this year by requiring close reading assignments for every content unit. Jennifer (personal communication, March 21, 2019) stated:

> They've made it mandatory for every unit cycle we have to have a reading because last year when we did those, our scores went up. So they saw a pattern that when everybody was reading, it really helps the kids and their Lexile levels and their scores.

To facilitate this process, Jennifer's (personal communication, March 21, 2019) administration designated a literacy workshop once or twice a month during teacher planning time. During that time, teachers can share their experiences with not just close reading, but literacy, and administrators provided feedback based upon discussions.

Textural and Structural Descriptions

The experiences of veteran middle school science teachers implementing literacy standards are interpreted using both textural and structural descriptions. The textural description interprets "what" the co-researchers experienced implementing the literacy standards, and the structural description details "how" the co-researchers experienced implementation (Moustakas, 1994). The descriptions are synthesized to produce the "essence" of the complete experience.

The textural description for implementing the literacy standards encompassed the resources and strategies teachers used in their science classrooms. Co-researchers used a variety of instructional resources and literacy strategies for learning, and they identified individual persons as resources of literacy information. Training and collaboration were identified as wanted and needed by the majority of co-researchers. The biggest challenges for science teachers were student literacy deficits in reading and writing.

The structural description focused on the co-researchers' confidence with literacy and their self-efficacy as science teachers implementing the literacy standards. Literacy education and training, either during college or through professional development training, varied widely among co-researchers. Teacher confidence issues were apparent among the co-researchers who had the least amount of literacy training, and while a few teachers indicated a slightly affected self-efficacy, overall impact on teacher efficacy was not apparent.

The "essence" combines the textural and structural descriptions to summarize the execution and philosophies of literacy in science. Science teachers who have literacy resources and literacy support had more positive feelings with implementing the standards despite the challenges they faced in the process. While all co-researchers recognized the importance of

literacy, most were working to find ways to supplement their content with effective reading and writing activities. Many teachers believed that meaningful professional training would bridge the gap with their knowledge and confidence.

Central Research Question

The central research question for this study, How do veteran middle school science teachers successfully integrate the Common Core Literacy Standards into their science instruction?, focused on how the concepts of literacy are embedded within the content instruction and through the student output. The question is geared toward the seventh interview question where teachers described what strategies or resources helped them through the literacy components of their instruction during the implementation of the standards. Follow-up questions were used to gather additional information from the co-researchers regarding literacy integration in science. Table 3 shows the multiple responses provided by the co-researchers.

Table 3

Teacher Interviews–Resources

Resource	Frequency	Percentage
Instructional Resources	13	34%
Other	7	18%
Academic Coach/ILT	6	16%
ELA Teachers	6	16%
Peer Teachers	6	16%
Total	**38**	**100%**

Co-researchers mentioned specific web-based programs and technology that are geared toward literacy in science. STEMscopes, a science website aligned with the Georgia Standards of Excellence, was a science literacy program purchased by the middle schools that employed Beth, Katie, and Felicia. They gave positive comments when using STEMscopes in their middle school science classes. Beth (personal communication, January 25, 2019) understands the value of literacy in the content classes because her students struggle with reading and writing. STEMscopes provides step-by-step instructions for science teachers to incorporate literacy lessons, and Felicia (personal communication, February 18, 2019) said, "STEMscopes are awesome because they're aware you're not the bomb at literacy."

Newsela, another Internet-based literacy resource, was cited by co-researchers as a tool in the science classroom. Katie (personal communication, April 10, 2019) said, "I try to do some of the Newsela assignments related to the topics we're going over in class." Emily (personal communication, February 7, 2019) also mentioned "different programs that will take articles and break them down in Lexile levels, so that is a huge help."

Other technology educational resources, such as Nearpod and Quizlet, were included in co-researchers' responses. Jennifer (personal communication, March 21, 2019) said, "I love Nearpod. It's interactive, and the kids like it much better than me putting a PowerPoint on there." Flipster, a periodical subscription purchased by Felicia's (personal communication, February 18, 2019) school, was a tool the science teachers were beginning to utilize for student reading. Three co-researchers use Quizlet for science vocabulary practice with their middle school students. Beth (personal communication, January 35, 2019) stated, "The kids love Quizlet. Vocabulary's been a big thing, especially for my lower kids; the Quizlet and the card

sets have really helped them." Laura (personal communication, April 12, 2019) identified GoFar, an assessment application available to Georgia teachers, as a beneficial search tool for student-constructed response questions. Rather, she felt that previous science writing was not helpful to students because it "was not really enriching their ability to discuss how they know and show what they know." According to Laura, GoFar prompts have "changed how we ask them to write."

One writing instructional strategy was discussed by two co-researchers. Isabel and Felicia mentioned ACES, an acronym which stands for Answer, Cite, Explain, and Summarize. Isabel (personal communication, March 21, 2019) stated, "We pushed the ACES strategy for a while." Felicia (personal communication, February 18, 2019) said, "It freaks [students] out that they're writing in science." While she was aware of the strategy, Felicia sought assistance from a language arts colleague because students are familiar with the process from their classes. She explained further, "If I give them a template they've already seen, they're like, 'Okay, I can do this', so that's why I go to them."

Amy and Jennifer discussed guided reading practices with their middle school students. With the science content, Amy (personal communication, November 30, 2018) said, "I usually have to guide them, and we read together. They can't figure it out yet how to read this passage and turn it into something important." By incorporating whole group reading, Jennifer (personal communication, March 21, 2019) stated, "They seem to like it better if I do it as a class instead of them having to do it by themselves."

Common resources for the co-researchers in this study are peer teachers within their perspective schools. Five co-researchers mentioned peer teachers as a resource and support.

Laura (personal communication, April 12, 2019) received literacy standards assistance from a former language arts teacher who now teaches science. Jennifer (personal communication, March 21, 2019) had another science teacher to turn to and said, "I talk to her a lot, so she helps me with everything, the content and bringing the reading in."

Professional learning communities within the different schools were mentioned by Emily, Beth, and Jennifer. At Emily's middle school, the seventh-grade team teachers meet once weekly, and the science department meets once a month. She (personal communication, February 7, 2019) further expanded by saying that vertical departments meetings with all three grade levels focused on the science content standards in general. Beth (personal communication, January 25, 2019) stated, "We have talked about it [literacy] in professional learning communities . . . about the importance of it."

Furthermore, language arts teachers were a common source of information for literacy concerns of the science teachers. When needing general guidance, Beth (personal communication, January 25, 2019) said, "I've had to rely on the language arts teachers in the building and ask them what they want. That's where I got more information." When literacy concerns arise for Jennifer, she (personal communication, March 21, 2019) revealed, "The ELA teacher and I are good friends, so she gives me ideas."

Other resources include academic coaches, instructional lead teachers (ILT), or members of the administration and represented 16% of responses. Isabel's trusted resource is a former administrator who is still employed by the system, and she would reach out to her. Isabel (personal communication, March 11, 2019) said, "If I got in a real bind, I would call her because she is very good at helping us and knowing what to do." Heather (personal communication,

February 26, 2019) remarked, “We have an ILT. I’m sure if I needed something, I could go to her.” When asked about administrative support, Jennifer (personal communication, March 21, 2019) said, “They do support us. And if we ever have any questions, we have several people we can contact that are more than happy to help us.”

Felicia (personal communication, February 18, 2019) was the only co-researcher to mention technology in general as a helpful tool for literacy in science, even though all 12 researchers and their students have access to technology. Her school uses system provided Apple technology, and all students are 1:1 with iPads. One positive aspect of the iPad technology is the adaptability features for reading and writing, such as screen color changes for dyslexic students or the read-aloud option for students will those accommodations. Amy turned to web-based technology to assist with her in teaching science to English Language Learner (ELL) students. Amy (personal communication, November 30, 2019) said, “I have a website that's amazing I found. In English, it's Natural Sciences. I can't pronounce it for you in Spanish, but they have videos.” Amy and Emily utilize Google Translate with Spanish translations. Amy (personal communication, November 30, 2019) stated, “I usually have someone in the class translate for me and help me.”

Subquestion 1

The first subquestion, How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?, directly reflects teacher efficacy with literacy standards in the science content. This research question is addressed with the fourth, sixth, and ninth interview questions. Co-researchers were asked to reflect upon their abilities with literacy implementation as well as their feelings associated with those abilities.

The fourth interview question asked the co-researchers to describe themselves as literacy teachers. This question targeted how science teachers perceive themselves within the context of the literacy implementation. The answers to that question varied with confidence levels from one co-researcher to the next with some confessing negativity or positivity. Other co-researchers focused their responses on the literacy activities rather than themselves.

Amy and Chris gave positive responses to the question. When asked to describe herself as a literacy teacher, Amy (personal communication, November 30, 2018) acknowledged that she will always work to learn new concepts. Furthermore, she said, "I feel like there's never something I can't learn. Overall though, I think because I have that grammar and English background, I may be a little bit more prepared than other content teachers." Although Chris admitted English was not his strongest subject in school, he learned how to improve his skills from his college professors, and that helps him now with literacy in science. Chris (personal communication, January 25, 2019) said, "I try to hit the basics and give a good foundation to the kids."

Beth, Heather, and Jennifer gave negative responses in describing themselves as a literacy teacher in science. Their testimonials were based upon their literacy training and experiences with literacy. Beth (personal communication, January 25, 2019) stated, "I'm a hot mess. I really am because I feel like I'm not a language arts teacher." When prompted further, Beth continued, "You want to be a good teacher, but sometimes you just don't know, and you don't know how to get there with literacy." Heather's (personal communication, February 26, 2019) response was, "It's very difficult because I'm not a language arts teacher." Even with her

negative response, Heather admitted that vocabulary focus is beneficial to her students, and she further stated:

> I took it upon myself to do vocabulary, but it's science vocabulary, and it's testing vocabulary. I think it made a huge difference, but that's not anything anybody gave me, told me to do, showed me, explained to me. That was something that I just did on my own.

Jennifer (personal communication, March 21, 2019) said, "I'm not a literacy teacher. I will never be a literacy teacher, and I don't like it." Jennifer further explained:

> I didn't go to school to be a literacy teacher. I know it does help around the board, but to me, science is hands-on, less reading, less writing, more experimenting and figuring things out. Since they want us to do these literacy standards, it pushes back those hands-on labs that we can't do as many, and now we're having to do more writing and reading, which to me, is another language arts class.

Sample student work showed the hands-on aspect Jennifer uses with science. Her students wrote on popsicle sticks and glued them together as a summarizing activity.

Co-researchers Felicia, Danielle, Laura, and Gena indicated positive and negative aspects when asked to describe themselves as literacy teachers. When Felicia initially began adding reading and writing to her lessons, she realized that it was more involved than just giving the assignments to students. Felicia (personal communication, February 18, 2019) said she initially felt confident and said she thought, "I'm killing it with literacy. No, they need a lot more support than I would ever imagine." Felicia progressed with experience and assistance from

language arts teachers at her school. In addition, she stated, “I’m a beginner, but I know who to ask now. That’s the big difference. Used to be a beginner who was just floundering.”

Danielle (personal communication, February 1, 2019) labeled herself as “very inadequately trained”; however, she described her personal childhood struggle with reading comprehension, and how her mother, an educator, helped her with those struggles. Laura and Gena addressed their perceived strengths and weaknesses as literacy teachers, and those involve student writing. Laura (personal communication, April 12, 2019) sees writing as a real-world tool for students. She said, “I want them to see the benefit of everything they learn and how they are going to use it, including reading and writing.” Gena (personal communication, February 22, 2019) said, “I think the strengths that I have would be using writing as a tool for students to show understanding, even if it is just a simple ticket out the door or a three-two-one.”

Sample student work was displayed in Gena’s classroom as evidence of a literacy focus for student understanding. Her focus was the science content with student writing over scoring grammar and mechanics. Gena (personal communication, February 22, 2019) stated, “I mean, if I could hand it to a language arts teacher would be nice, but I know I’m just looking for content, not necessarily literacy.” In regard to grading student writing, Laura (personal communication, April 12, 2019) stated, “I’m less focused on the mechanics of writing because I am more interested in what they say.” She went on to further state, “I still lack the motivation to push writing in my class because I’m pushing that they understand the content.”

Three co-researchers gave neutral responses to the fourth interview question, but they rather took the opportunity to indicate the literacy focus in their science classrooms. Katie (personal communication, April 10, 2019) said, “I do try to incorporate some of the literacy into

the science classroom. I try to do some of the Newsela assignments related to topics." Emily uses writing along with science lab assignments. Isabel's focus is science vocabulary with student understanding, and she disconnected that from literacy. When talking about vocabulary, Isabel (personal communication, March 11, 2019) stated, "In the end, that is part of literacy, but it doesn't always trigger for me because we are not necessarily reading passages or that kind of thing a lot of times."

The sixth interview question asks, "What challenges did you face while trying to implement literacy standards in the science classroom?" Co-researchers' responses on this particular question varied from time management issues to student literacy challenges. Table 4 shows the codes for the challenges during literacy standards implementation.

Table 4

Teacher Interviews – Challenges

Challenges	Frequency	Percentage
Student reading	13	31%
Time	10	23%
Student writing	7	16%
ELL	7	16%
Technology	5	11%
Total	**42**	**100%**

The time factor for teachers was a common response regarding their challenges with literacy within the science-content classroom and the parameters of allotted instructional time. Laura (personal communication, April 12, 2019) said time hindered her read-aloud Fridays she

once designated for her homeroom class. Before, she read science narratives from a historical fiction book that the students enjoyed. Now however Laura said, "There's no time to do that. They took that away. That was my favorite, but time is a factor. Time is a problem." Jennifer (personal communication, March 21, 2019) mentioned time as a challenging factor when completing mandatory close readings assignments per teaching content unit. She has to guide the students through the close readings. Jennifer said:

> I let the kids read passages, and then we talk about it and discuss it. I always go back, so if we read the next paragraph, I'll always go back to the first one. Then we read the second one again, so it takes a long time. It takes about two days, and that's just when I'm crunching for time. It's hard. And when we do have hands-on stuff, it takes a few days to get it all done. And then now we're crunched for time again because we have to get those close reads in, and we have to get this in. We've got to get that in.

