# RECIPROCAL TEACHING AS A READING COMPREHENSION INSTRUCTIONAL STRATEGY TO SUPPORT THE INTEGRATION OF SCIENCE LITERACY INTO THE MIDDLE SCHOOL SCIENCE CLASSROOM

BY

JANET JACOBS HOGAN

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**SIGNATURE PAGE**

This dissertation has been examined and approved.

Cassandra Smith — 2/18/2022

Cassandra Smith, EdD, Committee Chair — Date

Eunjeong Choi — 2/18/2022

Eunjeong Choi, PhD., Committee Member — Date

2/18/2022

Abi Nubla-Kung, PhD., Committee Member — Date

Vicki Butler, EdD — 2/18/22

Vicki Butler, EdD, Dean — Date

## DEDICATION

This dissertation is dedicated to those dearest to my heart. To my husband Chris, not only are you my best friend, but you also bring out the best in me. I am blessed to be on this journey through adulthood with you. Thank you for always having my back and being the perfect Yin to my Yang. To my daughter Katie, you never cease to amaze me. You are the quintessential combination of headstrong and compassionate. Hold tight to the values that make you an exceptional young woman, daughter, and friend. To my son Sam, your quiet confidence and sense of humor are unparalleled. You make me laugh. You are patient and kind to everyone. You always give people the benefit of the doubt by assuming positive intent. It is a character trait in you that I wish I had. To my Mom, Joan Jacobs, thank you for instilling in me that value of my faith and my education. Your love and support built a strong foundation allowing me to dream big. To my Dad, Joe Jacobs, thank you for showing me what hard work looks like. You always said that if something is worth doing, it is worth doing right. I cherish every laugh we have shared over the years. I miss you so much.

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# ABSTRACT

The *Massachusetts Science, Technology, and Engineering Framework* integrates literacy skills into the standards and requires science teachers to use instructional strategies to support literacy in the classroom (Massachusetts Department of Elementary and Secondary Education [MADESE], 2016a). However, secondary science teachers may not provide adequate instructional support for their students to build reading comprehension skills in science (Drew & Thomas, 2018). This study explored the experience and perceptions of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into their classrooms. The goal of the research was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom. The research questions focused on gathering information on middle school science teachers' understanding of science literacy, support for science literacy in the classroom, and perceptions and experience of using reciprocal teaching as a means of teaching reading comprehension. In this study, the researcher used a qualitative methodology with a descriptive single case study research design using a purposive sampling strategy. Semi-structured interviews and classroom observations occurred with middle school science teachers at a private, independent school for girls in grades 6 through 12 in a suburb south of Boston, Massachusetts. Data analysis occurred using thematic analysis. Findings indicate middle school science teachers perceive reciprocal teaching as an adaptable, easy to use reading comprehension instructional strategy to use in middle school science classrooms. Results

may inform school leaders and assist middle school science teachers in supporting student understanding of concepts by teaching reading comprehension (MADESE, 2016a).

# CHAPTER 1: INTRODUCTION TO THE STUDY

Literacy skills are critical to understanding and applying science knowledge (Massachusetts Department of Elementary and Secondary Education [MADESE], 2016a). Decades of educational reform created an accountability system requiring individual classroom teachers to implement reforms associated with state standards (Donnelly & Sadler, 2009). Standards specify instructional outcomes but do not provide specific details about how to accomplish those outcomes (Goldman et al., 2016). Science teachers require effective reading comprehension instructional strategies to help their students develop skills essential for academic success (Biancarosa & Snow, 2006). Middle school science teachers should embed disciplinary literacy skills within their classroom instruction (Shanahan & Shanahan, 2008).

Discipline-based literacy entails specialized knowledge and skills used in each academic discipline (Shanahan & Shanahan, 2012). Understanding scientific texts are discipline specific (Lee & Spratley, 2010). Every teacher has a responsibility to build literacy skills necessary for students to read with comprehension and think critically about the content within their discipline (Goldman, 2012). Middle and high school science teachers should focus on discipline-based literacy within the science classroom (Shanahan & Shanahan, 2012). However, few studies have examined how secondary teachers embed such literacy strategies within their instruction (Adams & Pegg, 2012).

According to the *National Assessment of Educational Progress* (NAEP), only 31% of eighth-grade students demonstrated competency in reading, applying, and analyzing challenging subject matter (Lee et al., 2007). Assessment results indicate many adolescents lack the literacy skills needed to succeed in middle and high school (Fang & Schleppegrell, 2010). Creating a literacy-rich science classroom environment requires intentionally selecting literacy strategies (Dew & Teague, 2015). The reciprocal teaching reading comprehension strategy is an instructional practice based upon teacher modeling, student participation, and four reading strategies used by effective readers: predicting, clarifying, questioning, and summarizing (McAllum, 2014). Palincsar and Brown (1984) developed reciprocal teaching to help struggling readers build reading comprehension skills. At first, the teacher models the strategies and gradually gives responsibility for their implementation to the students (Cooper & Greive, 2009). Reciprocal teaching is a reading comprehension instructional strategy to teach students to apply metacognitive thinking to make meaning from text (Rosenshine & Meister, 1994).

The middle school science classroom is a powerful place where teachers use scientific language to engage students in meaningful learning tasks (Grant et al., 2015). State standards include disciplinary literacy to ensure students engage in using specialized literacy in each subject area (Hynd-Shanahan, 2013). The choice of instructional strategy matters, especially for complex cognitive tasks such as reading comprehension (Duke et al., 2011). Reading comprehension aids in knowledge development (Cervetti & Hierbert, 2015). By actively supporting reading comprehension in science classrooms, teachers help students develop a deep understanding of scientific phenomena (Herman & Wardrip, 2012).

## Historical Background/Foundation

On April 11, 1965, President Lyndon Johnson signed the *Elementary and Secondary Education Act of 1965* (ESEA) into law (Alford, 1965). A key component of the law is the federal government's role in education (Gamson et al., 2015). Before the 1960s, the federal government had only limited involvement in educational policy (Kantor, 1991). However, in 1965, approximately a billion dollars went directly to school districts to implement programs for financially disadvantaged students (Thomas & Brady, 2005). Due to ESEA, schools that implemented federal guidelines received increased federal aid (Casalaspi, 2017). The federal funding, known as *Title 1*, included support for services to improve educational opportunities for low-achieving students (Borman & D'Agostino, 1996). An increase in school funding, combined with national efforts for equal access to education, resulted in creating the U.S. Department of Education (US DoED) in 1979 (McGuinn, 2015). Since 1965, major changes within federal law have affected school districts' funding, policy, and programming.

Sponsored by the federal Department of Education, the National Commission on Excellence in Education released the publication *A Nation at Risk: The Imperative for Educational Reform* in 1983 (Clark et al., 1983). The report highlighted indicators of educational risk, including the decline in science achievement scores and a lack of literacy skills among high school graduates (National Commission on Excellence in Education, 1983). Academic indicators cited in the report included elevated levels of illiteracy, poor performance when compared to other countries, and declining *Scholastic Aptitude Test* scores from 1963 to 1980 (Mehta, 2015). *A Nation at Risk* captured the attention of the public and created disagreement as to how to raise student achievement (Ravitch et al., 1998). The report became the impetus for standards-based education reform at the federal, state, and local levels (Association for Supervision and Curriculum Development, 2013).

Since 1983, literacy scores of eighth-grade students on the NAEP have remained low (Haynes, 2011). During reauthorization hearings in 2001, Congress renamed ESEA *No Child Left Behind Act of 2001* (NCLB) and President George W. Bush signed it into law (Husband & Hunt, 2015). NCLB represented a new approach to educational policy and required reading and math proficiency for all students by 2014 (U.S. Department of Education, 2002). The law included federal mandates including standardized testing in several grades in math, language arts, and science for greater school accountability. For the first time, outcomes on standardized tests became the basis for *Title 1* funding (Gordon, 2008). The federal government used NCLB to establish standards-based reform and performance outcomes as part of its influence on K-12 education (Goertz, 2005).

President Barack Obama reauthorized ESEA and signed the *Every Student Succeeds Act of 2015* (ESSA) into law (Cook-Harvey et al., 2016). ESSA remains the current national law on education (Fránquiz & Ortiz, 2016). An important aspect is a shift from federal to state authority over education (Malin et al., 2017; Sharp, 2016). This change was in response to school district complaints about the federal government dictating school improvement models that did not fit local situations (Ferguson, 2016). ESSA requires each state agency to submit a plan that comprises its vision and implementation of the law’s requirements (Black, 2017). Each state plan should include details of high academic content standards, communication policies with families, students, and communities about statewide assessments, and a system of school accountability to help ensure improved outcomes for all students (MADESE, 2017).

The Commonwealth of Massachusetts received approval of its ESSA plan from the US DoED in 2017. One section of Massachusetts' plan addressed strengthening learning standards, curriculum, and instruction (MADESE, 2017). Massachusetts' *Learning Standards* consist of an outline about what students should know and be able to demonstrate. School districts create curriculum documents and include an instructional pathway to achieve the learning standard (Hollins & Reiss, 2016). The *Common Core State Standards for Literacy in Science and Technical Subjects* (CCSS), *Next Generation Science Standards*, and *A Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas by the National Research Council* guided the creation of the *Massachusetts Science, Technology, and Engineering Curriculum Framework* (MADESE, 2016a).

The new state framework included a set of science and engineering practices deemed necessary for students to engage in scientific inquiry (National Research Council, 2012). These defined practices consist of skills developed through instruction and overlap with the *Massachusetts Curriculum Frameworks for English Language Arts and Literacy and Mathematics* (MADESE, 2016a). Using these practices could allow students to strengthen their science literacy and become critical consumers of scientific information (Duschl & Bybee, 2014).

**Science Literacy**

Science education reform requires teachers to communicate science through literacy (Pelger & Nilsson, 2016). Students who possess strong literacy skills think about what they read by questioning, interpreting, and evaluating to construct meaning (Harvey & Goudvis, 2007). A student who has science literacy knows more than just science content (Chen, 2019). Science literacy requires science-specific skills, including an understanding of the scientific method, inquiry, design, and communication (Yore et al., 2007). Additionally, students must possess the ability to analyze, interpret, construct, and critique science texts (Pearson et al., 2010). Students who do not meet the demands of science literacy skills struggle in the science classroom (Drew & Thomas, 2018). Developing these skills using science content could help build a student's science literacy while also improving their science achievement (Koomen et al., 2016). The *Language and Literacy Appendix* in the *Massachusetts Science, Technology, and Engineering Curriculum Framework* includes information about how literacy skills support students in building and applying scientific knowledge (MADESE, 2016a).

**Reading Comprehension**

Reading comprehension aids in creating understanding from content (McGlynn & Kelly, 2018). Students who use comprehension skills compare, evaluate, and interpret ideas and information to increase content understanding (Lesaux, 2012). A student's background knowledge about words and concepts affects reading comprehension skills (Daly, 2015). This skill integrates background knowledge and contextual knowledge to make sense of a text (Reardon et al., 2012). Adolescents need reading instruction and support when reading rich, dense, complex text (Fang & Wei, 2010). The nature of science materials makes them difficult to read (National Governors' Association, 2005). Elements, genre, and vocabulary found in science-based texts increase their level of difficulty (Gallagher et al., 2017). Science texts have technical terms and mathematical language making concepts more difficult to understand (Otero et al., 2002).

## Reading Comprehension Instruction

Reading comprehension instruction benefits all students (Ness, 2009). Researchers who conducted a study on the efficacy of reading comprehension strategy instruction with sixth- and seventh-grade students in English language arts classrooms found positive results (Vaughn et al., 2011). Furthermore, reading instruction in science can improve students' understanding and learning (Barton et al., 2002). Teachers have a critical role in students' reading comprehension development (Hilden & Pressley, 2007). Readers construct new knowledge from what they read, and this knowledge remains influenced heavily by what readers know from personal experience (Davis & Vehabovic, 2018). Effective reading comprehension instruction involves identifying and addressing relevant reading comprehension strategies and skills (Catts & Kamhi, 2017).

## Reading Comprehension Strategies

Palincsar and Brown (1984) developed an interactive method of instruction to guide struggling learners in reading comprehension skills known as reciprocal teaching. Reciprocal teaching is a scaffolded, student-centered reading comprehension strategy creating a dialogue between teacher and students (Arif, 2016). Scaffolded instruction describes a guidance system given to the student temporarily and removed when a need for support no longer exists (Boblett, 2012). Teachers focus on specific reading comprehension strategies students can apply when reading new text (Rosenshine & Meister, 1994). Teachers model appropriate strategies, ask questions, encourage student interactions, and provide feedback to scaffold learning (Gruenbaum, 2010). Teaching reading comprehension strategies effectively includes the teacher's gradual release of responsibility to the students (Shanahan, 2005). Each student takes the role of predictor, questionnaire, clarifier, or summarizer and takes turns discussing the learning strategy employed (Oczkus, 2013). Students collaborate to make meaning of the content they read (Agoro & Akinsola, 2013). Reciprocal teaching allows a concentration on small-group learning with the following four thinking strategies: Predicting, questioning, clarifying, and summarizing (Duke & Pearson, 2009).

The reciprocal teaching strategy aims to improve student comprehension in dialogue with their peers and individual assessments. The reciprocal teaching reading comprehension strategy yields exponential reading growth for all students (Oczkus, 2003). Researchers identified reciprocal teaching as one of the most successful instructional practices in the decade following its introduction (Bruer, 1993). This instructional method proved effective for diverse groups of pre-readers, students with limited comprehension and decoding skills, English language learners, and students with learning disabilities (McAllum, 2014).

## Problem Statement

The *Massachusetts Science, Technology, and Engineering Framework* consist of integrating literacy skills into the standards. According to the standards, science teachers must support student understanding of concepts by teaching reading comprehension

(MADESE, 2016a). Although current research includes information about how teaching literacy across disciplines enhances content learning, little empirical work exists on how secondary teachers learn to teach discipline-based literacy (Dillon et al., 2010).

Although new standards require science teachers to use instructional strategies to support literacy in the classroom, secondary science teachers may not provide adequate instructional support for their students to build the needed reading comprehension (Drew & Thomas, 2018). Science teachers must adapt literacy strategies to teach content (Gillis, 2014). *The National Reading Panel Report: Practical Advice for Teachers* included information to enhance teacher awareness of reading comprehension strategies and knowledge of how to apply them (Shanahan, 2005).

Many middle school students cannot convert their ability to read words into comprehension when reading a science text (Snow, 2010). Students regurgitate memorized information and lack understanding of what they have read and what it means (McGlynn & Kelly, 2018). Science teachers often feel uncomfortable or unprepared to teach literacy skills (Moje, 2008) and believe English or reading teachers have the responsibility to teach reading comprehension (Drew & Thomas, 2018). Middle school science teachers cite a lack of training and professional knowledge as barriers to teaching reading comprehension in the classroom (Ness, 2009).

**Audience**

School leaders are vital in improving student achievement (Espinoza & Cardichon, 2017). School leaders support teacher learning, intending to improve student achievement (Whitworth & Chiu, 2015). After teachers, principals are the most important factor associated with student achievement (Seashore et al., 2010). School leaders and teachers share responsibility for successfully implementing education reform (Yoon, 2016). One section of Massachusetts' ESSA addressed strengthening learning standards, curriculum, and instruction (MADESE, 2017). Principals need to understand the elements of good science instruction and practice to supervise effectively pedagogical improvements (McNeill et al., 2018).

Science literacy is a measure of the quality of science education (Rubini et al., 2016). Science teachers who understand the nature and development of scientific knowledge demonstrate these enhancements in their classroom instruction (Peacock et al., 2016). Integrating science literacy into the classroom is important in teaching and learning science (Kok-Sing, 2016). Teachers who use literacy strategies in the classroom help students develop competency when selecting and applying information (Meseșan, 2019). Students taught science literacy skills gain support in formulating ideas, sharing thoughts, understanding content, and solving problems (Krajcik & Sutherland, 2010). To help all students succeed, science teachers should support developing students' literacy skills (Ivey, 2002).

**Significance of the Study to Leadership**

Increasing the ability of science teachers to develop the literacy needs of adolescent students requires a commitment and investment from school leaders (Goldman, 2012). Effective instructional leaders have an integral role in school improvement (ten Bruggencate et al., 2012). Quality instructional leaders need high levels of knowledge and understanding about curriculum, instruction, and assessment

(Southworth, 2002). Effective school principals create a link between school leadership and student achievement (Bush & Glover, 2014). School leaders affect student achievement by influencing teachers' motivation and working conditions (Seashore et al., 2010). Effective leaders collaborate with teachers on research-based strategies to improve teaching and learning (Mendels, 2012). Participating in shared instructional leadership requires ongoing discussions between school leaders and teachers about curriculum, instruction, and assessment (Marks & Printy, 2003).

## Purpose of the Study

The purpose of this study is to explore the experience of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into their classrooms. The researcher's goal was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom. The information gained from this research may provide these teachers with a method to integrate the practices outlined in the *Massachusetts Science, Technology, and Engineering Framework* into the classroom to strengthen students' science literacy skills.

## Methodology and Research Design Overview

In this study, the researcher used a qualitative methodology with a descriptive single case study research design. Qualitative research, an inductive method, allows researchers to form generalizations based upon specific insights into a situation (Levitt et al., 2017). Qualitative researchers understand there are a variety of ways to make sense of the world and demonstrate an interest in those participating in research to discover meaning (Jones, 1995). The purpose of qualitative research is to aid in the exploration, description, and interpretation of the phenomenon from the point of view of participants studied to create meaning (Mohajan, 2018).

Researchers using qualitative case studies gain opportunities to explore or describe a phenomenon in real-life situations (Baxter & Jack, 2008). It is the recommended method to apply for areas of interest using naturally existing information from individuals or those involved in interactions within the scope of the study (Hercegovac et al., 2019; Hyett et al., 2014). Additionally, qualitative case studies are effective when the research and data collection occur in the participant's setting (Creswell & Creswell, 2017). A qualitative case study is an approach that focuses on an issue using multiple sources of evidence (Noor, 2008). The main goal of qualitative case study research is to complete an in-depth study of an issue, within its context, and understand it from the point of view of the participants (Sharan, 1980; Simons, 2009; Stake, 2006; Yin, 2017).

A descriptive single case study research design is the foundation of this research study. Single case study research is an investigative and analytical technique meant to capture the complexity of one object of study (Stake, 1995). The single case study design is relevant in the educational field when the researcher wants in-depth knowledge of an individual sample (Yin, 2017). This single case study consists of middle school science teachers from one private, independent school for girls in grades six through twelve in a suburb south of Boston. The researcher used a purposive sampling strategy with two middle school science teachers utilizing the reciprocal teaching reading instructional strategy. The researcher collected data using semi-structured interviews and classroom observations.

The researcher conducted two separate interviews with each participant. The initial interview occurred before using the reciprocal teaching strategy in the classroom to focus on the first two research questions. Each teacher responded to questions about the definition of science literacy and their experience with literacy instructional strategies. The final interview took place after using the reciprocal teaching strategy and focused on the third research question. Each teacher responded to questions centered on their perceptions using reciprocal teaching regarding ease of use to teach, benefits, difficulties, and student impact of using the instructional strategy to teach reading comprehension. Each recorded interview took place over Google Meet at a mutually agreed upon date and time.

Observations are useful in research as a source of evidence (McCutcheon, 1981). Researchers can combine observation data with interview data to gain perspective or in-depth information about a research question (Strøm & Fagermoen, 2012). It is vital to use observations in case studies involving classrooms to help researchers understand individuals' interactions (Hays, 2004). Within the first six weeks of the school year, each teacher was observed three times. The researcher took field notes while observing. Field notes consist of a worksheet including information such as date, location, type of setting, time in setting, and a two-column table for observations and observer's comments (Marshall & Rossman, 2016). Field notes could help describe the context and enhance data collection (Phillippi & Lauderdale, 2018).

## Research Questions

The following research questions investigated in this research study consist of:

1. Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy?

2. Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?

3. After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?

## Theoretical Framework

Four related learning theories provide the basis for the reciprocal teaching reading comprehension strategy (Rosenshine & Meister, 1994). Palincsar (1991) based reciprocal teaching on Vygotsky's zone of proximal development (ZPD) (Vygotsky, 1978), scaffolding (Wood et al., 1976), cognitive apprenticeship (Collins et al., 1989), and proleptic teaching (Brown & Palincsar, 1989; Palincsar, 1991). Teachers using reciprocal teaching explicitly model reading comprehension strategies with cooperative learning groups and intentionally fade support as the learner's competency increases (Palincsar & Brown, 1987). During reciprocal teaching, the teacher's role is to exemplify the thinking that occurs during reading and promote student independence (Seymour & Osana, 2003). This strategy enables learning through social interaction, the social construction of knowledge, and collaboration (Brown et al., 1989).

## Zone of Proximal Development

Palincsar and Brown (1984, as cited in Rosenshine & Meister, 1994) grounded reciprocal teaching in Vygotsky's sociocultural theory. The sociocultural theory focuses on the critical role social interaction plays in cognitive development (Vygotsky, 1978). Social interactions rely on language (Alves, 2014). Written and oral language used in social communication internalizes and regulates thinking (Eun, 2019). Social settings provide a cooperative learning forum for all group members (Palincsar & Brown, 1987). Cooperative learning settings can result in improved, measured outcomes (Sharan, 1980).

According to Vygotsky, social situations contribute to developing language analysis, thought, and concept formation (Mahn, 1999). The central concept of Vygotsky's theory is the ZPD (Eun, 2019). The ZPD is the difference between what a student can do without help and what they can do with assistance (Siyepu, 2013). It is the gap between a student's actual intellect and their intellect after receiving help (Shoaib, 2017). The nature of the interactions between participants in the ZPD is the critical factor for enhancing cognitive development (Vygotsky, 1978).

Vygotsky suggested most learning occurs within the ZPD because that is where students stretch their capabilities with help and support from a more capable person (Danish et al., 2017). Vygotsky contended the process of critical thinking occurrs through social interaction (Kapon, 2016). He also noted the importance of instruction to increase student concept formation and development (Adams, 2015). The sociocultural theory exists in science classes where students work with teachers (or more competent peers) who model literacy skills (Tracey & Morrow, 2012). Unfortunately, Vygotsky did not detail instructional strategies within the ZPD (Rosenshine & Meister, 1994). The ZPD provides the conceptual framework for guided learning, while scaffolding supplies the strategic framework for implementing strategies to support the learning (Sharma & Hannafin, 2007).

### Scaffolding

Wood et al. (1976) first used the term scaffolding as a metaphor in the context of learning and the conceptual work of Vygotsky (1978) developed it further (Dennen, 2004). During scaffolding, an expert performs as a guide to a novice by providing support for learning until the need for support no longer exists (Rosenshine & Meister, 1994). An essential feature of scaffolding is the gradual fading of support as students become increasingly able to complete the task alone (Hammond & Gibbons, 2005). As DeVries cited (2000), Palincsar and Brown noted the importance of structured dialogue and described the teacher's role in scaffolded instruction as students move towards understanding written texts. The gradual elimination of support is a key distinction between scaffolding and other forms of support (Sharma & Hannafin, 2007). Through the scaffolding process, students gain a more active, supportive, and strategic approach to reading comprehension (Stone, 1998).