Three co-researchers considered the time it takes for grading writing in science as a challenge. Beth (personal communication, January 25, 2019) stated, "It gets frustrating when I grade a benchmark, and they have a constructed response with a rubric; it takes me forever." Katie (personal communication, April 10, 2019) identified the time factor as a constraint with literacy because "that takes time, so we don't do it as often as we should." Furthermore, Katie added, "I feel like if you do it [literacy] well, then it just takes time, and that's hard."

Amy's middle school hosts a school-wide science fair each year, which incorporates literacy. The challenges associated with the required science fair deal with class time and students with lower reading levels, many of whom speak little, if any English, and have no

parental guidance or assistance outside of class. Amy (personal communication, November 30, 2018) stated:

> Getting them to do a science fair with a hypothesis and variables and procedure and an experiment and making a poster . . . we don't have any class time to do it. So when you're not using class time to help the kids who've never done a science fair, and then you expect them to have a jam-up science fair project; it's not going to happen.

In continuation, Amy acknowledged that she used time during Friday classes for students to work on their science fair projects under her guidance. The results were mixed. Amy said, "I had, out of four classes, two groups out of all four classes do a really good job."

Student reading and writing in science was a challenge mentioned by several co-researchers. Student reading was the challenge most mentioned throughout the interviews. According to the co-researchers, issues with student reading ranged from student reading levels to student motivation. When students are not reading on or near grade level, science teachers are seeing this impact their classes. Felicia (personal communication, February 28, 2019) stated that "there's an assumption with the literacy skills coming to you in a science classroom that they don't have, so like technical readings are impossible, and they're hard." Danielle (personal communication, February 1, 2019) made a general statement regarding student reading by saying, "It's amazing to me that I feel like over 20 years of education how much children's reading ability level has decreased."

With regard to student demographics, three co-researchers discussed ELL students within their discussion of literacy challenges in teaching science. Of that particular demographic, Felicia (personal communication, February 18, 2019) said, "It has exponentially grown in the

past two years," so her school has an ESOL teacher who comes into content classes to assist those students. The language barrier is extended further when the students are not literate in any language. Felicia (personal communication, February 18, 2019) stated, "Most of them can't read Spanish, so they just kind of don't have a language, and that's hard." Amy (personal communication, November 30, 2018) reiterated this challenge by saying that "some of them were never taught formally, so I usually have someone in the class translate for me and help me."

In addition to reading ability issues, several co-researchers find that students do not enjoy reading. Jennifer (personal communication, March 21, 2019) explained the students' attitude toward reading by saying, "They hate it. No matter how much I make it interactive. You get a handful of them that really like it. Then the other ones hate it." When asked about students and reading, Amy (personal communication, November 30, 2019) said, "It's hit or miss. Half of them hate it; the other half loves it." Gena (personal communication, February 22, 2019) gave this perspective about student reading:

> I think that reading is their weakness. A lot of them want it read to them, even if that's not an accommodation that they received. A lot of the programs we use can get it read to them anyways, and they'll use that instead of taking the time to really read it themselves, or if it doesn't have the read-aloud option, then they just won't read it. They'll try to skim through it and find answers or find explanations without truly taking time to get to know what it's talking about.

Jennifer (personal communication, March 21, 2019) added, "Just because they can read good doesn't mean they like to read. Some of them do, but a lot of them don't even like reading."

Vocabulary is another facet where teachers admit frustration, especially when students lack the general knowledge that teachers expect from them. Gena (personal communication, February 22, 2019) expounded on her thoughts regarding vocabulary:

> I think a weakness that I see in their literacy is definitely vocabulary. For example, the word diverse comes up a lot in science, and I bet I have 20 kids in class ask me, 'What does that mean?' And I just kind of assumed they should know that in seventh grade, but they don't, and it's a common science vocabulary word. So sometimes even the common words that you think they should already know, they come to you, and they have no clue what it means. So vocabulary is definitely the biggest struggle here.

Danielle (personal communication, February 1, 2019) reiterated an issue with vocabulary as students progress to middle school where the terminology becomes more complex. Danielle continued by saying, "I feel like once a word gets more than about six or seven letters in it, it becomes really hard for them."

Co-researchers specified student writing as a challenge in the science classroom. Chris (personal communication, January 25, 2019) experienced issues when school testing added writing when students were accustomed to multiple choice or matching questions. When considering his students, Chris said, "They felt they didn't need to have to write and waste time is the way they looked at it." Chris further expanded, "It's almost like they're texting while they are writing, so probably one of my big hurdles is trying to get them to decipher between text and their writing because that's a huge problem."

Beth (personal communication, January 25, 2019) indicated that her students' writing challenges left her with some frustrations. She said:

> Before this, when the kids couldn't write a complete sentence, I was like I don't really know how to get them there. It was frustrating because I would know they knew the content sometimes, but they couldn't write it. And then I'm like, what am I supposed to do to get them to write it? And how do I get there to get them there? I mean, because here they're getting a bad score because they can't write it.

Writing motivation in science was addressed as a challenge. Students question Beth when they are assigned science writing, whether for a classroom assignment or an assessment. She (personal communication, January 25, 2019) said, "That's what the kids are like, 'this is not language arts; why are we writing?' And that's what's so frustrating." In regard to her students, Felicia (personal communication, February 18, 2019) said, "It [writing] is a complete chore. They hate it. They find no joy in it, but they know they have to do it."

Grading student writing is a challenge encountered by co-researchers. Katie (personal communication, April 10, 2019) said, "I don't feel like I do a good job as far as teaching, and it's hard to really grade and give feedback and try to get them to improve." Laura and Gena acknowledged that they were more concerned with students understanding the science content and less on their writing skills. Laura (personal communication, April 12, 2019) said, "I'm less focused on the mechanics of writing because I am more interested in what they say." Gena (personal communication, February 22, 2019) admitted, "I guess one of my weaknesses is I let them kind of get by with not capitalizing, not using punctuation, run-on sentences. Sometimes it's not even a sentence, and I don't really hold them accountable for that in here."

Heather (personal communication, February 26, 2019) acknowledged now that students use iPad technology for assessments, she does not add a writing component due to convenience.

Her reason for omitting writing is "because you have to read it all from here, and you have to go back and add because the program will not grade the written portion." If Heather included a writing component, she would require additional time for grading the assessment.

Technology was a mentioned challenge during follow-up questioning. One issue for co-researchers Chris and Felicia was the general technology push by school systems. Chris (personal communication, January 25, 2019) mentioned the technology initiative as overwhelming because "there was a lot of stuff that came out all of a sudden this year." Felicia (personal communication, February 18, 2019) stated a similar sentiment by saying, "They're pretty good about tech here. They do too much sometimes." Jennifer (personal communication, March 21, 2019) liked the iPads for students but said management issues are a problem with students off task or viewing inappropriate content. Beth, however, was uncertain regarding adaptive features of technology. When asked if technology was helping student writing, Beth (personal communication, January 25, 2019) responded, "Yes, because they can do the text-to-speech. It's giving their thought out, but it's doing it for them. Then you don't know, is that always good too?" Danielle (personal communication, February 1, 2019) has seen a decline in student effort with technology as students seem to want speedy answers rather than take the time to read, analyze, and think.

The ninth interview question asked the co-researchers to describe how their experiences during the implementation of literacy standards into the science curriculum affected their self-perceptions of teaching. The question served as an avenue to inquire into the co-researchers' feelings of self-efficacy. The responses varied, with a few similarities regarding their efficacy levels with literacy in their science classroom.

Of the 12 co-researchers interviewed, four answered Question 9 with greater confidence than did the others regarding their teaching efficacy. The main indication for greater efficacy was the solid understanding of the science curriculum specified by those four co-researchers. Gena (personal communication, February 22, 2019) began her response by noting how unsure she felt but indicated a more positive efficacy as she continued talking. Chris was at ease with employing the literacy standards, especially writing, in his science content, but he acknowledged that some teachers may struggle. Chris (personal communication, January 25, 2019) explained:

> I think people tend to make too much out of it. I know that sounds bad because we should, but what I mean by that is, they look at it as a huge beast where you have to do all this work, and you've got all this grading, and you can't ever get caught up. For me, I can be teaching a specific element and right toward the end of class it's, 'All right. Give me a paragraph about this and explain to me what's going on.' It is one paragraph. It doesn't take a tremendously long time.

Katie (personal communication, April 10, 2019) rated the overall experience with literacy as a positive one. Her response was in the context of student interest or reaction to the activities. Katie said, "I've had good experiences, I think. I mean, if you can find something relevant, a good article, something for them to do, you can tell it piques their interest."

Some co-researchers' concerns with their self-efficacy were situated in the unfamiliarity they felt as a science teacher with student reading and writing. Regarding the literacy standards, Beth (personal communication, January 25, 2019) said:

> Oh, it's frustrating because you know it's the right thing to do, but then you're like, I don't know if I'm doing this the right way. So you have to step out of your comfort zone

> and just do it. Then sometimes you're feeling really good about yourself, and then you get the work, and you're like 'oh my God, no. It's horrible. This is really bad. Did I not monitor this correctly, or is this their level?' I just don't understand their level in reading and language arts. That's where I struggle.

In addition to those feelings, Beth also said, "I think most science teachers want to, and we try, but I think sometimes you don't know what to do." Danielle (personal communication, February 1, 2019) specified training deficits, but she pushed forward with her efforts. She explained her initial feelings with the literacy standards by stating:

> For a while, when I first saw them, I thought there's no way I can do this. I'm not prepared. I'm not trained. I'm not a language arts teacher even though it's on my certificate, but you just dig back in your bag of tricks and try to figure out.

Danielle's confidence level did not hinder her efforts with literacy in her science classroom.

Amy's (personal communication, November 30, 2018) response to the self-efficacy question tapped into her thoughts about learning and growing as an educator and lifelong learning. Additionally, Amy mentioned purposeful planning with the literacy standards and science content standards within the lessons. She stated, "When you're making those lesson plans, if you're not looking at the literacy standards as well as yours, you're behind."

The four co-researchers who indicated no changes in their efficacy levels throughout the interviews were Isabel, Jennifer, Emily, and Heather. Isabel and Jennifer both indicated negativity more toward the literacy standards than a reflection upon their efficacy levels. In response to the efficacy question, Isabel (personal communication, March 11, 2019) admitted:

> I'm probably not the best one to ask on that one, so I'll be honest with you. My mom is a retired teacher as well, and so I kind of teach. They change all those things like the standards now.

In addition to the standards, Isabel teaches four block classes that meet every other day along with one class that meets daily. As a result, literacy standards are not her main focus, and Isabel said:

> I can't keep up with what I've done, what I haven't done. I haven't done a whole lot of literacy really. That's when they keep on, 'You should do that, an article.' I'm like, 'Yeah, no.' Just let me keep my head floating above water.

Emily (personal communication, February 7, 2019) felt like middle school science teachers are dealing with the literacy implementation to the best of their ability. She said, "We're all kind of just struggling through and doing the best we can and learning as we go." When asked point blank if the implementation affected her efficacy, Emily stated, "As far as how I feel about myself as a teacher, no, because I'm doing the best I can and taking everything I've learned and trying to implement that." Heather (personal communication, February 26, 2019) stated, "As long as it stayed within the science curriculum, no." Heather said her self-efficacy as a teacher had not changed with the literacy standards.

Subquestion 2

The second subquestion asks, "How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?" This question speaks more toward instructional strategies with literacy and the activities within the lesson or unit plans. Information for this subquestion is gleaned from the fifth interview question as participants

elaborate upon student reading and writing in the science content. Data were triangulated through interviews and sample lessons, lesson plans, and student work.

Literacy in science classrooms involves reading and writing, such as with lab reports. Felicia (personal communication, February 18, 2019) described lab reports for her students. She explained,

> We've done lab reports; they have to be very structured though. You can say, 'Write up your findings.' They'd freak out. They don't even like filling in tables, so we do some more baby-stepping. I think I can speak for us all that we don't do more than a paragraph though. I mean, I don't know why you'd need to at this level.

Emily (personal communication, February 7, 2019) addressed what she refers to as "reading labs and that could be charts, or graphs, or paragraph form articles with questions to go along with that." Heather (personal communication, February 26, 2019) assigns her students lab reports using research and summarizing skills. Isabel (personal communication, March 11, 2019) explained that literacy in her science classroom involves labs where her students are "reading what they are doing, following those directions, and they'll write up their lab findings and observations."

In addition to lab reports, Amy (personal communication, November 30, 2019) assigns creative writing and what she calls a Wednesday blog where students have to read a question or scenario, and students "have to write a paragraph or continue with the scenario, especially with the body systems." Felicia, Danielle, Jennifer, and Katie indicated that they regularly use warm-up writing assignments to begin class, and those can range from one to two sentences to a paragraph.

When asked about student writing assignments, Beth (personal communication, January 25, 2019) explained how she helps students accomplish a larger amount of writing. She replied:

> If I do have them write more than one page, I'll have to chunk it. I'll say, 'Okay, you're going to do this part first. Everybody do it. Okay, work with somebody and read to each other. Read it out loud. Let's do the next part.' Because that's the only way I feel like I can get it done.

Gena (personal communication, February 22, 2019) also referred to the chunking strategy for helping students with reading and writing assignments. She said:

> [Students did better] as long as it is chunked. If you overwhelm them with work, then they don't like it. It's too much, but if there are one or two paragraphs for them to read and then have to respond to, yeah, I think they like it a lot.