### Cognitive Apprenticeship

Collins, Brown, and Newman developed the theory of cognitive apprenticeship (Ghefaili, 2003). Similar to scaffolding, cognitive apprenticeship is a model of instruction focused on learning through guided experience (Collins et al. 1991). During a cognitive apprenticeship, students learn cognitive and metacognitive skills and processes from a more experienced person (Dennen & Burner, 2008). Learning occurs as experts and novices interact socially while focusing on completing a task (Dennen, 2004). Understanding the learner's role is essential in the expert-novice conversations related to student learning goals (Sharma & Hannafin, 2007). Teaching and learning through cognitive apprenticeship require the expert to make the process visible so learners can watch and then practice the observed skills (Collins et al., 1989; Seymour & Osana, 2003). Reciprocal teaching exemplifies cognitive apprenticeship (Collins et al., 1991), and cognitive apprenticeship supports the learning that occurs during reciprocal teaching (Seymour & Osana, 2003). Instructional strategies supporting the theory of cognitive apprenticeship include modeling and scaffolding (Collins et al., 1989).

## Proleptic Teaching

Proleptic teaching is teaching in anticipation of competence (Brown et al., 1991). Proleptic teaching focuses on the student as a participant in the learning activity (Palincsar, 1984). A proleptic teacher is someone who believes learners can reach high goals regardless of their perceived abilities (Seymour & Osana, 2003). The reciprocal teaching reading comprehension strategy demonstrates proleptic teaching due to its gradual transfer of responsibility from teacher to the student regardless of where the learner may be in their development (Palincsar, 1984; Seymour & Osana, 2003). In the reciprocal teaching reading comprehension strategy, novices participate in a group activity before performing the skill without assistance while receiving support by observing and learning from an expert and the group (Palinscar & Brown, 1989).

The theories of the ZPD, scaffolding, cognitive apprenticeship and proleptic teaching are the basis for reciprocal teaching (Brown & Palincsar, 1989; Palincsar, 1991; Seymour & Osana, 2003). The instructional goal of reciprocal teaching is to facilitate learning and understanding of the text using modeling, scaffolding, and dialogue between teacher and students, or among peers (Yilmaz, 2011).

## Study Limitations

Study limitations are potential weaknesses beyond the researcher's control (Theofanidis & Fountouki, 2018). In this qualitative single case study, the researcher will rely on purposive sampling data to explore the experience of middle school science teachers at an independent school for girls who integrate the reciprocal teaching reading comprehension strategy into the classroom. For research focused on a single case, the issue of generalizability arises (Hodkinson & Hodkinson, 2001; Merriam & Tisdell, 2015). In qualitative case studies, findings can be difficult to validate (Baškarada, 2014). Common criticisms of qualitative research include researcher bias, subjectivity, and a lack of generalizability because a large amount of data is about a specific phenomenon (Koch & Harrington, 1998).

The purposive sampling method is a nonrandom selection technique used when researchers select participants based upon similar qualities or experiences among participants (Etikan et al., 2016). Purposive samples create researcher bias because the researcher's judgment guides the selection process (Sharma, 2017). The researched selected where to conduct the study and what grade level teachers to focus the study.

Semi-structured interviews rely on the vision, integrity, knowledge, and skill of the researcher (Rabionet, 2011). The data collected from participants during semi-structured interviews rely on the training and experience of the interviewer (Dingwall et al., 1998). In an attempt to mitigate the limitation, participant interviews were supplemented with participant observations. Using more than one data collection instrument helps validate research findings (Alshenqeeti, 2014).

## Study Delimitations

The researcher establishes the conditions for study delimitations (Theofanidis & Fountouki, 2018). The scope of this qualitative descriptive research study is limited to one private school in a suburb near Boston. This school is an independent school for girls in grades sixth through 12th. The study has two middle school science teachers employed during the 2021-2022 academic year. The independent school for girls is small with only several teachers available to interview. Single case study research may not produce a generalizable conclusion (Zainal, 2007). The findings and results may not necessarily transfer to other context areas, grade levels, subjects, locations, or a future time.

## Definitions of Key Terms

*Disciplinary literacy*: Instruction of reading skills, strategies, and concepts within content area classes (Shanahan & Shanahan, 2008).

*Reading comprehension*: The ability to read text with understanding (Snow, 2002).

*Reciprocal teaching*: A literacy instructional method developed through four comprehension monitoring strategies: summarizing, questioning, predicting, and clarifying (Palincsar & Brown, 1984).

*Science literacy*: The ability to read and write by using and understanding science content (DeBoer, 2000; Norris & Phillips, 2003; Roberts, 2007).

## Chapter Summary

Chapter 1 includes information about the background and reauthorization of the *Elementary and Secondary Education Act of 1965*. For almost 60 years, this historic act has established guidelines for educational funding, a national standards-based curriculum, and annual testing for greater school accountability (Bishop & Jackson, 2015). Its most recent iteration is the *Every Student Succeeds Act of 2015* and allows states to control educational policy (Sharp, 2016). In 2016, the Massachusetts Department of Elementary and Secondary Education released the *Science, Technology, and Engineering Curriculum Frameworks*. Embedded within the curriculum framework is language focusing on developing students' literacy skills (MADESE, 2016a).

A key science education objective is developing students' science literacy (Dragos & Mih, 2015). As a result, Chapter 1 also includes a description of science literacy and the importance of reading comprehension skills to increase content understanding. Reciprocal teaching is a reading comprehension instructional strategy (Palincsar & Brown, 1984). Exploring the experience of middle school science teachers at an independent school for girls who integrate the reciprocal teaching reading comprehension strategy into their classroom may provide insight for other science teachers and administrators as to how to implement the *Frameworks* into the classroom. Finally, the chapter includes information about the significance of the study to leadership, research design, theoretical framework, limitations, and delimitations of the study.

The literature review presented in Chapter 2 includes empirical studies focusing on science literacy and begins with a historical perspective of the government's role in education and the significance of the *Curriculum Frameworks* developed by Massachusetts and noted above. The chapter concludes with research about reading comprehension and the reciprocal teaching reading comprehension instructional strategy.

# CHAPTER 2: LITERATURE REVIEW

The purpose of this study is to explore the experience of middle school science teachers who integrate the reciprocal teaching reading comprehension strategy into the classroom. The goal of the research study was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom.

As previously noted, the National Center for Education Statistics (2010) wrote in its NAEP report, that eighth-grade students' literacy progress has remained low over the past 40 years. Research shows secondary students struggle to read complex material with technical vocabulary and concepts (Haynes, 2011). Literacy skills are integral for building content knowledge in science (Shiverdecker & Fries-Gaither, 2014). Adolescent students need direct instruction in reading and writing to build literacy skills (Carnegie Council on Advancing Adolescent Literacy, 2010). The reciprocal teaching reading comprehension strategy is an instructional strategy used to reinforce reading skills of predicting, questioning, clarifying, and summarizing (Palincsar & Brown, 1984). This study focuses on science literacy as reading, interpreting, and evaluating science content to generate understanding (DeBoer, 2000; Norris & Phillips, 2003; Roberts, 2007).

Students can learn reading comprehension skills (Shanahan, 2005). Disciplinary literacy uses strategies from each discipline to highlight how to use specific language, make arguments, organize texts, hold conversations, and construct meaning (Deane et al., 2015). Building science knowledge through disciplinary literacy allows students to learn science as a process and discipline (Moje, 2008).

The review of literature begins with an overview of the history of federal and state policy to establish the connection between school reform and literacy education. The literature reviewed as part of the study includes sources from peer-reviewed articles, books, dissertations, Internet sources, and government statistics. Google Scholar and City University of Seattle's online library served as repositories to access information. The literature review includes empirical research related to discipline-based literacy, science literacy, reading comprehension, reading comprehension instruction, and reciprocal teaching.

## Federal Policy and Literacy

Improving literacy instruction through educational policy is common (Shanahan, 2014). ESEA, passed by the U.S. Congress in 1965, defined the federal government's role in education and emphasized standards and accountability (Paul, 2016). The law increased federal funding in schools to improve academic achievement for low-income and disadvantaged students (Black, 2017). Federal lawmakers expanded funding for supplemental services that targeted disadvantaged children in a new program called *Title 1* (Gordon & Reber, 2015). Some school districts hired reading specialists with the increased funds (Borman et al., 2001). Title 1 students had access to additional reading instruction in small group reading programs taught by a reading specialist (Shanahan, 2014).

Beginning in 1969, the federal government required Title 1 program schools to participate in NAEP tests to monitor reading, mathematics, and science achievement (Bandeira de Mello et al., 2015). Between 1965 and 1980, Congress amended ESEA four times (McDonnell, 2005), but Title 1 funds for improving disadvantaged students' academic achievement remained a central feature each time (Skinner & Kuenzi, 2015).

According to NAEP tests, progress in reading achievement remained limited despite a rise in funding (Planty et al., 2009). In 1983, a report commissioned by the Department of Education entitled, *A Nation at Risk: The Imperative for Educational Reform*, raised concerns about high school graduates unable to compete with those from other nations (Harris et al., 2016). The report highlighted the fact that 13% of all 17-year-olds in the United States were functionally illiterate (Jorgensen & Hoffmann, 2003). Findings from this report contributed to a sense of crisis in education and provided a further rationale for education reform (Scott, 2011). Challenges described in *A Nation at Risk* still encourage lawmakers to improve student literacy through legislation (Shanahan, 2014).

State standards and accountability to government agencies replaced teacher autonomy over curriculum decisions (Sahlberg, 2016). Lawmakers responded to the claims that students were graduating without reading and mathematics skills by implementing policies that emphasized standards-based accountability (Hamilton et al., 2012). Throughout the 1990s, six states, including Massachusetts, voluntarily used state funding to develop educational standards (Hamilton et al., 2012). The *Massachusetts Education Reform Act of 1993* included language to establish curriculum frameworks with content standards for mastery (Anthony & Rossman, 1994). *The Massachusetts Science and Technology/Engineering Curriculum Framework* is one of seven curriculum frameworks developed during this reform effort (MADESE, 2015). In 1995, the *Science and Technology Curriculum Framework* received approval. Revisions made in 2001, 2006, and 2016 added (and retained) discipline-based literacy requirements (MADESE, 2016b).

In 2001, still dissatisfied with the low rate of student achievement, Congress reauthorized ESEA and renamed it *No Child Left Behind* (NCLB; Davidson et al., 2015). This law significantly expanded the federal government's role in educational policymaking (Steinberg & Quinn, 2017). NCLB required each state to create a standards-based accountability system that included standards, assessments, and student performance targets (Kenna & Russell, 2018). Using a developed state system, NCLB mandated that school districts have all students meet proficiency targets by 2014 (Welner, 2005).

Under NCLB, the federal government expanded Title 1 funding and established a new early literacy curriculum and instructional programs such as the *Reading First Initiative* and the *Early Reading First* program (Shanahan, 2014). Legislators who authored NCLB emphasized early literacy (Husband & Hunt, 2015). Congress dedicated a substantial amount of federal funds to improve young children's reading skills (Haynes, 2011). In 2008, amid allegations of impropriety concerning how states received grants, Congress defunded the *Reading First* program (Loewus, 2016).

Policies connected to standardized test-based accountability influenced the curriculum but led to only a slight improvement in student achievement (Mintrop & Sunderman, 2009; Valli & Buese, 2007). Under NCLB, each state sets standards, assessments, and performance levels for students (Haynes, 2011). A lack of consistency in how states set standards created differences in student achievement (Neal & Schanzenbach, 2010). Pressures related to NCLB assessment and accountability procedures increased the demand for national standards (McGuinn, 2015).

In 2009, the National Governors Association and the Council of Chief State School Officers agreed to the development of common national standards in core academic subjects (National Governors Association Center and Council of Chief State School Officers, 2010; Shanahan, 2014). In 2010, states began to adopt the *Common Core State Standards* (CCSS) *for K-12 English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects, and Mathematics* (Lee, 2017). The CCSS includes standards for mathematics and English language arts and literacy and standards-aligned practices related to the standards (Opfer et al., 2017). The documents consist of academic goals and standards, but curricula and instruction are under state and local control (McArdle, 2014). The CCSS does not detail instructional strategies for standards or standards-aligned practices (Shanahan, 2014).

Creating national standards proved difficult because of the complexities of academic standards previously set by states (Haynes, 2011). For example, Massachusetts already set high standards; therefore, the new national standards needed to be equal or greater than a state's current standards (Bidwell, 2014). To encourage states to adopt the

CCSS, the Obama administration offered *Race to the Top* (RTTT) federal grants (McGuinn, 2012). In 2010, the state Board of Education in Massachusetts, along with state boards in 47 other states, adopted CCSS. However, in 2015, Massachusetts voted to move away from CCSS because of declining scores in almost every category of the 2015 NAEP test (Amselem, 2015).

NCLB's key goal was that each state bring 100% of its students to proficiency on state-developed exams by the 2013-2014 school year (Davidson et al., 2015). As it became evident that NCLB's goal was unachievable, the Obama administration granted waivers for 43 states and the District of Columbia (Saultz et al., 2017). In December 2015, President Obama signed the *Every Student Succeeds Act* (ESSA), reversing the federal role in educational policy and returning authority for educational reform to individual states (Sharp, 2016). Under ESSA, Title 1 funding received a $500 million increase and a 20% increase in literacy grant programs (Loewus, 2015). State lawmakers gave school districts the discretion to use ESSA literacy grants based on individual needs (Loewus, 2016).

Researchers suggested that the most significant policy shift from NCLB to ESSA is that individual states have taken a more holistic approach to accountability and relying less on standardized test scores (Darling-Hammond et al., 2016). State lawmakers now have more control of the metrics used to hold schools accountable for student performance (Ferguson, 2016). For lawmakers, discipline-centered literacy is a policy concern (Lee & Spratley, 2010). States could improve every student's academic achievement (Weiss & McGuinn, 2016). In March 2017, the Massachusetts Board of

Elementary and Secondary Education voted unanimously to adopt revised, state-specific learning standards in mathematics and English language arts and literacy (MADESE, 2017).

## Science Literacy

The Massachusetts Department of Elementary and Secondary Education (2019) must create a vision, lead work to advance teaching and learning, and adopt superior academic standards (Weiss & McGuinn, 2016). Massachusetts set a literacy vision for core instruction that supports teaching literacy in content areas. Understanding literacy within disciplines allows teachers to teach literacy practices, help students read text, and foster the skills of the discipline (Frankel et al., 2016).

Literacy skills are essential for success in school and life (Zygouris-Coe, 2012). Literacy is a set of practices developed over time that include reading, writing, speaking, and listening (Frankel et al., 2016). Norris and Phillips (2003) focused on the fundamental skills of reading and the knowledge of science content to describe science literacy. To enhance the definition of science literacy, it could include more than students memorizing content (Chen, 2019). Language-based actions such as reading, writing, speaking, and thinking are the foundation of learning science (Karademir & Ulucinar, 2017).

Education policy indicates an essential outcome of science education is science literacy (Fives et al., 2014). The *Massachusetts Science, Technology, and Engineering Curriculum Framework* focuses on understanding and applying concepts and developing students' literacy skills (MADESE, 2016a). Curriculum frameworks contain specific instructional goals but do not provide instructional methods to reach those goals (Goldman et al., 2016). Having science literacy as an instructional outcome requires science teachers to strengthen their ability to teach literacy practices in the discipline (Fang & Wei, 2010).

Literacy processes differ according to the discipline (Frankel et al., 2016). Each academic discipline has a specialized way of communicating (Tang, 2016). Discipline-based literacy builds content knowledge (McConachie et al., 2006). Norms and practices from each discipline show uniqueness in language, text, and the ability to create meaning (Deane et al., 2015). Reading and writing in science differ from other disciplines (Shanahan & Shanahan, 2008). Reading and writing are essential to learning science (Phillips & Norris, 2009). In science, phenomena have a clear definition and undergo systematic research to provide empirical evidence before making a claim (Moje, 2008). Students need science literacy skills to research, design, and conduct investigations while analyzing information and claims from others' scientific research (Frankel et al., 2016). Students have meaningful science literacy experiences when they read, write, speak, and think about science (Shiverdecker & Fries-Gaither, 2014).

Reading is essential for science literacy (Creech & Hale, 2006). Scientifically literate students make connections between the language of science and science concepts written in text resulting in science knowledge (Pearson et al. 2010). Science teachers should help students read, write, speak, and listen in the context of science (Tang, 2016). Classroom practices should encourage students to learn from reading, writing, speaking, and listening to science texts (Taylor & Kilpin, 2013). Recent approaches called for a change in how science teachers develop students' literacy (Drew & Thomas, 2018). Reading and writing in science requires an understanding of conventions used in the discipline, including synthesizing complex information, asking questions, planning, carrying out investigations, analyzing and interpreting data, following procedures, being attentive to details, designing solutions, constructing explanations, and making and assessing arguments (MADESE, 2016a).

## Reading Comprehension

Reading is an interactive process in which readers construct meaning from text using effective reading strategies (Pourhosein et al., 2016). Researchers concluded that comprehension is the most important element when reading (Block et al., 2002). Reading comprehension is an essential and complex literacy skill (Catts & Kamhi, 2017; Snow, 2010). Comprehension includes understanding structure, recalling information, identifying themes, constructing ideas, and engaging in higher-order thinking (van den Broek & Kremer, 2000). Studies indicate a significant number of adolescents cannot understand complex texts (Vaughn et al., 2011). According to NAEP, 70% of middle and high school students score below a proficient level in reading achievement (Haynes, 2011). For middle school students, a lack of understanding and interpretation of information while reading creates difficulty in learning new content (Spires et al., 2018). Students who do not meet the increasing demands to read, write, speak, and listen will be less likely to succeed academically (Drew & Thomas, 2018). A student's ability to read and comprehend text is a key predictor of science achievement (American College Testing, 2006).

Reading comprehension is the result of the interaction between knowledge, strategies, and goals (Lee & Spratley, 2010). The purpose of reading is to construct meaningful patterns from words, sentences, and paragraphs from the text and make connections to build understanding (Lee & Spratley, 2010). Skilled readers have comprehension skills to make inferences, draw conclusions, evaluate sources, interpret information, and integrate ideas from complex texts (Lesaux, 2012). Texts within each discipline have specific content language and a unique structure (Schleppegrell, 2004). Reading science content is different than reading other material (Wright et al., 2016). Reading and understanding science require skills needed to comprehend exposition, argumentation, and procedural text (Saul, 2006). Science has a unique language (Warren, 2013) and its texts have the technical vocabulary and subject-specific syntax (Lee & Spratley, 2010). Students who struggle reading may be less able to comprehend and interpret science texts (Tate et al., 2012). Science teachers must incorporate reading comprehension strategies into classroom practice so that students' ability to read the text and communicate scientifically increases (Greenleaf et al., 2013).

Understanding written texts depend on a dynamic relationship between the reader's goals and the text's demands (Lee & Spratley, 2010). When readers miss general meanings in the text (e.g., inferences, hypotheses, assumptions, or conclusions) they also miss understanding science concepts (Norris & Phillips, 2003). Students who read science should focus on specific wording to interpret the author's findings (Norris & Phillips, 2003). Science is a reflective process that includes many steps (Klucevsek, 2017). As students read a scientific text, they make and revise predictions and use cues to make inferences (Lee, 2014). Reading comprehension is therefore a combination of reader, text, and purpose (Catts & Kamhi, 2017).

Reading comprehension is not improving while the complexity of texts is increasing (Spires et al., 2018). Unfortunately, improvement in early reading does not guarantee students will understand specialized texts as adolescents (Lee, 2007). Adolescent readers may lack comprehension skills and strategies for engaging with complex text and concepts (Gabriel & Wenz, 2017). According to Uccelli et al. (2015), reading comprehension difficulties result from students not understanding the text's academic language. Using scientific vocabulary increases the complexity of a text (Gallagher et al., 2017). As students move through school, reading and writing should become more discipline-focused to support increased student needs while reading content-specific texts (Shanahan & Shanahan, 2008). Students need explicit instruction to learn the comprehension strategies needed to read science successfully (Pearson et al., 2010). Instruction for engagement with content-rich texts and specialized vocabulary is necessary for middle and high school students (Snow, 2010).

## Reading Comprehension Instruction

In the late 1990s, a national shift in instructional methodology from a small group 'pull-out instructional model to instruction in-class resulted in teachers viewing reading specialists as a resource (Bean et al., 2015). Policy influenced what teachers taught but failed to improve how they taught (Coburn et al., 2016). Education reform imposed school change but lacked details about implementation (Harris, 2011). According to the ACT's *College Readiness in Reading Executive Summary* (American College Testing, 2006), very few secondary teachers teach reading skills or strategies. Secondary school teachers do not have the training to support science-specific instructional methods of literacy (Pearson et al., 2010). The challenge is for educators to balance science content and other important goals of science teaching (DeBoer, 2000).

Reading comprehension instruction is beneficial for all students (Ness, 2009). Teachers have an important role in supporting reading comprehension (Duke et al., 2011), with the most effective way to build student comprehension of text being direct instruction in reading comprehension strategies (Ness, 2011). Students encounter specific challenges when reading science texts (Lee & Spratley, 2010), primarily the academic language of science (Snow, 2010). Science teachers must provide students access and support when reading science texts (Carnegie Council on Advancing Adolescent Literacy, 2010). Science teachers have content-specific knowledge and should use comprehension strategies to engage students in disciplinary discourse (Buehl, 2017). As a result of skills developed from reading, writing, and understanding science texts, content-area teachers can model discipline-specific skills and practices students need to read, understand, and engage with science content (Gabriel & Wenz, 2017). High-quality instruction may increase a student's proficiency with academic language (Uccelli, 2015).

## Reciprocal Teaching

Science teachers' effectiveness is evident in students' success (Owens, 2009). The best way to support teaching and learning in science is by intentionally planning literacy strategies during instruction (Dew & Teague, 2015; Gallagher et al., 2017; Ness, 2011). Comprehension strategies are purposeful actions students take while reading to improve their understanding of the text (Shanahan, 2005). Reciprocal teaching is an instructional strategy using scaffolded discussion to strengthen comprehension (Oczkus, 2013). Palincsar and Brown (1984) initially designed this technique for small group tutoring with students who were strong decoders but had poor reading comprehension skills. Reciprocal teaching uses the comprehension strategies of predicting, questioning, clarifying, and summarizing coupled with ongoing communication between teacher and students, or students and students to make meaning of the text (Hacker & Tenent, 2002).

Palincsar and Brown (1984) developed reciprocal teaching to help struggling readers develop stronger reading comprehension skills. This cooperative learning method centers on the idea that knowledge and comprehension are byproducts of purposeful classroom interactions (Palincsar & Brown, 1984). During reciprocal teaching, groups of students work together to read and co-construct a text's meaning (Tarchi & Pinto, 2016). Teachers model appropriate strategies, ask questions, encourage student interactions, and provide feedback to scaffold learning (Gruenbaum, 2010).