Co-researchers indicated that constructed responses were added on assessments. Felicia (personal communication, February 18, 2019) has seen a change with more writing on assessments and said, "We're getting a push from the county office because they want us to have those high-level questions, and you can't get that high if they're not writing." Beth's assessments include some form of constructed response. According to Beth (personal communication, January 25, 2019), "It doesn't have to be an essay, but they have to write, and it has to be tied to a standard." Jennifer (personal communication, March 21, 2019) said that her middle school requires students to "do a written response for every summative test"; however, Gena (personal communication, February 22, 2019) mentioned no system requirement for science-constructed response on assessments, but teachers will use constructed response "because our standard says construct an explanation which would fall under that category." In

addition to multiple choice questions, Katie (personal communication, April 10, 2010) said, "I always do some short-answer response on their test." Chris (personal communication, January 25, 2019) avoids multiple choice type questions on his classroom assessments. He explained:

> Usually, I'll give one to two quizzes a week. They get five questions. Sometimes that could be one word; sometimes they have to give me two or three sentences to answer it, so it's kind of either they know it, or they don't. On the test, fill in the blank, short answer; always have at least one or two essay questions. I try to put some piece of literacy in everything.

While several co-researchers discussed the importance of science vocabulary, Amy and Gena specifically mentioned previewing vocabulary as part of their instructional strategies. Amy (personal communication, November 30, 2018) felt that the current standards do not emphasize vocabulary. She explained:

> I don't know why people think that you are going to figure out this vocabulary word that you've never seen before in the context and be okay, so we do vocabulary. I mean, I'm still old school.

Before beginning a new unit, Gena (personal communication, February 22, 2019) said, "I will have some kind of activity for the kids to highlight whatever we're about the talk about." According to Isabel (personal communication, March 11, 2019), vocabulary is a strong focus for students to apply prior knowledge toward learning the content. Science vocabulary is a focus in Heather's classroom. In addition to the content vocabulary, her students also work with vocabulary words seen in assessment questions. Heather (personal communication, February 26,

2019) requires students to make flash cards for new vocabulary that include the word, definition, and a picture to associate with the word.

Subquestion 3

Subquestion 3 is, "How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?" This subquestion is aimed at college-level literacy preparation and literacy training experiences before and after the implementation of literacy standards into the science content. Interview Questions 1, 2, and 3 addressed the preparation aspects of literacy within science. Question 8 provided teachers with an opportunity to express any methods or techniques that would have benefitted them in implementing the literacy standards.

When discussing undergraduate- or graduate-level courses, co-researchers were asked to recall anything related to literacy during teacher preparation. Five of the 12 co-researchers recalled a teaching of reading class as part of their undergraduate studies. Emily (personal communication, February 7, 2019) said, "We all did have to take a literacy class during undergrad." Isabel (personal communication, March 11, 2019) said, "We all took teaching of reading, but even then as a middle school, it was still geared toward elementary students." Amy (personal communication, November 30, 2018) recalled, "I had reading in the classroom at the bachelor's level." Beth (personal communication, January 25, 2019) stated, "I just remember during the bachelor's, we had to do reading across the curriculum." Because of her middle grades certification, Danielle (personal communication, February 1, 2019) had some experience with reading during her undergraduate studies. She said, "I know I took a class on how to teach reading and then how to teach language arts because my degree is in all four content areas."

Laura's undergraduate literacy exposure was more extensive than most middle school science teachers. She accumulated enough credits to minor in creative writing and received a provisional teaching certificate in language arts. Laura (personal communication, April 12, 2019) explained her reaction to the provisional certification as "funny because it was just poetry, but I guess also all the reading and philosophy writing I had to do because there was a debate class there."

Jennifer (personal communication, March 21, 2019) recalled an undergraduate literacy requirement where she had to create units with books, which she "hated because I'm not a book reader." Jennifer specifically noted that the literacy requirement had not connection to science. Jennifer went on to say, "I had to, but I wasn't a fan of it." Other than that experience, Jennifer had limited exposure to literacy before the standards were introduced.

The majority of co-researchers extended their education through graduate courses and higher degrees. Interview question number one extended to graduate-level education. Three co-researchers indicated little to no literacy preparation. When asked about her undergraduate- or graduate-level courses, Gena (personal communication, February 22, 2019) stated that she did not receive any education that incorporated literacy in the science content, yet she increased her personal knowledge as she developed her teaching style. Heather did not recall any specific literacy courses in her undergraduate- and graduate-level coursework. Katie had very little experience with literacy during her undergraduate and graduate studies.

Emily (personal communication, February 7, 2019) took graduate "literacy classes but not specific to the science content." Chris (personal communication, January 25, 2019) stated that his undergraduate- and graduate-level classes helped him understand literacy better through

the completion of various reading, writing, and speaking assignments. Amy's ease with the literacy standards was the integrated curriculum training she received as part of her specialist's degree. Amy (personal communication, November 30, 2018) said that she:

> had two classes on integrating curriculum in all subjects, so it was reading, grammar, all of it, and how can we put everything together . . . math, science, social studies. That was an interesting class. I learned a pretty good bit about that.

Literacy was not a heavy focus in Felicia's undergraduate studies, but with her master's program, she (personal communication, February 18, 2019) described scant exposure with choice menus where students could choose from reading and writing activities. During Felicia's graduate studies, she (personal communication, February 18, 2019) explained that the focus was:

> Not very literacy heavy because we're science teachers. They were like, "Oh, the English department will do that," which has not proven to be very false. They were big into the inquiry-based labs and hands-on and investigating. GSE [Georgia Standards of Excellence] was coming down the pipeline far off. They knew things were changing, but yeah, not a whole lot at all.

Interview Question 2 queried co-researchers about any literacy training prior to the literacy standards implementation. Very few co-researchers indicated content literacy exposure prior to the execution of the literacy standards in science. Beth (personal communication, January 25, 2019) participated in the Literacy Design Collaborative at the RESA level, which involved planning a science unit incorporating reading and writing. She stated, "There were no follow-ups to see were we really incorporating that." That experience had no accountability procedures for developing or encouraging Beth's literacy implementation in her classroom.

Laura and Chris were employed in different school systems than their current school system, and both were involved in some literacy activities in those locations. Laura‘s (personal communication, April 12, 2019) required training “wasn’t presented as a literacy boost, but I do remember that 6+1 Trait Writing and, of course, Learning Focused Schools training in the early 2000s.” Chris’s (personal communication, January 25, 2019) previous system held vertical alignment workshops for middle and high school subject teachers where he said that “we would do breakdown units for our own content, but they also wanted us to do a literacy piece with it.”

Interview Question 3 focused on the training and professional development the co-researchers were involved in for integrating the literacy standards in the science content standards. Co-researchers were asked to recall previous or current professional learning education with the literacy standards. Responses ranged from very little training to ongoing professional learning for literacy standards implementation.

Danielle, Katie, Laura, and Heather indicated they received no training with the literacy standards. Danielle (personal communication, February 1, 2019) replied, “I've been trained on the new standards, what those are, but not how to implement the literacy part of the standards.” Katie (personal communication, April 10, 2019) received some in-house training, but she recalled the focus was geared toward the 3-Dimensional Learning model from the Next Generation Science Standards rather than the literacy component of the standards. When the literacy standards were introduced, Laura (personal communication, April 12, 2019) said:

> We were handed that chart. No training. No information. No guidance, but at the same time, I think they assumed we could read, and we could figure it out. And do we need

> training? I would say so, but I think we faked it pretty well, [pause] but maybe our students' scores say otherwise.

Heather was employed in a different school system when the literacy standards emerged, but she (personal communication, February 26, 2019) stated, "We didn't go through any kind of training." Heather indicated that content teachers were told to include literacy, so they had students read a science-related book. Since changing school systems, Heather maintains that she has not received any formal literacy training.

Several co-researchers recalled experiences with either past or ongoing literacy professional development or literacy initiatives. Along with her science certification, Isabel (personal communication, March 11, 2019) added a reading endorsement several years ago; however, regarding literacy training, she said, "The last one we had with literacy has been a while . . . like several years." When the literacy standards emerged, Gena attended training sessions to integrate reading and writing in the content subject areas provided by her school's local RESA. Gena (personal communication, February 22, 2019) said:

> It just taught us different techniques that we could use, and how to talk to your language arts teachers to see what their protocol was for writing and try to use that as the same basis for what you have your kids do.

Gena (personal communication, February 22, 2019) admitted that at the time a former administrator was the main catalyst for literacy by emphasizing content writing because if students understood the content, then they could write about it. When asked a follow-up question regarding the current literacy standard at her school, Gena stated, "I do think there's

more of a push right now to incorporate constructed responses in our assessments, but I don't think the focus there is on literacy. I think the focus there is on the rigor of the questions."

Beth (personal communication, January 25, 2019) explained that her school's current literacy focus centers on student testing. Assessments have a constructed response, and science teachers have a rubric with which to grade student responses. To further explicate, Beth stated, "Other than that, there hasn't been a major focus on literacy other than us [teachers] doing it because we know we need it."

In the previous school year, Amy's school implemented literacy professional development. Amy (personal communication, November 30, 2018) explained, "It was reading and vocabulary . . . huge books of just reading and vocabulary strategies in the classroom. Once a month, we met and discussed [the strategies]." Amy's school system recently adopted the Learning Focused Schools instructional framework, which includes a literacy component, and Amy has experience using the program while employed in a previous school system.

Some schools employed academic coaches and instructional lead teachers to provide training and assisting teachers with curricular and instructional needs. Science teachers could go to the coach or lead teacher with concerns (Emily, personal communication, February 7, 2019; Felicia, personal communication, February 18, 2019; Heather, personal communication, February 26, 2019; Jennifer, personal communication, March 21, 2019). A school or a system with ongoing literacy initiatives or goals provided science teachers more insight concerning teacher expectations (Emily, personal communication, February 7, 2019; Felicia, personal communication, February 18, 2019; Jennifer, March 21, 2019; Katie, personal communication, April 10, 2019).

Interview Question 8 sought information from the co-researchers on what would help them effectively implement the literacy standards in their science classroom. Learning from science peers is one of the components of professional learning desired by four of the co-researchers. For content literacy, science teachers wanted more knowledge with integrating those standards, and they specifically requested to see a sample lesson that addressed the literacy challenges that they have faced (Beth, personal communication, January 25, 2019; Danielle, personal communication, February 1, 2019; Emily, personal communication, February 7, 2019; Felicia, personal communication, February 18, 2019).

Planning or collaborating with other teachers was indicated as a constructive learning opportunity for Katie and Laura. With literacy, Katie (personal communication, April 10, 2019) desired more collaboration and planning with language arts teachers. She viewed this type of professional development as beneficial for learning effective strategies and perhaps working in cross-curricular activities with other departments. As indicated earlier, Katie blamed the time factor and noted, "We all work well together, but when do you find the time to sit down and plan and collaborate and make it happen?" Laura (personal communication, April 12, 2019) wished for more cross-curricular opportunities within her grade level, so she thinks, "we need more opportunities to plan and collaborate together before the year even starts."

Additional training and professional development were mentioned by Danielle and Isabel. Student writing is an area that Danielle (personal communication, February 1, 2019) specifically discussed as a weakness for both her and her students, and she wanted more writing integration knowledge. Isabel (personal communication, March 11, 2019) desired more reading training suited for higher level readers because many of her students read at or above grade level.

Isabel also mentioned more specificity with literacy standards by commenting: “What is it that you really want me to do? Not this vague kind of open-ended, where you could take it in so many different directions, and you’re not sure if you are going the right direction with it.”

Classroom resources for incorporating science literacy were another response for co-researchers. Gena, Laura, and Danielle expressed the need for more hard copy literacy resources, while Jennifer wished for technology geared toward her students’ reading levels. Gena (personal communication, February 22, 2019) said, “I guess my biggest thing is I want the kids to see literacy away from their Chromebooks or away from technology.” She continued, “I would love some science content related books because I think that would help the kids to see that even science can have that element of storytelling.” Laura (personal communication, April 12, 2019) stated, “A class set of science historical fiction would be nice to set a day aside each week just to read and enjoy reading and science.” Also, because science teachers opted out of textbooks years ago because the content was more hands-on learning, Laura sees the need for either textbooks or more resources that incorporate literacy because “now, here we are untrained in literacy, trying to find examples of literacy to supplement our class, and we’re not doing very good at it.” Danielle (personal communication, February 1, 2019) wished for resources for “some interesting reading for them, but let it be science based.” Jennifer (personal communication, March 21, 2019) responded:

> I just think with those low-level kids they get tired of listening to me, and maybe if they had more of a . . . I know TV’s not good, but nowadays, that’s what they do. They want to see pictures, so they can understand it. I don’t think they’re understanding what

> they're reading, so if they had a program that had the reading and the pictures, kind of a picture book that's the level they're on, and they don't have those at this level.

Regarding the literacy standards implementation and how it could have improved, co-researchers Chris and Jennifer gave very different responses, but both suggested that literacy is necessary for learning science. Chris (personal communication, January 25, 2019) replied, "I think it would have been [better] if we'd have made these changes a long time before." Jennifer (personal communication, March 21, 2019) gave this reply:

> I just wish they wouldn't have so many [standards]. Maybe if they cut back on it and say, 'Okay, let's just do this in science, do this in social studies, do this in math'. Whatever else they have to do instead of having some many, it would, I think, help the science teachers, the social studies teachers; and the kids will enjoy it more when they know that, 'Okay, I'm going to science. I don't have to read all the time; I don't have to write all the time. I get to actually learn with experiments.' To me, that's what science is; that's why I chose science. It's just not like that anymore.

Summary

The purpose of this qualitative phenomenological study was to explore the experiences of veteran middle school science teachers in Northeast Georgia that are successfully transitioning to the Science Georgia Standards of Excellence. Twelve teachers with at least eight years of classroom experience participated in this study. I used a semistructured interview protocol, observation, and documents to gather data for this study.

My central focus in this study was the following central research question: How do veteran middle school science teachers successfully integrate the common core literacy standards

into their science instruction? Additionally, the study included three subquestions: (1) How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction? (2) How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners? (3) How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

I concentrated on the literacy standards implementation at Northeast Georgia middle schools and the lived experiences of co-researchers applying reading and writing standards in the science classroom. Research data were organized into four themes: (1) teacher collaboration supports learning, (2) work in progress, (3) literacy for learning, and (4) professional development will bridge the learning gap. The themes highlighted the experiences of veteran middle school science teachers.