Comprehension is best supported when students have a specific purpose for reading (Guthrie, 2004). The reciprocal teaching instructional strategy focuses on four reading comprehension strategies: predicting, questioning, clarifying, and summarizing (McAllum, 2014). Predicting helps motivate students and provides a purpose for their reading (Stricklin, 2011). Students make predictions about main and supporting ideas based upon their previous knowledge and experience (Pilten, 2016). During prediction, students activate prior knowledge and generate hypotheses to self-monitor their comprehension (Gruenbaum, 2012). Clarification happens after reading when students critically evaluate the text (Palincsar & Brown, 1984). During this step, students use metacognition to monitor comprehension (King & Johnson, 1998).

Metacognitive thinking during clarification allows students to reflect on which tools help them gain the most understanding (Block & Pressley, 2007). When questioning, students focus on the text's main ideas by creating questions about what they read (Pilten, 2016). Questioning may rely on the reader to make inferences while reading (Gruenbaum, 2012). Finally, summarizing teaches students to reduce the text to the essential information (Shanahan, 2005). Creating a summary involves explaining a text's details in a concise way (Duffy, 2003). Students learn best when actively engaging with content (Pearson et al., 2010; Spires et al., 2016). Science learning occurs when students engage with the language of science (Karademir & Ulucinar, 2017).

Teaching reading comprehension strategies effectively includes the teacher's gradual release of responsibility to the students (Shanahan, 2005). Teachers who use this instructional practice and model the four reading comprehension strategies should gradually shift the responsibility of learning to the students (Rosenhine & Meister, 1994). Watching the teacher replicate thinking that occurs while reading a science text is an effective way for students to learn comprehension strategies (Grant & Lapp, 2011). Gradually reducing teacher support allows students to become more capable of using the reading comprehension strategies (Okkinga et al., 2018). During the transfer of responsibility, teachers provide feedback and encourage student reflection to increase students' competencies (Tarchi & Pinto, 2016).

Teachers explicitly instruct students in reading comprehension strategies to improve reading comprehension (National Reading Panel, 2000). Encouraging student interactions while using the four strategies found in reciprocal teaching may improve reading comprehension (Yang, 2010). Science learning and performance enhancement occur when students engage in academic conversations with their peers (Michaels & O'Connor, 2012). Using oral language supports literacy development (Gabriel, 2020). Peer-to-peer conversations about text can lead to greater student engagement, understanding, and achievement (Nystrand, 2006).

## Summary

Educational policy shapes classroom instruction and methodology (Shanahan, 2014). Literacy demands increase as students move through school (Spires et al., 2018; Tang, 2016). Increased text complexity in science means that reading comprehension instruction is critically important for middle and high school students (Ness, 2009). Science literacy is supported when helping students comprehend science texts (Lee & Spratley, 2010). Meaningful literacy experiences occur when students read, write, and discuss science concepts (Shiverdecker & Fries-Gaither, 2014). Reading comprehension instruction is most effective when focused on a limited number of strategies (Duke & Pearson, 2009). The comprehension strategies of predicting, questioning, clarifying, and summarizing developed in reciprocal teaching improve reading comprehension (Fung et al., 2003; Palincsar & Brown, 1984; Vacca & Vacca, 2005). Researchers studying the reciprocal teaching reading comprehension strategy found positive impacts on students' reading comprehension skills (Raslie et al., 2015).

Chapter 3 includes discussions of the methodology and the appropriateness of the research design used to answer the research questions. The chapter also includes descriptions of the instruments, participants, data collection and analysis, limitations, and delimitations.

# CHAPTER 3: METHODOLOGY

The purpose of this study was to explore the experience of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into the classroom. The goal was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom.

Understanding how middle school science teachers define and support science literacy in the classroom was necessary to explore the experience of integrating reciprocal teaching as a reading comprehension strategy. The researcher gathered information associated with science literacy and reciprocal teaching by conducting research based on the following research questions:

1. Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy?
2. Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?
3. After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?

Chapter 3 details the qualitative methodology of a descriptive single case study research design using semi-structured interviews and classroom observations of participants from one private, independent school for girls in grades sixth through 12th in a suburb south of Boston. The chapter includes a description of the participants, data collection methods, data analysis, limitations, and delimitations.

## Research Method

### Methodology

This study used a qualitative methodology. The choice of which research method to use depends on the research problem (Noor, 2008; Viswambharan & Priya, 2016). The purpose of qualitative research is to understand an experience or situation in a profound, meaningful way (Cruz & Tantia, 2017). Creswell (2016) claimed qualitative research begins when the researcher questions the meaning an individual or groups of individuals give to a social or human problem. Yin (2017) stated qualitative research should address "how" and "why" questions. The qualitative approach allowed the researcher to develop an in-depth understanding of the problem under investigation within its context using various data sources.

Unlike quantitative research that aims to draw a random sample to represent a larger population, qualitative researchers purposefully select participants or sites and focus data collection on interviews, archives, and observations (Creswell, 2016; Ridder, 2017). Qualitative research does not include calculations or statistical analysis (Brink, 1993). Researchers do not bring study participants into a lab or other artificial situations (Creswell, 2016). Qualitative research focuses on words rather than numbers to interpret and make meaning of a situation (Walia, 2015). In qualitative research, the researcher does not control the context (Ridder, 2017); it occurs in a natural setting and allows the researcher to observe and interpret actual experiences (Creswell & Creswell, 2017).

Qualitative researchers may use purposive sampling and semi-structured, open-ended interviews, observations, and documents for data collection and analysis (Creswell, 2016; Dudwick et al., 2006; Gopaldas, 2016).

## Research Design

This researcher used a descriptive single case study research design. This single case study consisted of middle school science teachers from one private, independent school for girls in grades 6 through 12 in a suburb south of Boston. Case study research focuses on a particular issue rather than an entire organization (Noor, 2008). In a single case study, the researcher develops a deeper understanding of specific contexts and creates a more careful examination of existing phenomena (Gustafsson, 2017). Case studies are valuable in practice-oriented fields such as education (Mohajan, 2018; Yin, 2017).

Other major qualitative research genres include narrative research, ethnography, phenomenology, and grounded theory (Marshall & Rossman, 2016). Although these genres may use the same data collection processes such as interviews, observations, documents, and audiovisual materials, Creswell (2016) explains each genre's differences stem from foundational considerations. Narrative research focuses on stories about an individual's life, such as a biography or autobiography. Ethnography focuses on culture and culture-sharing. A phenomenological study focuses on life as lived and seeks to compare those who have had a similar experience (Marshall & Rossman, 2016). The grounded theory seeks to explain social phenomena by working backward (Marshall & Rossman, 2016) and uses a large amount of data from the field to construct a theory

(Creswell, 2016). Because the purpose of this study was not to tell a story about an individual's life, focus on culture or culture-sharing, explore a lived experience, or explain a social phenomenon, narrative research, ethnography, phenomenology, and grounded theory were not selected.

Researchers using a case study design incorporate multiple data sources to provide a detailed account of events in a real-life context (Morgan et al., 2017). Commonly used methods of data collection for case studies include interviews and observations (Yin, 2017). An advantage of interviews and observations is the close collaboration between the participants and the researcher (Crabtree et al., 1999). Researchers explore real-life events in depth and in context using interviews and observations (Yin, 2017). Using the descriptive single case study research design, the researcher can record and analyze multiple data sources to understand how and why events happen within a particular setting (Ridder, 2017).

## Instruments

### Interviews

A qualitative research interview aids in gathering information and knowledge from interviewees based upon their life experiences (DiCicco-Bloom & Crabtree, 2006). Using semi-structured in-depth interviews, the researcher developed a list of open-ended questions with time allotted to each topic according to the interviewer's discretion (Jarratt, 1996). Open-ended questions give access to a better opportunity for the participant to organize their answers based on their context (Aberbach & Rockman, 2002). The flexibility of this approach allowed the researcher and participant to discover or elaborate on important information (Gill et al., 2008).

In this study, the researcher conducted two separate interviews with each participant. The initial interview occurred before using the reciprocal teaching strategy in the classroom to focus on the first two research questions. Questions were open-ended and began with background data to ease the interviewee into the interview (Jacob & Furgerson, 2012). Creswell (2017) suggested preserving conversational and inquiry goals of the research by including introductory questions, transition questions, key questions, and closing questions. Each teacher responded to questions centered on the definition of science literacy, experience with literacy instructional strategies, and their understanding of reciprocal teaching. The final interview focused on the third research question and took place after each participant used the reciprocal teaching strategy three times. The time between the initial and final interview was approximately six weeks. Each teacher responded to questions centered on the benefits and difficulties using the reciprocal teaching instructional strategy. Each recorded interview took place over Google Meet at a pre-set date and time. Given the nature of qualitative research as an emergent process, the researcher could ask the participants for short follow-up interviews to gain further understanding or ask the participant if they agree with the ideas the researcher has interpreted from the data (Jacob & Furgerson, 2012).

## Observations

Using multiple forms of data collection allowed the researcher to analyze an array of information (Turner, 2010). Gathering data through direct observation is essential to case study research (Murphy & Dingwall, 2007). Classroom observations can be time-consuming and challenging (Curry et al., 2009). The researcher used observation protocol described by Creswell (2017) including identifying the setting, duration of the observation, determining the observer's role, designing a method for recording notes and using introductory and thank-you statements. Participants suggested observation dates and times according to their lesson plans. Each teacher independently but concurrently recommended observation dates and times, the researcher was able to accommodate every suggestion. The researcher was introduced at the start of each observed class and given the opportunity to collectively thank the students at the end of the class period. During each one-hour observation session, the researcher noted the use of instructional language and strategies surrounding science literacy and reciprocal teaching. Field notes are a detailed, nonjudgmental, concrete descriptive record of the observation (Marshall & Rossman, 2016). Field notes consist of a worksheet that includes information such as date, location, type of setting, time in setting, and a two-column table for observations and observer's comments (Marshall & Rossman, 2016). The researcher used a field note template including date, location, type of setting, time in setting, and a two-column table for observations and observer's comments. The researcher and the teachers mutually agreed upon dates and times for interviews and observations.

## Trustworthiness

Credibility, transferability, consistency, and dependability were strategies established to determine this study's trustworthiness. The participants were familiar with the researcher because of her work as a two-season athletic coach at the independent school for girls and understands the community's culture. The researcher and teacher participants have a trusting and respectful professional relationship. The independent school for girls employs two middle-school science teachers. Both participated in the study to allow for data triangulation. Jonsen & Jehn, (2009) suggest the use of triangulation to increase validity and reduce subjectivity in qualitative studies. Using triangulation improved the case study's accuracy and strengthened the credibility of findings (Cronin, 2014; Yin, 2017). Researchers use triangulation to examine multiple data collection methods, analyze data, and present the findings to understand a phenomenon (Denzin, 2009). Establishing transferability, highly detailed descriptions of the participant's experience, and context all aid in determining if the phenomenon can transfer to another context (Korstjens & Moser, 2018). All middle school science teachers in Massachusetts, regardless of type of school environment, follow the same state frameworks allowing for transferability. Ensuring consistency by triangulating data and member checking helped establish dependability (Tracy, 2010). Member checking happens when participants review the researcher's work to check if the information conveyed during an interview is authentic (Harper & Cole, 2012). The researcher used member checking following the analysis to check for dependability. Creswell (2017) suggested researchers conduct member checks with interpreted data such as themes and patterns rather than actual interview transcripts. To establish confirmability, the researcher kept an audit journal, including details about the analysis and interpretation of data. The researcher offered participants access to all written information. Both participants declined the offer to see written information. Instead, the researcher met with each participant to verbally review themes.

Qualitative research depends on human skills and perceptions. Therefore, taking steps to mitigate inevitable researcher biases helped establish the trustworthiness of this qualitative research study (Shenton, 2004). The researcher's years of teaching science are an important factor to consider when controlling bias. Bracketing is a reflective journey of the researcher's effectiveness by putting aside personal feelings and preconceived notions (Ahern, 1999). The researcher used reflexive journaling to minimize potential bias. Reflexive journaling helps novice researchers address challenges and help with interviewing techniques (Meyer & Willis, 2019). Keeping a reflexive journal is a strategy that helped the researcher consciously acknowledge bias (Ortlipp, 2008). Because the researcher lacks experience with the chosen research technique, the use of reflexive journaling helped to mitigate bias. For example, the researcher reflected on the comfort of performing observations but the discomfort of conducting one-to-one interviews. The perceived level of comfort or discomfort was based on professional experience. The researcher has a professional responsibility to conduct classroom observations for teacher evaluation. However, the researcher very rarely conducts a one-to-one interview.

## Participants

Middle school science teachers at an independent school for girls south of Boston comprised the sample population who implemented the reciprocal teaching instructional strategy. Purposive sampling is an effective type of nonprobability sampling used to explore phenomena. Researchers decide what they need to know and select participants based on their knowledge or experience (Tongco, 2007). Purposive sampling is a nonrandom technique that does not need a specific number of participants (Etikan et al., 2016). The main objective of a purposive sample is for researchers to choose a sample logically assumed to represent the target population (Lavrakas, 2008). Qualitative samples tend to be small and have no statistical grounds for guidance (Punch, 2014). An appropriate sample size answers the research question (Marshall, 1996). In this study, the target population consisted of middle school science teachers who teach students in grades six through eight at a small independent school for girls. The independent school for girls employs two middle-school science teachers. Both middle school science teachers at the school accepted the invitation to participate in the study. At the individual meeting where the participant signed the consent forms, the researcher gave each a copy of the book *Reciprocal Teaching at Work* by Lori Oczkus. Neither teacher had previously used the reciprocal teaching instructional strategy. Teacher A is beginning her second year in teaching while Teacher B is entering into year five.

**Ethical Measures**

Research regulations are necessary for ensuring an acceptable standard for conduct (Morris & Morris, 2016). Qualitative researchers must consider the impact of their actions on participants (Creswell & Miller, 2000). The researcher must adhere to the following ethical principles: respect for persons, beneficence, and non-maleficence, and justice (Kalu, 2017). Respect for persons was honored when the researcher provided a clear explanation of the study, allowing participants to understand their role before giving their consent to participate (Munhall, 2012). The ethical principles of beneficence and non-maleficence meant that the researcher was mindful of the potential benefits and risks of the study (Alston & Bowles, 2019). For example, a potential benefit for the participants was the addition of a new instructional strategy into their teaching repertoire while a risk could have the teacher feeling uncomfortable in class because of the unfamiliarity of the strategy. The ethical principle of justice ensures the research study was fair and participants had the right to have their privacy respected (Scott, 2017). During data collection, the researcher respected the participants and the organization by requesting consent and maintaining the participants' and organization's anonymity (Creswell, 2016). Ethical practices included the researcher recognizing the importance of their subjectivity and understanding the participants had ownership of the data collected (Creswell, 2016).

## Data Analysis Methods

An inductive approach for analyzing data allowed the researcher to develop a clear link between the research questions and the data findings (Thomas, 2006). Qualitative data are most likely to be words from interviews or field notes (Punch, 2014). Triangulation of data use multiple perceptions to clarify meaning (Bloomberg & Volpe, 2018).

Semi-structured, in-depth interview data are an essential part of qualitative research (Campbell et al., 2013). Primary data consisted of words in interview transcripts and field notes (St. Pierre & Jackson, 2014). In this study, the researcher conducted two recorded interviews with each participant, one before using the reciprocal teaching strategy and one after three classroom observations of participants using the reciprocal teaching strategy, for each participant separately. The researcher used Google Meet and the Chrome Extension Tactiq to record and transcribe each interview. The researcher annotated, created themes, and coded the transcripts based upon the research questions. The researcher carefully read the transcripts and observational field notes to identify emerging themes to become categories for analysis (Fereday & Muir-Cochrane, 2006). The thematic analysis looked for patterns of meaning across data sets to make sense of experiences (Braun et al., 2019). Themes disseminate into smaller units known as codes that center on a core idea to identify and interpret the data (Clarke & Braun, 2017). The researcher coded the data and developed themes.

According to Yin (2017), case study researchers construct validity by triangulating multiple sources of evidence and enhance trustworthiness by member checking. Multiple sources of evidence in this study included interviews and observations. Finally, the researcher kept an audit journal allowing transparency in data collection and management.

## Limitations

A qualitative single case study research design using a purposive sampling strategy has inherent limitations. Limitations are potential weaknesses out of the researcher's control (Theofanidis & Fountouki, 2018). Every study has limitations (Punch, 2014). Limitations associated with qualitative methodology include validity, reliability, and generalizability (Anderson, 2010). Validity refers to the degree to which the study measures what it intends to measure, and reliability is the study's consistency measured over time (Bloomberg & Volpe, 2018). Generalizability refers to the degree to which findings from a study sample apply to a larger population (Leung, 2015). For single case study research, generalizability could be an issue (Smith, 2018).

The purposive sampling technique is a nonrandom selection of participants (Albuquerque et al., 2014). The researcher identified and selected knowledgeable participants, willing to participate, and who possess the qualities the researcher was seeking (Etikan et al., 2016). Purposive samples can be prone to researcher bias (Sharma, 2017). Qualitative researchers should strive for self-awareness and reflect upon their own bias and subjectivity (Creswell, 2017; Sutton & Austin, 2015). The researcher mitigated limitations using triangulation, member checking, writing field notes, keeping an audit journal, and reflexive journaling.

## Delimitations

A researcher must select specific boundaries in case study research (Yin, 2017). Delimitations are specific boundaries drawn around the study (Punch, 2014). Delimitations result from the researcher's choices about the study and set the boundaries of the research (Ellis & Levy, 2009). This qualitative descriptive research design limited the scope of the study to middle school science teachers in one independent school for girls in grades six through twelve in a suburb south of Boston. A single case study's results may not represent an extensive group. Therefore, the findings and results may not necessarily transfer to other context areas, grade levels, subjects, locations, or the future (Gerring, 2004).

The researcher considered factors associated with COVID-19. The researcher chose a school willing to participate in a study during Covid. For health and safety, all interviews and observations were conducted virtually. The Centers for Disease Control and Prevention and the Massachusetts Department of Elementary and Secondary

Education guided schools to safely open and operate for in-school instruction, and for teachers and staff to modify the classroom layout to slow the spread of the virus. School reopening guidelines included masks, social distancing when possible, and classroom configurations with desks all facing the same direction (MADESE, 2020).

## Summary

Chapter 3 detailed the study's research method and design, instruments for data collection, participant selection, data analysis methods, and study limitations and delimitations. A qualitative single case study was the most appropriate design for researching the problem of science teachers' use of instructional strategies to support literacy. The findings of this study could benefit middle school science teachers to increase the academic achievement and science literacy skills of their students. Chapter 4 includes the results of the data analysis.

# CHAPTER 4: FINDINGS

The purpose of this study was to explore the experience of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into the classroom. The researcher's goal was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom. The research questions guiding this study were:

**RQ1:** Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy?

**RQ2:** Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?

**RQ3:** After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?

Chapter 3 included details about the qualitative methodology of a single case study research design using semi-structured interviews and classroom observations of participants from one, private, independent school for girls in grades sixth through twelfth in a suburb south of Boston. The design of this qualitative case study aimed to provide science teachers with a method to integrate the practices outlined in the *Massachusetts Science, Technology, and Engineering Framework* into the classroom to strengthen students' science literacy skills. Chapter 4 includes a discussion of data analysis procedures and a presentation of the findings.

## Presentation of the Findings

Understanding how middle school science teachers define and support science literacy in the classroom was necessary to explore the experience of integrating reciprocal teaching as a reading comprehension strategy. Ethical considerations for the study followed IRB protocols including obtaining organizational informed consent, participant informed consent, participant permission before each observation and interview, and maintaining anonymity. The school employs two middle school science teachers both of whom agreed to participate in the study. Data collection occurred virtually within the first six weeks of school. The researcher conducted two interviews with each participant. The researcher recorded and transcribed each of the semi-structured interviews. During classroom observations, the researcher gathered data using field notes. The researcher used the transcribed interviews in conjunction with the field notes to look for patterns of meaning across the data. The researcher used an inductive approach for analyzing the data by using annotated interview transcripts and field notes to establish overarching codes. After the creation of codes, the researcher identified patterns and established themes. The themes became categories for analysis.

In the initial interview, the researcher focused on the first two guided research questions. The researcher structured the questions to gather information on the teachers' understandings of science literacy and how science literacy supported the classroom.

### Research Question 1

Using two open-ended questions helped with soliciting responses to Research Question 1, “Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy.” The first interview question asked by the researcher was, “Describe in your own words what it means to be scientifically literate.”

Both middle school science teachers repeated the question before they answered. The researcher made note of the effect during questioning. Both teachers were thoughtful and appeared to choose their words carefully. One emerging theme centered on terms associated with the scientific method. The scientific method is a step-by-step method used to collect data through observation and experimentation. The steps to the scientific method include asking a question, conducting research, forming a hypothesis, testing a hypothesis by conducting an experiment, making observations, analyzing results, forming conclusion, and presenting the findings. Both teachers referenced terms associated with the scientific method. Both teachers explained a scientifically literate student can figure out or interpret information from a given source or demonstrate the ability to seek additional information for reliability. Teacher A defined a scientifically literate student as “able to see the reality of what is presented in light of the scientific method.” Teacher B defined a scientifically literate student as “being able to read and understand a piece of literature written about science.” Table 1 displays a summary of themes from interview question 1.

**Table 1**

*Research Question 1: Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy.*

| Interview 1 Question 1 |
| --- |
| Scientific Method Terms |
| Understanding and interpreting data |
| Analyze information |
| Reliability of written work or an experiment |

The second interview question associated with Research Question 1 was "What would a scientifically literate student know and be able to do?" Both teachers used the word "identify" when describing a scientifically literate student. Teacher A stated "the student would know how to identify parts of an experiment or study" Teacher B claimed, "a scientifically literate student is able to identify important aspects of what they are learning about." Teacher B also discussed the importance of applying scientific knowledge to a student's own life. Teacher A referenced scientific honesty and the importance of knowing how errors help us grow in our understanding of science. Both middle school science teachers used language related to the process of a science experiment. Teacher A referenced students being able to create their own hypothesis and conduct experiments. Teacher B discussed a student being able to understand what happened in an experiment and being able to interpret the results. The themes for the second interview question are in Table 2.

**Table 2**

*Research Question 1: Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy.*

| Interview 1 Question 2 |
|---|
| Identify parts of an experiment |
| Lab skills |
| Transfer of information |

**Research Question 2**

Using one open-ended question helped with soliciting responses to Research Question 2, “Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?” The researcher asked, “With science literacy in mind, describe some of the strategies you use in the classroom to support the development of those skills?” Each teacher approached the question differently. Teacher A’s response to the question centered around helping students build critical thinking skills using inquiry-based activities. Teacher A said “science is inductive so using inquiry based activities help the students practice good reasoning and critical thinking skills”. Teacher B focused on helping students understand content when they are reading from a textbook. Teacher B stated she "asks questions to make sure they understand what they are reading". Both teachers commented that they model skills for their students. Teacher A modeled how to create a hypothesis and identify variables during inquiry-based activities while Teacher B modeled how to read a science textbook. Since Teacher A and Teacher B defined a scientifically literate student as one who understands and applies steps in the scientific method, both teachers referred to supporting science literacy in the classroom during any activity that involves the scientific method. Both teachers acknowledged in the future they want to focus more time on reading scientific studies and journal articles. Themes for interview question 3 display in Table 3.