In Chapter 4, I provided a detailed analysis of the data collection and discussed the literacy implementation shared by the co-researchers in Northeast Georgia. The developed themes focused upon the co-researchers responses to the phenomenon of literacy integration. The data contributes information that despite a general lack of training and challenges, veteran middle school science teachers persist in literacy efforts while maintaining efficacy levels.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this transcendental phenomenological study was to understand the experiences of veteran middle school science teachers in Northeast Georgia during literacy standards implementation into the content area curriculum. The 12 participants were middle school science teachers with eight or more years of experience and various levels of training and knowledge regarding literacy. Data collection included a semistructured interview, documents, observation field notes, and demographic questionnaires. Data analysis applied Moustakas' (1994) modification of the Stevick-Colaizzi-Keen method to determine the essence of co-researchers' experiences. The NVivo program was utilized with all documents to code for themes from the significant statements. Chapter 5 opens with a summary of findings in data analysis and how those findings relate to the literature. The chapter continues with the implications of the study, delimitations and limitations of the study, recommendations for future research, and a summary of the transcendental phenomenological study.

Summary of Findings

Through data analysis of co-researcher interviews, observations, and documents, four themes emerged: (1) teacher collaboration supports learning, (2) work in progress, (3) literacy for learning, and (4) professional development will bridge the learning gap. This transcendental phenomenological study was based upon one central research question and three subresearch questions:

CQ: How do veteran middle school science teachers successfully integrate the common core literacy standards into their science instruction?

SQ1: How do veteran science teachers feel about their ability to successfully integrate literacy standards into their content instruction?

SQ2: How do veteran science teachers use literacy (reading and writing) to build knowledge in adolescent learners?

SQ3: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

Responses to the central research question exposed the first theme: teacher collaboration supports learning. As co-researchers discussed literacy integration in the science classroom, many identified collaboration as a resource when education or training left gaps. These veteran teachers indicated high levels of collegiality with peer science teachers, language arts teachers, or administrative leaders. Each co-research indicated that they had an individual or individuals at his or her school or systems that they considered a trusted resource to contact with questions, problems, or concerns arise with reading and writing standards. For example, the science teachers go to language arts teachers for guidance to obtain help and assistance in understanding a literacy standard.. While schools or systems facilitated professional learning communities, co-researchers did not solicit those as resources unless follow-up questions asked about them. Literacy was not a major focus of professional learning communities, but co-researchers indicated that they could address the literacy standards during those times if needed. Instructional resources and technology geared explicitly toward scientific literacy also facilitated integration for several co-researchers. They were taking their knowledge to the next level by using collaborative resources.

Responses to the first subquestion lead to the correlation of the next theme: work in progress. Student literacy concerns comprised the majority of the responses regarding teacher challenges with reading and writing standards in the science content. Issues with student reading and writing skills and motivation encompassed challenges from 11 of the 12 co-researchers. For example, the co-researchers were very troubled with student reading levels that do not always match up with the grade level content. In addition, co-researchers indicated that the reading struggle for students created a comprehension issue with the science content and vocabulary.

While eight of the 12 co-researchers were trained with implementing literacy into science, most were not trained specifically in literacy. As a result, the majority of the science teachers were left to determine the next steps for student literacy in science. Several co-researchers were unsure of how to help students with reading and writing deficits. Four co-researchers discussed other challenges with classes involving subgroups, such as students with disabilities or ELL students, even though support personnel provide assistance. Literacy standards require student writing, but co-researchers felt caught between grading content and student responses.

Time with science literacy was the second largest challenge for the co-researchers. Time was an issue when students worked longer on reading or writing assignments. For example, a reading or writing assignment that took longer than anticipated cut into the co-researchers' planning and pacing of instruction. Class time was not the only time consideration for co-researchers; they were also concerned with the amount of time needed to grade student-constructed response writing and time for collaboration or literacy professional development.

Despite the challenges, the co-researchers keep working to integrate reading and writing in the science discipline.

Responses to the second subquestion revealed the third theme: literacy for learning. Specifically mentioned by six co-researchers were STEMscopes and Newsela, online-based resources for scientific reading activities. They indicated that these resources were easy to use, and the resources saved time co-researchers normally spent searching for resources because the information was readily available for use. Three co-researchers talked about Quizlet, which is an online resource for vocabulary practice and competitive review for their middle school students. Ten of the 12 co-researchers expressed positivity with science literacy, but all 12 were using reading and writing for student learning. The co-researchers in this study knew that without literacy, students would not learn science content.

The last subquestion revealed the fourth theme: professional development will bridge the learning gap. Information collected from the co-researcher interviews described the true feelings of veteran science teachers regarding implementation of the literacy standards. The co-researchers were opinionated when discussing literacy and the effect it is having on teaching science. Teacher efficacy was largely unaffected for eight of the co-researchers; although most were not as confident with literacy, their content science knowledge compensated for overall efficacy.

Several co-researchers indicated that the literacy implementation was thrown on them with very little training or assistance; however, the veteran science teachers noted that professional learning would be beneficial and meaning provided it came from someone who had similar classroom experiences. Co-researchers were adamant about the preciousness of their

time; however, five of the 12 participants felt that seeing an example of a literacy lesson in science would benefit their knowledge and understanding of how to implement the literacy standards. The integral piece of that observation was that the teacher providing the professional learning experience needed to address common and realistic issues that the co-researchers identified. While four of the co-researchers were employed by schools or systems with ongoing literacy initiatives, the 12 co-researchers felt that they could still learn more about literacy for teaching science. Though teachers are expected to teach the standards, communication is needed within the school regarding literacy expectations. Collaborative time with other teachers, including science peers and language arts teachers, was a support factor for co-researchers, and several felt that collaboration was beneficial when implementing literacy. These collaborative practices show a motivation for learning that will help not only the teachers but students as well.

Discussion

This transcendental phenomenological study sought to understand the experiences of veteran middle school science teachers during the implementation of literacy standards in the content area in Northeast Georgia. The following section will discuss the findings of the research study in relation to the theoretical and empirical literature reviewed in Chapter 2. The chapter will conclude with delimitations and limitations of the study as well as recommendations for further research.

Theoretical Literature

Two theories provided the foundation for this study. Bandura's (1977) self-efficacy theory (SET) suggests that teacher self-efficacy development is established through performance accomplishments, vicarious experience, verbal persuasion, and physiological states. The second

theory is Deci and Ryan's (1985) self-determination theory (SDT) that concentrates upon teacher motivation.

This study focused on the co-researchers' efficacy during the implementation of literacy standards in the content area, and it extended the following information regarding Bandura's self-efficacy theory. Performance accomplishments through mastery experiences influenced co-researchers' efficacy as they evaluated themselves as literacy teachers. At the time of data collection, only three co-researchers expressed a negative literacy self-evaluation with regards to their experiences; however, those co-researchers said they received little or no training with reading and writing for the content. Bandura (1986) explained that self-doubt occurs even when individuals see successful accomplishments. Four other co-researchers indicated positive and negative perceptions based upon their experiences; while they felt good about some experiences, other practices left them with self-doubt regarding literacy.

Vicarious experiences involve activities that individuals perceive as threatening (Bandura, 1977). Co-researchers, especially those with little literacy training, indicated stepping out of their science teacher comfort zone with literacy. Observation models of professional development can assist teacher self-efficacy through the vicarious experience of observation (Bandura, 1977). When co-researchers were asked what would help with the implementation of literacy standards, several believed that seeing scientific literacy in action within real-world classrooms like theirs would greatly benefit them. In other words, seeing how science teachers worked through typical problems or issues that the co-researchers face would give them more confidence to work through their own perceived areas of weakness. Felicia (personal communication, February 18, 2019) said:

> I want to see how people use it [literacy], and it just integrates right in their lesson, and it's tiered to high heaven because my kids are all over the board with reading levels and writing levels. That's what would be helpful.

Verbal persuasion alone does not generally encourage others (Bandura, 1977), but peer collaboration where teachers receive help from trusted individuals can work toward raising teacher efficacy with reading and writing strategies. The co-researchers in schools or systems with active literacy initiatives expressed positive experiences with the follow-up literacy sessions. These initiatives give them the opportunity to discuss the ongoing outcomes of the focus on literacy focus and get feedback from one another and the administrative leaders. Jennifer (personal communication, March 21, 2019) stated this about her follow-up meetings, "We have to share with them how we've been doing, what we've been doing, and they give us other ideas of how we can make it better or different ways to do it."

The physiological state of anxiety can have an effect on self-efficacy (Bandura, 1977). Four of the 12 co-researchers indicated a lowered overall self-efficacy with implementing literacy standards, but that anxiety did not hinder their efforts with the standards. Instead, the dip in self-efficacy allowed the co-researchers to determine areas of perceived weakness where they could use assistance. They then went to peer science or language arts teachers for guidance, which contributes to the collective efficacy of the peer group (Bandura, 2000). Co-researchers in this study showed little to no negative efficacy changes during the implementation of literacy standards because they possessed the science content knowledge along with background experiences; furthermore, all co-researchers used some form of collegial support to get through this change.

Deci and Ryan's (1985) self-determination theory (SDT) focuses upon motivation during a situation, such as the implementation of literacy standards in the content area. The Georgia Standards of Excellence mandates the curriculum, so it is an external regulation, which centers upon extrinsic motivation (Ryan & Deci, 2000); co-researchers are expected to teach the standards in their content. With regards to SDT, co-researchers' motivation level varied with science reading and writing. Out of the 12 co-researchers, only two indicated lesser motivation with the literacy standards other than the mandate. Jennifer's (personal communication, March 21, 2019) feelings were, "since they want us to do these literacy standards, it pushes back those hands-on labs that we can't do as many. Now we're having to do more writing and reading, which to me is another language arts class."

Two co-researchers gave indications of integrated regulation of intrinsic motivation (Ryan & Deci, 2000) because they shared the value of reading and writing as a life skill, not just for learning the science content. With regards to how he managed this literacy implementation, Chris (personal communication, January 25, 2019) responded:

> I talk a lot to my kids, and I try to explain things. I talk to them like I'm talking to an adult. I feel if I have worked my part to do in building a relationship with my kids--because we do motivational Mondays, and it's just about life. It's not about politics, religion, school, nothing. It's just about life, being a good person, doing the right thing, making good decisions, and so on. I try to implement that into this because I'm trying to let them know that this is a step forward, where it's trying to make them a better student, but it's also preparing them for high school and college. And things will be easier once they get there because if they can do it now, they're going to have a lot easier road in life.

The remaining eight co-researchers ranged throughout the motivational continuum from amotivated to motivated as they indicated value with reading and writing as a part of student science learning, but they were still struggling at times with the disconnect between content and literacy. While she expressed the importance of real-world scientific learning, Laura (April 12, 2019) stated, "I still lack the motivation to push writing in my class because I'm pushing that they understand the content." The co-researchers' experiences indicated a confirmation of Bandura's SET and Deci and Ryan's SDT.

Empirical Literature

Current research regarding middle school content literacy focuses on specific professional learning models or specific literacy strategies for middle and high school teachers. Content literacy was an educational research topic before, but much of the research focused on training new teachers for the standards. Veteran teachers' experiences with implementing literacy standards in science content is a gap in the research.

Previous research focused on literacy as a tool for learning (Lacina & Watson, 2008), and content coverage is not separate from literacy applications (Alvermann & Phelps, 1998). In this study, co-researchers still struggled with fluidly integrating reading and writing in the curriculum and gave content standards a higher priority. Research previously revealed that influences, such as mandated testing, benchmark testing, and pacing, led to an intensive focus on covering the content (Mastropieri, Scruggs, & Graetz, 2003; Ness, 2009). This study extended that research to include veteran science teachers' views of literacy. The co-researchers were challenged to place literacy within the science content in the amount of time that they had.

Heller and Greenleaf (2007) indicated that each discipline has literacy practices; therefore, scientific literacy would not necessarily look like literacy in another content area. Scientific literacy is more inquiry-based learning (Palinscar, 2013), and middle school science teachers were trained in the content, which leads to lesser confidence with literacy (Giles, Wang, Smith, & Johnson, 2013). Now that the literacy expectation is present, co-researchers in this study felt lacking in having sufficient training and knowledge. Goldman (2012) suggested that content teachers need a combination of training with disciplinary content and disciplinary literacy. This study extended the research on the topic of training for veteran teachers in that specialized literacy guidance is needed to further teacher knowledge.

In this study, co-researchers were using literacy practices within the content, including inquiry-based labs; however, when students had problems, whether this was because students were unprepared for the increasing complexity of the middle school science content (Heller & Greenleaf, 2007) or they did not perform on grade level, co-researchers were left working through the next steps for those students. The time involved with these situations compounded the issue of curriculum pacing. Despite these challenges, co-researchers were resilient in their endeavors. Danielle (personal communication, February 1, 2019) stated:

> Most seventh-grade science is written at grade level, if not above grade level. A lot of it is higher than what an average seventh grader's Lexile score I think probably should be, so you have to find lower-leveled reading. I have to do a lot of differentiation reading levels and then go from there, trying to fill in those gaps based from where they're at in their reading ability.

Danielle's response is one example of developmentally responsive teaching for middle school students. Adolescent learners want relevant connections with learning (Guzetti & Bang, 2011). Co-researchers provided real-world applications so students could make connections with learning in science. Laura (April 12, 2019) stated,

> With literacy, it keeps us focused on what we're really here to do is to teach them how to find information, learn from that information, and apply it. Because if we don't teach them how to read, if we don't teach them how to discern between fact and fiction, or even gosh, I'm getting started on the news, we're never going to have new inventions. We're never going to cure stuff. We're never going to grow, and we're just going to be like the sheep and just die that way.

Professional learning is necessary for true knowledge and understanding (Paik et al., 2011), but teacher learning also impacts their motivation (Day & Gu, 2007). Co-researchers were adamant about their time but felt that targeted professional learning, such as observation of a literacy integrated science lesson, would benefit their understanding. This study backed up research regarding the importance of teacher collaboration and collegiality during new implementation (Cantrell, Burns, & Callaway, 2009; Friedman, 2000; Paik et al., 2011) and the favorable impact that professional learning and collaboration have upon teacher efficacy (Cantrell et al., 2009; Ross & Bruce, 2007). All 12 co-researchers used some form of teacher collaboration as a resource during the literacy standards implementation. The importance of school or system organizational goals affects the collective efficacy of the teachers (Skaalvik & Skaalvik, 2010). Co-researchers had varied experiences with school leadership and the importance of literacy.

While some participants had school-wide literacy initiatives with follow-up discussion meetings, other co-researchers indicated that the literacy push was a little more than an occasional mention by at the school or system level. With regards to the literacy standards, Heather (personal communication, February 26, 2019) stated:

> It was just kind of one of those things of 'oh, here's the standards.' And it's not really ever addressed. It's like, here they are, you're supposed to be doing them. Make sure you actually cover the real standards. So it's kind of like it's a side note.

Teachers need supportive assistance in order to maintain motivation towards any goals or initiatives. Despite the issues, co-researchers managed to overcome their obstacles and continue with reading and writing in the science discipline.

This study of veteran middle school science teachers implementing literacy standards added value to the research field. One implementation issue addressed is the need for continued teacher support over a period of time. Veteran teachers may not always have the expertise that is expected, but the type of professional development they seek is very specific, and they do not back down from their commitment to scientific learning. The teachers in this study found methods for learning when training was lacking, and they maintained their overall teaching efficacy despite the challenges they faced.

Implications

The findings of this transcendental phenomenological study suggest implications for implementing literacy standards in the middle school science classroom. These implications will be addressed through empirical, theoretical, and practical perspectives. This section will conclude with a summary.

Empirical Implications

A review of the literature revealed a gap in research on how implementing literacy standards affect veteran middle school science teachers. Several studies focused upon novice teachers or upon reading strategies (Cahoon & Straw, 2008), professional development programs (Cantrell et al., 2009), or initiatives, but no research was available that addressed veteran middle school science teachers' experiences with training and implementing literacy standards. Once science teachers created lessons for science reading and writing and students do not meet the expectations, teachers are left unsure of what to do at that point. This area of concern was one for many veteran middle school science teachers.

The literacy training of middle school science teachers is related to their feelings associated with literacy implementation. Although this study took place across the same regional area, the level of professional development varied widely. Because the veteran teacher status was a minimum of eight years of teaching experience, teachers may not have had the background knowledge of student reading and writing. While the majority of the teachers furthered their education with higher degrees, the education did not necessarily supplement their literacy knowledge. Furthermore, the training associated with the literacy standards was not given as much focus as the content standards, or the training was nonexistent. While some teachers have system or school literacy initiatives, not all teachers were given the same expectations or resources. As a result, collaboration between science teachers and language arts teachers accounted for much of the knowledge gleaned with respect to literacy. Teachers who did not receive as much training with the literacy standards used peer relationships to collaborate with

the literacy standards and literacy integration. Consequently, more literacy professional development, collaboration time, and ongoing support are needed for science content teachers.

Theoretical Implications

The theoretical basis of the implementation of literacy standards shows the significance of teacher confidence with reading and writing in the science classroom. Overall, due to knowledge and training, teacher confidence in the implementation of literacy standards was generally lacking because of teachers' limited knowledge and training on literacy standards (Bandura, 1986). The major concern was not as much the literacy standards, but how to handle student reading abilities and writing skills within the science content (Shanahan & Shanahan, 2008). Despite a lack of literacy training, veteran science teachers did not falter considerably with their overall self-efficacy as knowledge of the science content in that collaboration and teaching experience supplemented those feelings (Bandura, 2000). Most teachers understood the significance of literacy in middle school science even if they were not enthusiastic about including reading and writing as part of their activities. Teachers expressed a need for visual observation of science literacy instruction as a beneficial aspect of professional learning (Bandura, 1977; Tschannen-Moran et al., 1998).

Practical Implications

The practical implications of this study are geared toward the regional level, system level, and school level. With the regional level and system levels, professional development for content literacy can provide additional training, knowledge, and support for all teachers. School systems could establish a literacy initiative and provide the means for professional development and collaboration opportunities. At the school level, the administrative can express their

expectations for collaboration and provide dedicated time for teachers to work together with the content and literacy standards. Schools can utilize expert teachers such as academic coaches and instructional lead teachers to design and facilitate literacy learning sessions and professional development opportunities.

The school administration can also establish a literacy focus expectation and promote reading and writing to teachers and students by making literacy a true priority. Schools should provide opportunities for teachers to observe one another for the purpose to learn new ideas with literacy implementation. Teachers can participate in professional development activities provided by the school, district, or region. If given time to collaborate with others, teachers must dedicate that time to focus on literacy and continue to incorporate more reading and writing activities in the science content. Also, teachers must be open to learning opportunities and see literacy as a tool for learning rather than an added requirement.

Summary of Implications

Prior research aligned the importance of professional learning and training with new implementation of the literacy standards in the content area and teacher attitudes toward change. The challenges related to student reading and writing issues were felt as a result of a lack of teacher literacy knowledge. The attitudes about science literacy were integral to the veteran teachers' experiences.

Teacher self-efficacy was a subject of past research. Previous research involved the process of teachers implementing new teaching standards and their reactions and feelings based upon those experiences (Bandura, 1986). A surprising finding in this study was the lack of confidence veteran teachers had in communicating their literacy feelings with the school

administration. Despite needing more professional development, teachers were concerned about speaking up for fear of losing planning time that is already loaded with teaching responsibilities. Teachers felt comfortable discussing feelings with peer teachers.

Teacher professional development should be ongoing so that teachers feel supported in their efforts and feel encouraged to continue reading and writing practices for science learning. The professional learning with scientific literacy may have to become more specialized for the content (Gillis, 2014; Goldman, 2012) so that teachers can experience literacy-infused lessons and counteract the belief that literacy will take over the science content (O'Brien, Stewart, & Moje, 1995). If science teachers are also expected to be effective literacy teachers, more education is needed specifically for the science content along with opportunities to practice and reflect.

Teacher learning communities provide schools an opportunity to promote literacy efforts and strengthen teacher confidence by supporting their work with student reading and writing in the content (Gu & Day, 2013). Expectations regarding collaboration are important to the overall school and individual teachers (Friedman & Kass, 2002). Learning communities can provide support for teachers through the discussion of ideas and the sharing of teaching strategies or providing a safe environment for teachers to provide feedback honestly about literacy in their science classroom. Veteran middle school science teachers want their feelings and experiences validated while working to help their students learn science.

Delimitations and Limitations

This study focused solely upon Northeastern Georgia science teachers of Grades 6, 7, and 8 who had eight or more years of teaching experience and were identified by their administrators

as potential co-researchers for this study. Veteran teachers have seen their fair share of curriculum reform, and little literature revolves around the experienced teacher who stays in the profession. Additionally, veteran teachers may share a different viewpoint of curriculum reform than novice teachers. The motivation that drives the experienced teachers was the information that this study was seeking.

Delimitations

Middle school is a boundary because less research revolves around Grades 6 through 8 regarding content area literacy. Biancarosa and Snow (2006) identified adolescents as an at-risk group because they may not acquire the literacy skills needed in modern society.

Advanced literacy levels are necessary for the amount and types of information needed today (Calkins et al., 2012). Middle school is an important stage of education that provides support for student success at the high school level and later during higher learning courses or career learning.

Science is the chosen content area as teachers of that subject are likely to experience difficulty with literacy integration. While some educators believe that reading is a necessary component of science, others may struggle with the logistics of including reading in the science context (Fang & Wei, 2010). As a language arts teacher, I wanted to explore how science teachers view reading, writing, and speaking in their content area and the motivation that drives their literacy instruction. If science teachers experienced difficulties in literacy implementation, I was interested in how they describe the difficulties, and whether they overcame those particular problems. Furthermore, I endeavored to learn how successes were achieved with middle school science content.

Limitations

Limitations of this study exist. One limitation was that the study only addressed the experiences of middle school science teachers in Northeast Georgia. The Common Core State Standards are currently being implemented in several American states; however, Georgia previously did not include an achievement expectation with literacy implementation in the content areas for middle school. The reliance upon middle school administrators' referral of teachers for this study was another limitation. I relied on middle school administrators in Northeast Georgia to identify science teachers who were veteran middle school science teachers. Another limitation, the focus upon experienced teachers, was one that limited the number of possible co-researchers, but it directs attention on the educators who demonstrate motivation for teaching the standards despite any associated adversities. Finally, the school demographics, income levels, or the percentage of free or reduced student meals were not fully investigated to determine if the co-researchers' experiences were aligned by homogeneous demographics.

Recommendations for Future Research

This transcendental phenomenological study contributed to the literature on veteran middle school science teachers implementing literacy standards in Georgia. Further investigation into the demographics of the co-researchers' schools, especially if the demographics are homogeneous, could add another piece of information concerning the implementation experiences of the participants in this study. Because this study focused upon one regional area of Pioneer RESA, further research could branch out to other veteran middle school science teachers throughout the state's public schools, charter schools, and career

academies. Other states that have included the Common Core Literacy Standards could be used to explore veteran middle school science teachers' experiences with implementation.

Additional research could delve into professional development expectations and practices with middle school science literacy. Other systems may apply specific literacy initiatives or programs such as Learning Focused Schools, and research could examine the effect those efforts have on the classroom practices of middle school science teachers. Resources such as STEMscopes or Newsela could be included within such inquiries. Investigating the practices of middle schools who promote teacher collaboration and planning through professional learning communities can inform the outcomes for veteran teachers.

Summary

This transcendental phenomenological study filled a gap in the literature concerning experiences of veteran middle school science teachers implementing literacy standards in the Pioneer RESA district of Northeast Georgia. Participants' experiences will help inform school and system administration regarding the needs of veteran teachers during a standards change. The central questions focused upon teachers' feelings, methods of implementation, and the support during literacy implementation. Following a six-month period of data collection, the following findings were identified:

- Training and professional development for implementing the literacy standards varied among science teachers, and teachers wanted more knowledge and guidance with reading and writing, specifically when students were not meeting expectations.
- Although teachers did not receive the same literacy training, they collaborated with peer teachers to supplement their knowledge and strategies.

- Resources for teaching literacy in science were identified as helpful and needed by teachers.
- Teachers valued literacy in the science classroom, but many saw reading and writing practices as an added aspect rather than an opportunity to merge literacy with the content.
- Overall teacher efficacy did not significantly change, but confidence with literacy was reported as being lower. Teacher collaboration and experience accounted for the maintenance of efficacy.

Middle schools in Georgia can make literacy implementation in science successful for veteran teachers by providing meaningful professional learning, collaborative support, and resources. Even though the Georgia Standards of Excellence was introduced in Georgia in 2015, science teachers have not received the same training with literacy standards implementation. Teachers, regardless of training or support, continue to include scientific literacy in their middle school classrooms. Teachers improved their literacy knowledge through collaborative efforts with other science teachers and language arts teachers. A discourse still exists for some teachers with literacy and the science content, and the time factor for instruction, planning, and collaboration was a challenge. Through supportive efforts, middle schools can assist veteran science teachers in working together to improve their confidence with content literacy.

REFERENCES

Alvermann, D. E., & Phelps, S. F. (1998). *Content reading and literacy: Succeeding in today's diverse classrooms* (2nd ed.). Boston, MA: Allyn and Bacon.

Aydeniz, M., & Southerland, S. A. (2012). A national survey of middle and high school science teachers' responses to standardized testing: Is science being devalued in schools? *Journal of Science Teacher Education, 23*(3), 233–257. doi:10.1007/s10972-012-9266-3

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122–147. doi:10.1037/0003-066X.37.2.122

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4*(3), 359–373. doi:10.1521/jscp.1986.4.3.359

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 50*(2), 248–287. doi:10.1016/0749-5978(91)90022-L

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117–148. doi:10.1207/s15326985ep2802_3

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science, 9*(3), 75–78. doi:10.1111/1467-8721.00064

Bandura, A. (2007). Much ado over a faulty conception of perceived self-efficacy grounded in faulty experimentation. *Journal of Social and Clinical Psychology, 26*(6), 641–658. doi:10.1521/jcsp.2007.26.6.641

Berman, I., & Biancarosa, G. (2005). *Reading to achieve: A governor's guide to adolescent literacy*. Washington, DC: National Governors Association Center for Best Practices. Retrieved from ERIC database. (ED489229)

Biancarosa, G. (2012). Adolescent literacy: More than remediation. *Educational Leadership, 69*(6), 22–27. Retrieved from http://www.ascd.org/publications/educational-leadership/mar12/vol69/num06/toc.aspx

Biancarosa, G., & Snow, C. E. (2006). *Reading next—A vision for action and research in middle and high school literacy: A report to Carnegie Corporation of New York* (2nd ed.). Washington, DC: Alliance for Excellent Education. Retrieved from Advanced Placement Source database: (Accession No. 17474402)

Booker, K. (2018). The high tide raises all ships: Middle grades teachers' perspectives on school belonging in early adolescence. *Research in Middle Level Education Online, 41*(8), 1–15. doi:10.1080/19404476.2018.1505402

Bordelon, T. D., Phillips, I., Parkison, P. T., Thomas, J., & Howell, C. (2012). Teacher efficacy: How teachers rate themselves and how students rate their teachers. *Action in Teacher Education, 34*(1), 14–25. doi:10.1080/01626620.2012.642282

Bower, H. A., Carlton Parsons, E. R. (2016). Teacher identity and reform: Intersections within school culture. *The Urban Review, 48*(5), 743–765. doi:10.1007/s11256-016-0376-7

Bray, P. M. (2011). Perspectives and possibilities from a Black veteran educator: An understanding of agency. *Vitae Scholasticae, 28*(2), 51–64. Retrieved from Education Source database. (Accession No. 70199220)

Brown, E. L., Horner, C. G., Kerr, M. M., Scanlon, C. L. (2014). United States teachers' emotional labor and professional identities. *KEDI Journal of Educational Policy, 11*(2), 205–225. Retrieved from Education Source database. (Accession No. 100381665)

Brown, P. L., & Concannon, J. P. (2016). Students' perceptions of vocabulary knowledge and learning in a middle school science classroom. *International Journal of Science Education, 38*(3), 391–408. doi:10.1080/09500693.2016.1143571

Buchanan, R. (2015). Teacher identity and agency in an era of accountability. *Teachers and Teaching: Theory and Practice, 21*(6), 700–719. doi:10.1080/13540602.2015.1044329

Cahoon, B., & Straw, S. (2008). Literacy across the curriculum: Teachers teaching teachers about content area reading strategies. *English Quarterly, 40*(3/4), 22–33.