**Table 3**

*Research Question 2: Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?*

| Interview 1 Question 3 |
| --- |
| Critical thinking |
| Check for understanding |
| Teacher modeling |
| Future lesson plans |

In the final interview, the researcher focused on the third guided-research question. Each participant's final interview occurred following three classroom observations using the reciprocal teaching reading comprehension strategy. The researcher structured the questions to gather information on the teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension. The researcher created codes for analysis for Research Question 3 from each middle school science teacher's final interview transcript and field notes from all classroom observations.

**Research Question 3**

Using four interview questions helped with soliciting responses to Research Question 3, "After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?" The first question the interviewer asked was "Compared to other instructional strategies you have tried, how easy was it for you to learn how to use the reciprocal teaching instructional strategy in the classroom?" Both teachers stated they prepared for the classroom lesson using the book *Reciprocal Teaching at Work* by Lori Oczkus. However, each teacher explained how they prepared differently. Teacher A made notes from the book to ensure competency using the strategy. Teacher B tried the strategy and went back to re-read it a second time to ensure competency. Both middle school science teachers said the strategy was not difficult to learn however, it did require teacher preparation for successful implementation. During the interview, Teacher A commented on the easy adaptability of the strategy based upon the unique needs of different classes. Although the foundation of the Reciprocal Teaching instructional strategy was the same in both teachers' classes, the researcher observed that Teacher A and Teacher B used different classroom instructional methods during different class blocks. Teacher A originally used the strategy as a whole group and in a different observation modified the instruction incorporating individual and small group work. Teacher B broke into groups of four before modeling the instruction. Both teachers circled about the room during small group work. The field notes supported the claims made during the interviews. Themes for final interview question 1 display in Table 4.

**Table 4**

*Research Question 3: After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?*

| Interview 2 Question 1 |
| --- |
| Used *Reciprocal Teaching at Work* by Lori Oczkus |
| Needed teacher preparation |
| Implementation |
| Adaptable for different classes |

The second interview question to support Research Question 3, "describe the benefit/benefits, if any, your students experienced with reading comprehension because of using the reciprocal teaching instructional strategy", focused on the teachers' perceived advantage students received from learning the strategy. During the interview, both teachers commented students benefitted from the strategy by slowing down and thinking about what they read. Reciprocal teaching focuses on four reading strategies – predicting, questioning, clarifying, and summarizing. Teacher A introduced the strategy to the students saying, “the strategy helps you understand what you are reading.” During an observation, Teacher B said, “you will work together in groups to understand what you are reading.” During the interviews, the teachers commented on the different benefits. The researcher observed the benefits that the teacher commented upon during the interview. Teacher A found students self-identifying areas of confusion beneficial while Teacher B praised the reciprocal teaching questioning strategy. Both teachers commented on their students building reading skills as a benefit. Themes for final interview question 2 display in Table 5.

**Table 5**

*Research Question 3: After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?*

| Interview 2 Question 2 |
| --- |
| Student reading pace |
| Metacognition |
| Skill building |
| Found different parts of the strategy beneficial |

Conversely, interview question three, “tell me about the difficulties, if any, using the reciprocal teaching strategy,” focused on the obstacles associated with using the reciprocal teaching reading comprehension instructional strategy. Both teachers agreed the biggest difficulty using the strategy was time. The researcher observed Teacher A rush to finish the first lesson plan during observation one. Teacher A’s answer centered around the time it took during class to model the strategy and then have the time allowing for the students to practice. Teacher B focused on the time it took to prepare to use the strategy and determine what would work best at grade level. Field notes indicated that Teacher A adjusted her lesson and was able to finish the next two lessons following the first observation. Teacher B’s three observations did not reveal a lesson running over allotted class time.

During the second-class observation, Teacher A encountered a few students who thought using the strategy was a waste of time. The researcher observed this dialogue between the students and the teacher. Teacher A used the student feedback and readjusted the lesson design to include both individual and group parts to the lesson the next time for future use of the strategy. This adjustment seemed to satisfy the students because there was no pushback from the students during the third observation. Themes for final interview question 3 display in Table 6.

The final interview two-part question to explore Research Question 3, “how would you describe to another science teacher the impact that the reciprocal teaching reading comprehension instructional strategy had on your students, and would you recommend that science teachers try the strategy to help their students with reading comprehension skills?” During the final interview, both teachers used the term “deeper.” Teacher A stated “it gave them the explicit awareness of strategies that are absolutely necessary for deeper learning.” Teacher B commented, “it was good to get the students to think deeper about the text they are reading and go further to make sure they understand what they are learning.” The teachers found the strategy helped with student understanding and encouraged students to be independent learners. During Teacher A’s final observation, students were placed into groups of four and used large chart paper to write how they used the strategy. The researcher observed students needing less direction from the teacher than they did in earlier observations. During Teacher B’s final observation, students were able to use the turn and talk technique successfully to summarize a passage from the textbook.

**Table 6**

*Research Question 3: After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers’ perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?*

| Interview 2 Question 3 |
| --- |
| Time |
| Buy in from a few students |
| Figuring out what works best with each group of students |

During the final recorded interview, each teacher expressed appreciation for different aspects of reciprocal teaching. As the researcher noted in the field notes, Teacher A also commented that the strategy “helped students begin to summarize in a way that is clear and efficient”. Teacher B saw value in clarifying as it “actually stopped students and made them look at the text to try and figure things out”. The researcher observed the students engaging in the dialogue Teacher B is referencing.  Finally, both teachers would recommend the reciprocal teaching reading comprehension strategy to other science teachers. Themes for final interview question 4 display in Table 7.

**Table 7**

*Research Question 3: After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?*

| Interview 2 Question 4 |
|---|
| Deeper thinking and learning |
| Helps students become independent learners |
| Effectively summarize |
| Check for understanding |
| Positive feedback |
| Awareness |

Understanding how middle school science teachers define and support science literacy in the classroom was necessary to explore the experience of integrating reciprocal teaching as a reading comprehension strategy. Each teacher responded to a series of open-ended questions about science literacy before using the reciprocal teaching reading comprehension in the classroom. The initial interview responses focused on language surrounding the scientific method. Words used consisted of experiment, hypothesis, data, analysis, theory, and variable. The teachers viewed a scientifically literate student as one who knew and understood the language of science. A scientifically literate student would read about and understand science. They would have the ability to take part in an experiment or read about an investigation with understanding. Students who are scientifically literate critically think and analyze data seeking truth. They can interpret data and findings. Scientifically literate students take the skills of the scientific method learned in science class and apply them in their own lives.

Following the initial interview, the researcher observed each teacher using the reciprocal teaching reading comprehension strategy three times. Upon completion of the classroom observations, participants completed a final interview. Each teacher had unique but positive experiences using reciprocal teaching. Although both teachers believed they did not have enough time to use reciprocal teaching, the teachers maintained their position that students benefitted from the use of the strategy. Students engaged in four reading strategies- predicting, questioning, clarifying, and summarizing. These reading strategies forced students to slow down, think deeper, and analyze the text. Teachers could adapt the strategy as the needs of the class changed providing flexibility of use. Both teachers would recommend the strategy to other science teachers even though time posed as a constraint when preparing for and learning the strategy.

## Summary

Chapter 4 includes the procedures used for data collection and analysis and the findings of the study. This descriptive single case study explored the experience of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into the classroom. The emerging themes from the perception of the middle school science teachers is that scientific literacy centers around the scientific method. Students who are scientifically literate think critically, identify parts of a lab experiment, apply knowledge and analyze information. The perception of middle school science teachers who experienced reciprocal teaching instructional strategy to teach reading comprehension claimed the strategy helped students become more independent learners by building their skills and thinking about what they were reading. Additionally, the flexibility of instruction the strategy allows middle school science teachers to adapt the strategy to meet the needs of a variety of classes. Chapter 5 contains a summary of the study, a discussion of the findings, and an application of the findings as it relates to the problem statement. A detailed discussion of how to apply the to improve leadership and implement changes will follow.

# CHAPTER 5: CONCLUSIONS AND DISCUSSION

The purpose of this study was to explore the experience of middle school teachers who integrated the reciprocal teaching reading comprehension strategy into the classroom. *Massachusetts Science, Technology, and Engineering Curriculum Framework* includes information about how literacy skills support students in building and applying scientific knowledge (MADESE, 2016). Understanding how middle school science teachers define and support science literacy in the classroom was necessary to explore the experience of integrating reciprocal teaching as a reading comprehension strategy.

The goal of this research study was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom. To answer the research questions, the researcher used purposive sampling to target middle school science teachers who teach in grades sixth through eight at a small independent school for girls. Each teacher participated in two interviews and three classroom observations. The information gained from this research study could provide science teachers with an instructional strategy to integrate the practices outlined in the *Massachusetts Science, Technology, and Engineering Curriculum Framework* into the classroom to strengthen students' science literacy skills.

The major findings in this study highlight that middle school science teachers understand the importance of building science literacy skills in students. Both teachers focused heavily on language surrounding the scientific method to describe a scientifically literate student. However, each teacher described a different approach to the classroom strategies used to support the development of those skills. After using reciprocal teaching in the classroom, both teachers would recommend the strategy to other teachers as a reading comprehension instructional strategy for middle school science teachers to use to help teach science literacy.

Chapter 5 includes an interpretation of results by the researcher and a discussion of implications for leadership based on the results. Each research question as well as recommendations will aid in concluding practical application and further research.

## Discussion of Findings and Conclusions

Understanding how middle school science teachers define and support science literacy in the classroom was necessary to explore the experience of integrating reciprocal teaching as a reading comprehension strategy. A qualitative methodology of a descriptive single case study research design using semi-structured interviews and classroom observations supported this study. Three Research Questions guided the data collection. Using triangulation of interviews and observational data helped with drawing conclusions.

**RQ1:** Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy?

The middle school science teachers' understanding of science literacy centered around the scientific method. The teachers described a scientifically literate student as one who was able to able to identify parts of an experiment and interpret scientific information in a lab, a textbook reading, or in their own lives. Knowing, understanding, and applying specific language typically used in a science experiment such as data, analysis, hypothesis, and concluding indicated to the teachers that a student was scientifically literate.

**RQ2:** Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom?

Both teachers indicated the importance of modeling to support science literacy. By modeling the skills necessary to engage in inquiry-based activities or interpret information from a textbook, the teachers felt they were showing students the behavior of someone who is scientifically literate. Modeling activities such as creating a hypothesis, interpreting data, or critical analysis of a textbook reading help develop a students' scientific literacy. Both teachers want to dedicate more classroom time to reading current scientific studies and journal articles to increase students' understanding of the application of the scientific method. The teachers supported science literacy by modeling and providing students the opportunity to strengthen skills from the scientific method such as asking questions, forming hypotheses, conducting experiments, making observations, analyzing results, forming conclusions, and analyzing results. However, both teachers acknowledged a lack of dedicated classroom time to reading about science beyond the textbook.

**RQ3:** After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension?

Even though each teacher prepared differently to use the reciprocal teaching instructional strategy, both teachers claimed the strategy was not difficult to learn. The difficulty arose in the amount of time it took to prepare for class and teach the students the strategy. Conversely, both teachers also described the slowdown in classroom pace as a benefit. Students seemed more deliberate and analytical while reading. Additionally, each teacher enjoyed the flexibility the strategy allowed. Both teachers were able to adjust their teaching methods based upon the needs and skill level of the students allowing for specific targeted instruction.