Calkins, L., Ehrenworth, M., & Lehman, C. (2012). *Pathways to the Common Core: Accelerating achievement*. Portsmouth, NH: Heinemann.

Cantrell, S. C., Burns, L. D., & Callaway, P. (2009). Middle- and high-school content area teachers' perceptions about literacy teaching and learning. *Literacy Research & Instruction, 48*(1), 76–94. doi:10.1080/19388070802434899

Cantrell, S. C., & Callaway, P. (2008). High and low implementers of content literacy instruction: Portraits of teacher efficacy. *Teaching and Teacher Education, 24*(7), 1739–1750. doi:10.1016/j.tate.2008.02.020

Cardoza, M. (2013, January 8). Final draft of Next Generation Science Standards released for public comment [Press Release]. Retrieved from the Georgia Department of Education Website: http://www.doe.k12.ga.us/External-Affairs-and Policy/communications/Pages/PressReleaseDetails.aspx?PressView=default&pid=83

Chong, S., & Low, E. L. (2009). Why I want to teach and how I feel about teaching – formation of teacher identity from pre-service to the beginning teacher phase. *Educational Research for Policy and Practice, 8*(1), 59-72, doi: 10.1007/s10671-008-9056-z

Clements, R. (2013) Teacher accountability or credibility? *Journal of Physical Education, Recreation & Dance, 84*(6), 3-4, doi: 10.1080/07303084.2013.808106

Common Core State Standards Initiative. (2012).Standards in your state [Website]. Retrieved from http://www.corestandards.org/in-the-states#virgina

Coulter, S., & Lester, J. (2011). Finding and redefining the meaning of teaching: Exploring the experiences of mid-career teachers. *Journal of Curriculum & Instruction, 5*(2), 5–26. doi:10.3776/joci.2011.v5n2p5-26

Creswell, J. (2007). *Qualitative inquiry and research design*. Thousand Oaks, CA: Sage.

Darby, A. (2008). Teachers' emotions in the reconstruction of professional self-understanding. *Teaching and Teacher Education, 24*(5), 1160–1172. doi:10.1016/j.tate.2007.02.001

Day, C. (2012). New lives of teachers. *Teacher Education Quarterly, 39*(1), 7–26. Retrieved from MLA International Bibliography database. (Accession No. 2014401270)

Day, C., & Gu, Q. (2007). Variations in the conditions for teachers' professional learning and development: Sustaining commitment and effectiveness over a career. *Oxford Review of Education, 33*(4), 423–443. doi:10.1080/03054980701450746

Day, C., & Smethen, L. (2009). The effects of reform: Have teachers really lost their sense of professionalism? *Journal of Educational Change, 10*(2/3), 141–157. doi:10.1007/s10833-009-9110-5

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

Dickens, R. H., & Meisinger, E. B. (2016). Examining the effects of skill level and reading modality on reading comprehension. *Reading Psychology, 37*(2), 318–337. doi:10.1080/02702711.2015.1055869

Drew, S. V., & Thomas, J. (2018). Secondary science teachers' implementation of CCSS and NGSS literacy practices: A survey study. *Reading and Writing, 31*(2), 267–291. doi:10.1007/s11145-017-9784-7

Duffy, G. (2002). Visioning and the development of outstanding teachers. *Reading Research and Instruction, 41*(4), 331–344. http://dx.doi.org./10.1080/19388070209558375

Fang, Z. (2014). Preparing content area teachers for disciplinary literacy instruction: The role of literacy teacher educators. *Journal of Adolescent & Adult Literacy, 57*(6), 444–448. http://dx.doi.org /10.1002/jaal.269

Fang, Z., & Wei, Y. (2010). Improving middle school students' science literacy through reading infusion. *The Journal of Educational Research, 103*(4), 262–273. http://dx.doi.org/10.1080/10.220670903383051

Faulkner, S. A., & Cook, C. M. (2006). Testing vs. teaching: The perceived impact of assessment demands on middle grades instructional practices. *RMLE Online: Research in Middle Level Education, 29*(7), 1–13. Retrieved from ERIC database. (EJ804104)

Fisher, D., & Frey, N. (2008). Student and teacher perspectives on the usefulness of content literacy strategies. *Literacy Research & Instruction, 47*(4), 246–263. Retrieved from Complementary Index Database. (Accession No. 34319978)

Friedman, I. A. (2000). Burnout in teachers: Shattered dreams of impeccable professional performance. *Journal of Clinical Psychology, 56*(5), 595–606. doi:10.1002/(SICI)1097-4679(200005)56:5<595::AID-JCLP2>3.0.CO;2-Q

Friedman, I. A., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and Teacher Education, 18*(6), 675–686. doi:10.1016/S0742-051X(02)00027-6

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior, 26*(4), 331–362. doi:10.1002/job.322

Georgia Department of Education. (2014). 2014 CCRPI indicators. Retrieved from https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Accountability/Documents/Indicators%20and%20Targets/2014%20CCRPI%20Indicators%2004.01.14%20v2.pdf

Georgia Department of Education. (2016a). Leader keys effectiveness system. Retrieved from http://www.gadoe.org/School-Improvement/Teacher-and-Leader-Effectiveness/Documents/LKES%20Handbook%202016-2017%20Final%20%20(4).pdf

Georgia Department of Education. (2016b). Teacher keys effectiveness system implementation handbook. Retrieved from http://www.gadoe.org/School-Improvement/Teacher-and-Leader-Effectiveness/Documents/Finalized%20TKES%20Handbook%20with%20district%20feedback%20%202016-2017.pdf

Georgia Department of Education. (2018). Redesigned college and career performance index (CCRPI). Retrieved from http://www.gadoe.org/Curriculum-Instruction-and-

Assessment/Accountability/Documents/Resdesigned%20CCRPI%20Support%20Documents/Redesigned%20CCRPI%20Overview%20011918.pdf

Georgia Department of Education. (2019). College and career ready performance index. (CCRPI). Retrieved from http://ccrpi.gadoe.org/2018/Views/Shared/_Layout.html

Georgia Department of Education. (2019). Georgia Standards of Excellence (GSE). Retrieved from https://www.georgiastandards.org/Georgia-Standards/Pages/default.aspx

Giles, C., Wang, Y., Smith, J., & Johnson, D. (2013). "I'm no longer just teaching history." Professional development for teaching Common Core State Standards for literacy in social studies. *Middle School Journal, 44*(3), 34–43. Retrieved from https://www.jstor.org/stable/41763127

Gillis, V. (2014). Disciplinary literacy: "Adapt" not adopt. *Journal of Adolescent & Adult Literacy, 57*(8), *614–623.* Retrieved from ERIC database. (EJ1024968)

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479–507. http://dx.doi.org/10.2307/1163531

Goldman, S. R. (2012). Adolescent literacy: Learning and understanding content. *The Future of Children, 22*(2), 89–116. Retrieved from ERIC database. (EJ996190)

Gonzalez, A., Peters, M. L., Orange, A., & Grigsby, B. (2017). The influence of high-stakes testing on teacher self-efficacy and job-related stress. *Cambridge Journal of Education, 47*(4), 513–531. http://dx.doi.org/10.1080/0305764X.2016.1214237

Graham, A. C. K., Kerkhoff, S. N., & Spires, H. A. (2017). Disciplinary literacy in the middle school: Exploring pedagogical tensions. *Middle Grades Research Journal, 11*(1), 63–83. Retrieved from ERIC database. (EJ1146221)

Greene, J. L. (2015). The fundamentals of academic vocabulary: Essential concepts for middle school students and their teachers. *Perspectives on Language and Literacy, 41*(3), 29–32. Retrieved from https://search.proquest.com/docview/1717466792?pq-origsite=gscholar

Greene, W. L., Musser, P. M., Casbon, J., Caskey, M. M., Samek, L. L., & Olson, M. (2008). Caught in the middle again: Accountability and the changing practice of middle school teachers. *Middle Grades Research Journal, 3*(4), 41–72. Retrieved from Education Source database. (Accession No. 51835584)

Gu, Q., & Day, C. (2007). Teachers resilience: A necessary condition for effectiveness. *Teaching and Teacher Education, 23*(8), 1302–1316. doi:10.1016/j.tate.2006.06.006

Gu, Q., & Day, C. (2013). Challenges to teacher resilience: Conditions count. B*ritish Educational Research Journal, 39*(1), 22–44. doi:10.1080/01411926.2011.623152

Guskey, T. R. (1984). The influence of change in instructional effectiveness upon the affective characteristics of teachers. *American Educational Research Journal, 21*(2), 245–259. Retrieved from Complementary Index database. (Accession No. 19804994)

Guskey, T. R. (1989). Attitude and perceptual change in teachers. *International Journal of Research, 13*(4), 439–453. doi:10.1016/0883-0355(89)90039-6

Guzzetti, B. J., & Bang, E. (2011). The influence of literacy-based standards instruction on adolescents' interest, participation, and achievement in science. *Literacy Research and Instruction, 50*(1), 44–67. doi:10.1080/19388070903447774

Hargreaves, A. (2005). Educational change takes ages: Life, career, and generational factors in teachers' emotional responses to educational change. *Teaching and Teacher Education, 21*(8), 967–983. http://dx.doi.org/10.1016/j.tate.2005.06.007

Harris, D. M. (2012). Varying teacher expectations and standards: Curriculum differentiation in the age of standards-based reform. *Education and Urban Society, 44*(2), 128–150. http://dx.doi.org/10.1177/0013124511431568

Harris, D. N., Ingle, W. K., Rutledge, S. A. (2014). How teacher evaluation methods matter for accountability: A comparative analysis of teacher effectiveness ratings by principals and teacher value-added measures. *American Educational Research Journal, 51*(1), 73–112. doi:10.3102/0002831213517130

Heller, R., & Greenleaf, C. (2007). *Literacy instruction in the content areas: Getting to the core of middle and high school improvement*. Washington, DC: Alliance for Excellent Education. Retrieved from ERIC database. (ED510920)

Hen, M., & Goroshit, M. (2016). Social-emotional competencies among teachers: An examination of interrelationships. *Cogent Education, 3*(1), 1–9. http://dx.doi.org/10.1080/2331186X.2016.1151996

Henk, W. A., Mallette, M. H., Waggoner, J. E., & Delaney, C. J. (2005). What matters most? A survey of accomplished middle-level educators' beliefs and values about literacy. *Action in Teacher Education, 27*(2), 33–42. Retrieved from ERIC database. (EJ720275)

International Reading Association. (2012). *Adolescent literacy* [Position statement]. Newark, DE: Author. Retrieved from https://www.literacyworldwide.org/docs/default-source/where-we-stand/adolescent-literacy-position-statement.pdf?sfvrsn=8

Jackson, A.W., & Davis, G. A. (2000). *Turning points 2000: Educating adolescents in the 21st century*. New York, NY: Teachers College Press.

Jacob, B. A., & Lefgren, L. (2008). Can principals identify effective teachers? Evidence on subjective performance evaluation in education. *Journal of Labor Economics, 26*(1), 101–136. https://www.jstor.org/stable/10.1086/522974

Jimenez-Silva, M., & Gómez, C. L. (2011). Developing language skills in science classrooms. *Science Activities, 48*(1), 23–28. doi:10.1080/00236121.2010.495141

Kelchtermans, G. (2005). Teachers' emotions in educational reforms: Self-understanding, vulnerable commitment and micropolitical literacy. *Teaching and Teacher Education, 21*(8), 995–1006. http://dx.doi.org/10.1016/j.tate.2005.06.009

Kelchtermans, G. (2009). Who I am and how I teach is the message: Self-understanding, vulnerability, and reflection. *Teachers and Teaching: Theory and practice, 15*(2), 257–272. doi:10.1080/13540600902875332

Lacina, J., & Watson, P. A. (2008). Focus of Literacy: Effective content teachers for the middle grades. *Children Education, 84*(3), 159–162. doi:10.1080/00094056.2008.10522998:

Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency, and professional vulnerability in a context of secondary school reform. *Teaching and Teacher Education, 21*(8), 899–916. http://dx.doi.org/10.1016/j.tate.2005.06.003

Le Roux, A. (2011). The interface between identity and change: How in-service teachers use discursive strategies to cope with educational change. *Education as Change, 15*(2), 303–316. doi:10.1080/16823206.2011.619142

Levine, T. H. (2011). Experienced teachers and school reform: Exploring how two different professional communities facilitated and complicated change. *Improving Schools 14*(1), 30–47. http://dx.doi.org/10.1177/1365480211398233

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage.

Lotter, C., Smiley, W., Thompson, S., & Dickenson, T. (2016). The impact of a professional development model on middle school science teachers' efficacy and implementation of inquiry. *International Journal of Science Education, 38*(18), 2712–2741. http://dx.doi.org/10.1080/09500693.2016.1259535

Lounsbury, J. H. (2010). This we believe: Keys to educating young adolescents. *Middle School Journal, 41*(3), 52–53. doi: 10.1080/00940771.2010.11461722

Mansfield, C. F., Beltman, S., Price, A., & McConney, A. (2012). "Don't sweat the small stuff:" Understanding teacher resilience at the chalkface. *Teaching and Teacher Education, 28*(3), 357–367. doi:10.1016/j.tate.2011.11.001

Maskit, D. (2011). Teachers' attitudes toward pedagogical changes during various stages of professional development. *Teaching and Teacher Education, 27*(5), 851–860. doi:10.1016/j.tate.2011.01.009

Mastropieri, M. A., Scruggs, T. E., & Graetz, J. E. (2003). Reading comprehension instruction for secondary students: Challenges for struggling students and teachers. *Learning Disability Quarterly, 26*(2), 103–116. doi:10.2307/1593593

McCoss-Yergian, T., & Krepps, L. (2010). Do teacher attitudes impact literacy strategy implementation in content area classrooms? *Journal of Instructional Pedagogies, 4*, 1–18. Retrieved from ERIC database. (EJ109699)

Milner, R. H. (2002). A case study of an experienced English teacher's self-efficacy and persistence through "crisis" situations: Theoretical and practical considerations. *The High School Journal, 86*(1), 28–35. doi:10.1353/hsj.2002.0020

Mintrop, M., & Ordenes, M. (2017). Teacher work motivation in the era of extrinsic incentives: Performance goals and pro-social commitments in the service of equity. *Education Policy Analysis Archives, 25*(44), 1–43. doi:http://dx.doi.org/10.14507/epaa.25.2482

Moè, A., Pazzaglia, F., & Ronconi, L. (2010). When being able is not enough. The combined value of positive effect and self-efficacy for job satisfaction in teaching. *Teaching and Teacher Education, 26*(5), 1145–1153. doi:10.1016/j.tate.2010.02.010

Moje, E. B. (2015). Doing and teaching disciplinary literacy with adolescent learners: A social and cultural enterprise. *Harvard Educational Review, 85*(2), 254–278. http://dx.doi.org/10.17763/0017-8055.85.2.254

Morgan, M., Ludlow, L., Kitching, K., O'Leary, M., Clarke, A. (2010). What makes teachers tick? Sustaining events in new teachers' lives. *British Educational Research Journal, 36*(2), 191-208. doi: 10.1080/01411920902780972

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

Musoleno, R., & White, G. (2010). Influences of high-stakes testing on middle school mission and practice. *RMLE Online: Research in Middle Level Education, 34*(3), 1–10. Retrieved from ERIC database. (EJ914055)

National Governors Association Center for Best Practices and Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC: Authors.

Retrieved from https://www.aps.edu/academics/common-core-state-standards/documents/CCSSI_ELA%20Standards.pdf

National Middle School Association. (2003). This we believe: Successful schools for young adolescents. Westerville, OH: Author.

Ness, M. K. (2009). Reading comprehension strategies in secondary content area classrooms: Teacher use of and attitudes toward reading comprehension instruction. *Reading Horizons*, *49*(2), 143–166. Retrieved from ERIC database. (EJ867137)

NGSS Lead States. 2013. *Next generation science standards: For states, by state*s. Washington, DC: The National Academies Press.

Nielsen, D. L., Barry, A. L., & Staab, P. T. (2008). Teachers' reflections of professional change during a literacy-reform initiative. *Teaching and Teacher Education*, *24*(5), 1288–1303. doi:10.1016/j.tate.2007.01.015

O'Brien, D., Stewart, R., & Moje, E. (1995). Why content literacy is difficult to infuse into the secondary school: Complexities of curriculum, pedagogy, and school culture. *Reading Research Quarterly*, *30*(3), 442–463. doi:10.2307/747625

Paik, S., Zhang, M., Lundeberg, M. A., Eberhardt, J., Shin, T. S., & Zhang, T. (2011). Supporting science teachers in alignment with state curriculum standards through professional development: Teachers' preparedness, expectations and their fulfillment. *Journal of Science Education and Technology*, *20*(4), 422–434. doi:10.1007/s10956-011-9308-1

Palincsar, A. S. (2013). Guest editorial: The Next Generation Science Standards and the Common Core State Standards: Proposing a happy marriage. *Science and Children, 51*(1), 10–15. Retrieved from https://www.jstor.org/stable/43176068

Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.

Phelps, P. H., & Benson, T. R. (2012). Teachers with a passion for the profession. *Action in Teacher Education, 34*(1), 65–76. doi:10.1080/01626620.2012.642289

Polk, J. A. (2006). Traits of effective teachers. *Arts Education Policy Review, 107*(4), 23–29. doi:10.3200/AEPR.107.4.23-29

Putnam, S. M. (2012). Investigating teacher efficacy: Comparing preservice and inservice teachers with different levels of experience. *Action in Teacher Education, 34*(1), 26–40. doi:10.1080/01626620.2012.642285

Ross, J. A. (1994). The impact of an inservice to promote cooperative learning on the stability of teacher efficacy. *Teaching & Teacher Education, 10*(4), 381–394. http://dx.doi.org/10.1016/0742-051X(94)90020-5

Ross, J., & Bruce, C. (2007). Professional development effects on teacher efficacy: Results of randomized field trial. *The Journal of Educational Research, 101*(1), 50–60. Retrieved from https://www.jstor.org/stable/27548214

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. doi:10.1037110003-066X.55.1.68

Sadler, P. M., Sonnert, G., Coyle, H. P., Cook-Smith, N., & Miller, J. L. (2013). The influence of teachers knowledge on student learning in middle school physical science classrooms.

American Education Research Journal, 50(5), 1020–1049. doi:10.3102/0002831213477680

Sampson, V., Enderle, P., Grooms, J., & Witte, S. (2013). Writing to learn by learning to write during the school science laboratory: Helping middle and high school students develop argumentative writing skills as they learn core ideas. *Science Education, 97*(5), 643–670. doi:10.1002/sce.21069

Sanacore, J., & Palumbo, A. (2010). Middle school students need more opportunities to read across the curriculum. *The Clearing House, 83*(5), 180–185. http://dx.doi.org/10.1080/00098650903583735

Santoro, D. A. (2011). Good teaching in difficult times: Demoralization in the pursuit of good work. *American Journal of Education, 118*(1), 1–23. http://dx.doi.org/10.1086/662010

Schoenbach, R., Greenleaf, C. L., & Hale, G. (2010). Framework fuels the need to read: Strategies boost literacy of students in content-area classes. *Journal of Staff Development, 31*(5), 38–42. Retrieved from ERIC database. (EJ915114)

Shanahan, T., & Shanahan, C. (2008). Teaching disciplinary literacy to adolescents: Rethinking content-area literacy. *Harvard Educational Review, 78*(1), 40–59. Retrieved from ERIC database. (EJ791477)

Shanahan, T., & Shanahan, C. R. (2015). Disciplinary literacy comes to middle school. *Voices from the Middle, 22*(3), 10–13. Retrieved from Education Source database. (Accession No. 101635693)

Sinclair, C. (2008). Initial and changing student teacher motivation and commitment to teaching. *Asia-Pacific Journal of Teacher Education, 36*(2), 79-104. doi: 10.1080/13598660801971658

Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education, 26*(4), 1059–1069. doi:10.1016/j.tate.2009.11.001

Snow, C. E., Martin, T., & Berman, I. (2008). State literacy plans: Incorporating adolescent literacy. *Harvard Educational Review, 78*(1), 211–230. Retrieved from ERIC database. (EJ791486)

Stone-Johnson, C. (2011). Talkin' bout my generation: Boomers, Xers, and educational change. *Journal of Educational Change, 12*(2), 221–239. doi:10.1007/s10833-011-9160-3

Stronge, J. H., Ward, T. J., & Grant, L. W. (2011). What makes good teachers good? A cross-case analysis of the connection between teacher effectiveness and student achievement. *Journal of Teacher Education, 62*(4), 339–355. doi:10.1177/0022487111404241

Sutton, R., & Wheatley, K. (2003). Teachers' emotions and teaching: A review of the literature and directions for future research. *Educational Psychology Review, 15*(4), 327–358. doi:10.1023/A:1026131715856

Thornburg, D. G., & Mungai, A. (2011). Teacher empowerment and school reform. *Journal of Ethnographic & Qualitative Research, 5*(4), 205–217. Retrieved from ERIC database. (EJ955299)

Tong, F., Irby, B. J., Lara-Alecio, R., Guerrero, C., Fan, Y., & Huerta, M. (2014). A randomized study of a literacy-integrated science intervention for low-socio-economic status middle

school students: Findings from first-year implementation. *International Journal of Science Education, 36*(12), 2083–2109. http://dx.doi.org/10.1080/09500693.2014.883107

Tschannen-Moran, M., & Woolfolk Hoy, A. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education, 23*(6), 944–956. doi:10.1016/j.tate.2006.05.003

Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202–248. Retrieved from https://www.jstor.org/stable/1170754

Usher, E., & Pajares, F. (2008). Sources of self-efficacy in school: Critical review of the literature and future directions. *Review of Educational Research, 78*(4), 751–796. doi:10.3102/0034654308321456

Valli, L., & Buese, D. (2007). The changing roles of teachers in an era of high-stakes accountability. *American Educational Research Journal, 44*(3), 519-558. doi: 10.3102/0002831207306859

Wilder, P., & Herro, D. (2016). Lessons learned: Collaborative symbiosis and responsive disciplinary teaching. *Journal of Adolescent & Adult Literacy, 59*(5), 539–549. http://dx.doi.org/10.1002/jaal.476

Williams, J. S. (2003). Why great teachers stay. *Educational Leadership, 60*(8), 71–74. Retrieved from ERIC database. (EJ666122)

Wilson, E., & Deaney, R (2010). Changing career and changing identity: How do teacher career changers exercise agency in identity construction? *Social Psychology of Education, 13*(2), 169–183. doi:10.1007/s11218-010-9119-x

APPENDIX A: TEACHER INTERVIEW PROTOCOL

Open-Ended Interview Questions

Content Area Literacy Integration

1. Please describe all of your college-level preparation for teaching literacy in the science content area.
2. Please describe all of your literacy educational and training experiences prior to literacy standards implementation.
3. Please describe all of your literacy educational training experiences after the literacy standards implementation.
4. How would you describe yourself as a literacy teacher?
5. How important is literacy instruction in your classroom?
6. What challenges did you face while trying to implement literacy standards in the science classroom?
7. What helped you or what strategies did you use to cope during the implementation of literacy standards?
8. What would have helped you to better implement the literacy standards in science?
9. How have your experiences during the literacy standards implementation affected your self-perceptions of teaching?

APPENDIX B: DEMOGRAPHIC QUESTIONNAIRE

Teacher Demographic Questionnaire

1) What is your age?*

( ) 25-34

( ) 35-44

( ) 45-54

( ) 55-64

( ) 65-74

2) How would you identify your race/ethnicity (check all that apply)?*

[ ] White

[ ] Black or African American

[ ] Latino (any race)

[ ] Asian or Other Pacific Islander

[ ] American Indian or Alaska Native

[ ] Other—Write In (Required): _____*

3) Gender?*

( ) Female

( ) Male

4) What is the highest degree or level of school you have completed? (If you're currently enrolled in school, please indicate the highest degree you have received.)*

( ) Bachelor's degree

( ) Bachelor's degree

( ) Specialist's Degree

( ) Doctorate

5) How many years of teaching experience do you have?* _____

APPENDIX C: CONSENT FORM

CONSENT FORM

Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation

Summer Smith
Liberty University
School of Education

You are invited to be in a research study of veteran middle school science teachers' experiences with implementing literacy standards. Georgia middle school science teachers now teach literacy standards in addition to science content standards. You were selected as a possible participant because you teach middle school science in northeast Georgia and have a minimum of 8 years of teaching experience. Please read this form and ask any questions you may have before agreeing to be in the study.

Summer Smith, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to explore the experiences of veteran science teachers who are transitioning to Georgia Standards of Excellence.

Procedures: If you agree to be in this study, I would ask you to do the following things:

1. Complete a demographic questionnaire, which should take approximately 10 minutes or less.
2. Participate in a one on one interview, which would take approximately one hour. The interview will be audio recorded with a digital voice recorder.
3. Allow the researcher to observe least one classroom observation period.
4. Share lesson/unit plans with evidence of literacy planning and/or student work samples.

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study.

Compensation: Participants will not be compensated for participating in this study.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participants and schools will be assigned a pseudonym. I will conduct the interviews in a location where others will not easily overhear the conversation.
- Data will be stored on a password locked computer and hard copies of data will be kept in a locking document box. After three years, all electronic records will be deleted. Audio recordings will be maintained on a SD card, with only the researcher having access and will be erased after three years. Interviews will be recorded and transcribed. Recordings will be stored on a password locked computer for three years and then erased. Only the researcher will have access to these recordings.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you, will be destroyed immediately and will not be included in this study.

Contacts and Questions: The researcher conducting this study is Summer Smith. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at ssmith38@liberty.edu. You may also contact the researcher's faculty chair, Dr. Meredith Park, at mjpark@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record me as part of my participation in this study.

_____

Signature of Participant Date

_____

Signature of Investigator Date

APPENDIX D: IRB APPROVAL LETTER

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

October 12, 2018

Summer Smith
IRB Approval 3489.101218: Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation

Dear Summer Smith,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

6. Collection of data from voice, video, digital, or image recordings made for research purposes.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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APPENDIX E: SYSTEM PERMISSION REQUEST

DATE

Dear:

As a graduate student of the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The title of my research project is Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation. The purpose of this qualitative study is to explore the experiences of effective veteran science teachers who are successfully transitioning to Science Georgia Standards of Excellence. Northeast Georgia science teachers with eight or more years of experience in grades six through eight are the focus of this study. I am writing to request your permission to conduct my research in your school district and invite veteran middle school science teachers to participate in my research study.

Participants will be asked to complete a demographic questionnaire, schedule at least one interview and one classroom observation as well as submit sample units or lesson plans. It should take approximately one to two hours for the teacher to complete the procedures listed. The teacher's name and demographic information will be requested as part of his or her participation, but the information will remain confidential. Participants will be presented with informed consent information prior to participating. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. Please send your response to my email address which is ssmith38@liberty.edu. If you choose to grant permission, please provide a signed statement on official letterhead indicating your approval.

Sincerely,

Summer Smith

Summer Smith
Doctoral Candidate
Liberty University

APPENDIX F: TEACHER RECRUITMENT EMAIL

DATE

Dear:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of my research is to explore the experiences of effective veteran science teachers who are successfully transitioning to Science Georgia Standards of Excellence, and I am writing to invite you to participate in my study.

If you have been teaching science for a minimum of eight years in grades six through eight and are willing to participate, your name has been recommended to me for my study. You will be asked to complete a demographic questionnaire, schedule at least one interview and one classroom observation as well as submit sample units or lesson plans. It should take approximately one to two hours for you to complete the procedures listed. Your participation will be completely anonymous. Your name and/or other identifying information will be requested as part of your participation, but the information will remain confidential.

To participate, contact me with scheduling possibilities, and I will work to accommodate the best possible times for interviews and observations. My email address is ssmith38@liberty.edu.

A stamped consent document is attached with this letter. The consent document contains additional information about my research; please read the consent document and notify me if you have questions or concerns. Thank you, in advance, for your consideration.

Sincerely,

Summer Smith
Doctoral Candidate
Liberty University

APPENDIX G: HABERSHAM SCHOOLS APPLICATION

APPLICATION TO **CONDUCT RESEARCH**

REQUESTING PERSON (S)

Contact Name Summer Smith **Title/Agency** Doctoral Student at Liberty University

Address_____. **Day Phone:** XXX-XXX-XXXX **Email Address** ssmith38@liberty.edu

City/State Baldwin, GA **Zip** 30511

College/Institution or Organization Sponsoring Project Liberty University

DESCRIPTION OF STUDY

Title of Research Proposal Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation

Synopsis of Research purpose, procedures and anticipated results:
The research purpose is to uncover the experiences of middle school science teachers in implementing literacy standards. The researcher will conduct face to face interviews, and at least one classroom observation of participant teachers. Additional data collection includes samples of lesson or unit plans indicating literacy implementation and/or anonymous student work samples demonstrating literacy standards. Participants will also be asked to verify interview transcriptions for accuracy. Developing an understanding of veteran teachers' abilities to effectively implement literacy standards will provide school administrators and professional development planners with insight on what they must emphasize in order to achieve positive outcomes in the areas of student achievement and teacher effectiveness.

Beginning Date: November, 2018 **Completion Date** February, 2019

INFORMATION REQUIRED

Please provide (1) copy of your research proposal.

Please provide an attachment to answer the following questions:

1. **How much school time will be involved for staff research?**
2. **What schools will be involved?**
3. **Number of students needed and particular characteristics (boy, girl, age, etc.)**
4. **Information needed for individual students.**

5. **What are space/room requirements?**

6. **Will school supplies/equipment be required?**

7. **Will financial support be requested from the Habersham County Board of Education?**

8. **How will teachers be required to help in the study (function and time)?**

9. **How will other school personnel be involved in the study (function and time)?**

10. **What data will be collected? (Specify names of commercially available tests and attach copies of research-developed instruments)**

11. **What methods of data analysis will be used?**

12. **How will parental consent be obtained (if appropriate)?**

13. **How will human subjects be protected in view of the Family Rights and Privacy Act?**

14. **How will this study benefit Habersham County Schools?**

15. **Have you received IRB approval from your college/university?**
yes☐ no☐
(Please include copy of approval letter with your packet, if available). If you have not received IRB approval please indicate the anticipated submission date and approval timeline.

RESULTS

Do you agree to provide a copy/summary of the completed study to the Habersham County Board of Education? Yes, I agree.

Electronic Signature Summer Smith **Date 9/27/18**

Please return form via email or fax (706-754-4141) along with a copy of your proposal to:
Rhonda Andrews – if grade K-5 – randrews@habershamschools.com

Pam Dalton – if grades 6 – 12 – pdalton@habershamschools.com

ATTACHMENT FOR HABERSHAM SCHOOLS QUESTIONS

1. How much school time will be involved for staff research?
   Approximately one hour is desired for each teacher's classroom observation; the interview protocol and participant checking transcribed interview can occur after school hours or during other designated times.

2. What schools will be involved?
   North Habersham Middle School, South Habersham Middle School, and Wilbanks Middle School

3. Number of students needed and particular characteristics (boy, girl, age, etc.)
   N/A; no student participation is needed.

4. Information needed for individual students.
   N/A

5. What are space/room requirements?
   Space is needed in a private room for teacher interviews and meeting for member checking of transcribed interviews.

6. Will school supplies/equipment be required?
   N/A

7. Will financial support be requested from the Habersham County Board of Education?
   N/A

8. How will teachers be required to help in the study (function and time)?
   Approximate time required is three total hours. One on one interviews with participants will last approximately one hour; one classroom observation period is needed; follow up member checking of data analysis will last approximately one hour.

9. How will other school personnel be involved in the study (function and time)?
   N/A

10. What data will be collected? (Specify names of commercially available tests and attach copies of research-developed instruments)
    Instruments are a demographic questionnaire, semi-structured protocol, and interview guide (attached), and anonymous student work samples or evidence of literacy plans.

11. What methods of data analysis will be used?
Survey Gizmo will be utilized online for demographic questionnaire, digital voice recorder is used for interview recording, Transcribe Me online is used for audio transcription, and qualitative analysis software (Atlas.ti or NVivo) is used to code themes from the data.

12. How will parental consent be obtained (if appropriate)?
N/A

13. How will human subjects be protected in view of the Family Rights and Privacy Act?
A consent form will be in an email sent to teachers suggested by school administration as possible participants. Name and identifying information of teachers will be requested as part of participation, but the information will remain confidential, and pseudonyms will be used. All hard copy data will be kept in a locked box; all computer data will be kept on a password protected computer with only the researcher having access. After the three-year federal retention policy, all hard data files will be shredded, and computer data records stored on a computer hard drive will be erased using commercial software applications. For data stored on USB drives, the storage devices will be scrubbed of data and physically destroyed. Audio files of interviews will be erased and physically destroyed,

14. How will this study benefit Habersham County Schools?
Developing an understanding of career teachers' abilities effect implement literacy standards will provide school administrators and professional development planners with insight on what they must emphasize in order to achieve positive outcomes in the areas of student achievement and teacher effectiveness.

15. Have you received IRB approval from your college/university?
I received preliminary approval from Liberty University School of Education IRB, but I am now awaiting approval from Liberty University IRB. I anticipate approval by the end of October 2018.

(Please include copy of approval letter with your packet, if available). If you have not received IRB approval, please indicate the anticipated submission date and approval timeline.

I have attached the preliminary approval from Liberty SOE IRB.

APPENDIX H: DAWSON SCHOOLS APPLICATION

Dawson County School
28 Main Street
Dawsonville, GA 30534
(706) 265-3246
FAX (706) 265-1226
www.dawsoncountyschools.org

Dr. Damon Gibbs
Superintendent

Research Request Proposal

Date of Request: October 12, 2018

Student Contact Information:
Summer Smith
XXXX
Baldwin, GA 30511
XXX-XXX-XXXX
ssmith38@liberty.edu

SUPERVISING SCHOOL: Liberty University

RESEARCH TOPIC: Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation

STUDY DESCRIPTION: The purpose of this phenomenological study is to explore the experiences of veteran middle school science teachers who are transitioning to Science Georgia Standards of Excellence. Participants will take part in one on one interview, one classroom observation period, and a follow up member checking of the interview transcription. Participants will also complete a demographic questionnaire and submit lesson/unit plans or anonymous student work samples showing literacy integration.

STUDY DESIGN: Qualitative

METHOD OF ANALYSIS: Data will be organized and analyzed using the Stevick-Colaizzi-Keen method for transcendental phenomenology. Each interview will be transcribed with Transcribe Me, relevant statements will be pulled and imported into a spread sheet with participant demographic information and imported into Atlas ti. Coding will be based upon themes of participants' experiences with literacy implementation. Further analysis will examine all meaning and lead to a synthesis of what each participant experienced.

IRB APPROVAL RECEIVED: ☒ YES (if yes, please attach a copy) ☐ NO

INFORMED CONSENT REQUIRED: ☒ YES ☐ NO

COPY OF SURVEY QUESTIONS ATTACHED: ☒ YES ☐ NO ☐ N/A

COPY OF INTERVIEW QUESTIONS ATTACHED: ☒ YES ☐ NO ☐ N/A

Return completed form to:

Dr. Janice Darnell
Director of Student Support Services
jdarnell@dawson.k12.ga.us
(706) 265 – 3246 Ext. 1014

APPENDIX I: GAINESVILLE CITY SCHOOLS APPLICATION

Attachment C

Gainesville City Schools
508 Oak Street
Gainesville, GA 30501

Application to Conduct Research in the Gainesville City Schools System

Researcher Summer Smith

Title of Proposed Research Study Successfully Implementing Literacy Standards in the Science Classroom

Proposed Project Starting Date November, 2018

Proposed Project Ending Date February, 2019

Proposed Schools to be included in the research project?
Gainesville Middle School

Purpose of the Study
The purpose of this qualitative phenomenological study is to explore the experiences of veteran science teachers that are successfully transitioning to Science Georgia Standards of Excellence.

Rationale for the Study (How will the study contribute to this field of research?)
Veteran science teachers in northeast Georgia are the target population because little research exists regarding veteran teachers and their efficacy levels with implementing new standards. The significance of this study is to add to the existing literature about successful academic literacy integration into the science content area by veteran middle school educators.

Research Questions or Hypotheses
Main research question: How do veteran middle school science teachers successfully integrate the literacy standards into their science instruction?
Sub-question one: How do veteran teachers feel about their ability to successfully integrate literacy standards into their content instruction?
Sub-question two: How do veteran science teachers use literacy to build knowledge in adolescent learners?
Sub-question three: How do veteran middle school science teachers feel they could best be supported with implementation of literacy standards in the content area?

Does the study relate to an identified research priority of the Gainesville City School System? (Attachment A) Yes X No _____
If yes, identify the area Literacy and instructional techniques

Describe how the study relates to GCSS current research priorities.

Developing an understanding of veteran teachers' abilities to effectively implement literacy standards will provide school administrators and professional development planners with insight on what they must emphasize in order to achieve outcomes in the areas of student achievement and teacher effectiveness.

Methodology

A. Participants

Students: Number 0 Grade(s) _____
Teachers: Number 2-3 Grade(s) 6-8
Administrators: Number 0
Support Staff: Number 0
Parents: Number 0

How were participants selected for the research project?

Upon system permission, the researcher will contact middle school administration to identify an purposely select science teachers, regardless of gender, age, or ethnicity, in grades six, seven, or eight who have a minimum of 10 years of teaching experience.

How much time will be required for individuals participating in the study?

Approximately three hours is required for each participant.

What will participants be asked to do?

Participants will take part in one on one interview, one classroom observation period, and follow up member checking of interview transcription. Participants will also complete a demographic questionnaire and submit lesson/unit plans or anonymous student work samples showing literacy integration.

How will consent be obtained from all research participants, and if necessary, from parents/guardians? (See sample Parental Permission Form, Attachment C)

A consent form will be in an email sent to teachers suggested by school administration as possible participants.

Identify any potential benefits or risks for participants that might result from the research.

Potential Benefits	Potential Risks
No direct benefits to participants.	Only risk is a breach if the data is lost or stolen.
Fill gap in research regarding veteran teachers' efficacy.	

B. Research Design Information

_____ Quantitative __X__ Qualitative _____ Mixed Methods

Briefly describe your design.

A qualitative, transcendental phenomenological study will be conducted to uncover the experiences of middle school science teachers in implementing the common core literacy standards.

Is this a single case study or one of a series of studies? single

B. Data Collection and Analysis

List data that will be collected for this study. Include a copy of all surveys, interview protocols, tests, checklists or other data collection instruments.

Data to be Collected	*Data Collection Instrument	Data Source	Anticipated Date of Data Collection
demographics	questionnaire	teacher participants	November, 2018
interview	interview protocol	teacher participants	November-February, 2018
classroom observation	field notes		November-February, 2018
lesson/unit plans	N/A	teacher participants	November-February, 2018
anonymous student work	N/A	teacher participants	November-February, 2018

* Surveys require approval of the Gainesville City Schools Board of Education.

Describe your data analysis procedures. Identify descriptive and/or inferential statistics that will be used to test the hypotheses.

Data will be organized and analyzed using Stevick-Colaizzi-Keen method for transcendental phenomenology. Each interview will be transcribed with Transcribe me, relevant statements will be pulled and imported into a spread sheet with participant demographic information and imported into Atlas ti. Coding will be based upon themes of participants' experiences with literacy implementation. Further analysis will examine all meaning and lead to a synthesis of what the participant experienced.

Will anyone other than the researcher be involved in the data analysis process?
_____ Yes __X__ No If yes, who will assist with data analysis procedures?

Researcher Applicant Checklist: have you included?
- Signed applicant agreement
- Participant consent form
- Data collection instruments

APPENDIX J: BANKS COUNTY SCHOOLS APPROVAL LETTER

P.O. Box 248
Homer, GA 30547
Phone: 706-677-2224
Fax: 706-677-2223

Banks County School System

STAN DAVIS
Superintendent

DR. ANN HOPKINS
Assistant Superintendent

January 11, 2019

Summer Smith
Banks County Schools
Liberty University

Dear Summer:

Thank you for your request to have Banks County Schools participate in your doctoral research study: Successfully Implementing Common Core Literacy Standards in the Science Classroom: A Phenomenological Investigation.

Please maintain this letter as notification of approval of Banks County Schools' willingness to take part in your study. Should you need additional information or should the scope of your proposal change, please let me know.

I look forward to hearing of your results. Good luck!

Sincerely,

Ann L. Hopkins