Teachers' perceptions of science literacy center around the scientific method. The scientific method is a step-by-step method used to collect data through observation and experimentation. The steps to the scientific method include asking a question, conducting research, forming a hypothesis, testing a hypothesis by conducting an experiment, making observations, analyzing results, forming conclusion, and presenting the findings. The teachers supported science literacy in the classroom by modeling and providing students the opportunity to strengthen skills from the scientific method such as asking questions, forming hypotheses, conducting experiments, making observations, analyzing results, forming conclusions, and analyzing results. Both teachers used the reciprocal teaching reading comprehension instructional strategy to model the skills of predicting, questioning, clarifying, and summarizing. Skills gained from using the reciprocal teaching reading comprehension strategy may be transferrable to those needed when using the scientific method.

The theoretical framework Palincsar (1991) based reciprocal teaching on include Vygotsky's zone of proximal development (ZPD) (Vygotsky, 1978), scaffolding (Wood et al., 1976), cognitive apprenticeship (Collins et al., 1989), and proleptic teaching (Brown & Palincsar, 1989; Palincsar, 1991). Teachers using reciprocal teaching explicitly model reading comprehension strategies with cooperative learning groups and intentionally fade support as the learner's competency increases (Palincsar & Brown, 1987). During reciprocal teaching, the teacher's role is to exemplify the thinking that occurs during reading and promote student independence (Seymour & Osana, 2003). This strategy enables learning through social interaction, the social construction of knowledge, and collaboration (Brown et al., 1989). During observations, the teachers modeled each part of the strategy and then checked for understanding as the students worked in cooperative learning groups and attempted the skills of predicting, questioning, clarifying, and summarizing. Although the teachers found different parts of the strategy more beneficial, both teachers would recommend other middle school science teachers use reciprocal teaching to teach reading comprehension.

## Application to the Problem Statement

The *Massachusetts Science, Technology, and Engineering Framework* contain a vision for core instruction that supports teaching literacy in the content area. Norris and Phillips (2003) focused on the fundamental skills of reading and the knowledge of science content to describe science literacy. Having science literacy as an instructional outcome requires science teachers to strengthen their ability to teach literacy practices in the discipline (Fang & Wei, 2010). However, science teachers often feel uncomfortable or unprepared to teach literacy skills (Moje, 2008). Science teachers must adapt literacy strategies to teach content (Gillis, 2014).

Reciprocal teaching uses the comprehension strategies of predicting, questioning, clarifying, and summarizing coupled with ongoing communication between teacher and students, or students and students to make meaning of a text (Hacker & Tenent, 2002). Palincsar and Brown (1984) initially designed this technique for small group tutoring with students who were strong decoders but had poor reading comprehension skills. Although the teachers found different parts of the reciprocal teaching reading comprehension instructional strategy more beneficial, both teachers would recommend other middle school science teachers use reciprocal teaching as an instructional strategy. Exploring reciprocal teaching as a reading comprehension instructional strategy could provide science teachers with a literacy strategy to help support the integration of science literacy into the middle school science classroom.

## Application to Leadership

School leaders are vital in improving student achievement (Espinoza & Cardichon, 2017). Effective leaders collaborate with teachers on research-based strategies to improve teaching and learning (Mendels, 2012). One of the drawbacks to reciprocal teaching was the time teachers needed to learn the strategy and prepare to use it in the science classroom. Increasing the ability of science teachers to develop the literacy needs of adolescent students requires a commitment and investment from school leaders (Goldman, 2012). School leaders should aim to provide adequate professional development time and opportunities for science teachers to strengthen their abilities to teach literacy.

Quality instructional leaders need high levels of knowledge and understanding about curriculum, instruction, and assessment (Southworth, 2002). Principals need to understand the elements of good science instruction and practice to supervise effectively pedagogical improvements (McNeill et al., 2018). Understanding the importance of the scientific method as it relates to science literacy will bolster the effectiveness of feedback from classroom observations and teacher evaluations. Effective instructional leaders have an integral role in school improvement (ten Bruggencate et al., 2012). School improvement occurs as teachers improve their effectiveness in the classroom. School leaders affect student achievement by influencing teachers' motivation and working conditions (Seashore et al., 2010). When teachers believe they have support with time and resources to build pedagogical knowledge, effective implementation of state frameworks and increased student achievement lead to overall school improvement. Participating in shared instructional leadership requires ongoing discussions between school leaders and teachers about curriculum, instruction, and assessment (Marks & Printy, 2003).

## Recommendations for Action

School leaders and teachers share responsibility for successfully implementing education reform (Yoon, 2016). Science teachers and district administrators are responsible for implementing the *Massachusetts Science, Technology, and Engineering Framework.* The standards include language around literacy skills such as reading comprehension The recommendation for action is for science teachers and district administrators to collaborate and establish a common vision of science literacy and methods to support science literacy in the classroom.

Steps in creating a common vision for science literacy begin in a formal document such as a School Improvement Plan. In the plan, a strategic objective should be written focusing on science literacy. Actions and activities supporting the initiative include early release time, attending conferences or workshops, and summer institutes. The teachers in this study cited a lack of time in class and a lack of time for preparing for class as an obstacle. Professional development time should be provided to science teachers to build strong focus on instructional strategies such as reciprocal teaching and to create comprehensive lesson plans with non-fiction journal articles. Science teachers need collaboration time to share classroom initiatives surrounding science literacy. Creating a common language about literacy and instructional strategies will help teachers and administrators build a strong knowledge base about literacy. Teachers and administrators will learn about science literacy, reading comprehension, and understand how to support literacy skills in the science classroom. Teachers and administrators share responsibility for implementing state standards, a common understanding of literacy and strategies to teach literacy skills in the science classroom benefit everyone.

**Recommendations for Further Research**

Future research to continue to build knowledge about reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the classroom could extend to qualitative and quantitative research studies.

This qualitative single case study research design using purposive sampling had inherent limitations and delimitations. Sample size was very small. Future research could be conducted using a school with a larger number of middle school teachers. Having more participants would increase the number of interviews and classroom observations thereby providing additional data to analyze. A researcher could also use a co-ed school or an all-boys school to perform a research study. Middle school science teachers who instruct male and females or males alone could build additional knowledge and understanding to this phenomenon. The researcher could expand the study longitudinally. Teacher observations could be performed before using the reciprocal teaching reading comprehension strategy. Doing this would allow the researcher to analyze data about how middle school teachers support science literacy in the classroom prior to using reciprocal teaching. The study could also be expanded beyond middle school. Using the reciprocal teaching instructional strategy within a high school could help to build knowledge in this topic area.

Other areas to consider for further research, based upon science literacy and the reciprocal teaching reading comprehension instructional strategy, could center around a quantitative study. To understand if the strategy is effective for students, the researcher could set up a control group of students and an experimental group of students. Both groups could complete the same pre-assessment. Only the experimental group would receive classroom instruction about the reciprocal teaching reading comprehension strategy. Finally, both groups could complete the same post-assessment. Data gathered from the tests could aid in comparing those students who received the instruction to those students who did not. Instead of focusing on teachers who use the instructional strategy, the focus could be on the effectiveness of the strategy on the students.

Questions arose as the researcher reflected upon the findings. What if the participating science teachers received professional development for science literacy and training using the reciprocal teaching instructional strategy? Could a multi-year study provide additional insight and depth to the study? Did the branch of science the class was studying have any bearing on the results? What if teachers have varying understanding of science literacy or how to support in in the classroom? The variability for future studies is numerous and could provide greater understanding of the topic of science literacy and reading comprehension instructional strategies.

## Concluding Statement

The *Massachusetts Science, Technology, and Engineering Framework* incorporate literacy skills into the state standards (Massachusetts Department of Elementary and Secondary Education [MADESE], 2016a). State standards include disciplinary literacy to ensure students engage in using specialized literacy in each subject area (Hynd-Shanahan, 2013). The standards require science teachers to use instructional strategies to support literacy in the classroom. However, research indicated that science teachers often feel unprepared to use literacy-building strategies in the classroom. Students who possess strong literacy skills think about what they read by questioning, interpreting, and evaluating to construct meaning (Harvey & Goudvis, 2007). By actively supporting reading comprehension in science classrooms, teachers help students develop a deep understanding of scientific phenomena (Herman & Wardrip, 2012). Reciprocal teaching is a scaffolded, student-centered reading comprehension strategy creating a dialogue between and among the teacher and the students (Arif, 2016).

The purpose of this study was to explore the experience of middle school science teachers who integrated the reciprocal teaching reading comprehension strategy into the classroom. The researcher's goal was to determine middle school science teachers' perceptions and experiences using reciprocal teaching as a reading comprehension instructional strategy to support the integration of science literacy into the middle school science classroom. Findings indicate that teachers perceive reciprocal teaching as an adaptable, easy to use reading comprehension instructional strategy to use in middle school science classrooms. The results of this study provide middle school science teachers with an easy to learn and adaptable reading comprehension instructional strategy.

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## APPENDIX A

### Participant Interview Questions

Interview #1

| Guiding Research Questions |
|---|
| 1.) Before implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' understandings of science literacy? |
| 2.) Before implementing the reciprocal teaching reading comprehension strategy, how do middle school science teachers support science literacy in the classroom? |

Warm up question:

*Tell me a little about why you decided to become a science teacher.

1.) Describe in your own words what it means to be scientifically literate.

2.) What would a scientifically literate student know and be able to do?

3.) With science literacy in mind, describe some of the strategies you use in the classroom to support the development of those skills?

Interview #2

| Guiding Research Question |
|---|
| 3.) After implementing the reciprocal teaching reading comprehension strategy, what are middle school science teachers' perceptions and experiences using the reciprocal teaching instructional strategy to teach reading comprehension? |

Warm up question:

*Tell me about your favorite unit/topic to teach in science. Why is it your favorite?

1.) Compared to other instructional strategies you have tried, how easy was it for you to learn how to use the reciprocal teaching instructional strategy in the classroom?

2.) Describe the benefit/benefits, if any, your students experience with reading comprehension because of using the reciprocal teaching instructional strategy.

3.) Tell me about the difficulties, if any, using the reciprocal teaching strategy.

4.) How would you describe to another science teacher the impact that the reciprocal teaching reading comprehension instructional strategy had on your students? Would you recommend that science teacher try the strategy to help their students with reading comprehension skills?

APPENDIX B

CityUniversity of Seattle

**CITYU RESEARCH PARTICIPANT INFORMED CONSENT**

**Title of Study:**

Reciprocal Teaching as a Reading Comprehension Instructional Strategy to Support the Integration of Science Literacy into the Middle School Classroom

**Name and Title of Researcher(s):**

Janet J. Hogan

***For Student Researcher(s):***

**Faculty Supervisor:** Dr. Cassandra Smith

**Department:** School of Applied Leadership

**Telephone:**

**City U E-mail:** Smithcassandra@cityu.edu

**Program Director:**

Dr. Joel Domingo

**You are being invited to participate in a research study.**

**Key Information about this Research Study**

The researcher will explain this research study to you before you will be asked to participate in the study and before you sign this consent form.

- Your participation is voluntary and you can decide not to participate or withdraw your participation at any time without penalty or negative consequences.
- It is your choice whether or not you want to participate in this research.
- The purpose of the research is to explore the experience of middle school teachers who integrate the reciprocal teaching reading comprehension strategy into the classroom.
- If you choose to participate you will be asked to use the reciprocal teaching strategy in your classroom three times while being observed and commit to two interviews. The first interview will occur before trying the reciprocal teaching reading comprehension instructional strategy. The second interview will occur after using the instructional strategy in the classroom three times.
- As a response to the COVID-19 pandemic, research participants interviews will be conducted and recorded via Google Meet or Zoom.
- As a response to the COVID-19 pandemic, classroom observations will be conducted virtually. Observations will not be recorded.
- The risks or discomforts from this research include learning and trying a new instructional strategy.
- The direct benefits of your participation are exploring a new instructional strategy for teaching reading comprehension.

You should talk to the researcher(s) about the study and ask them as many questions you need to help you make your decision.

**What should I know about being a participant in this research study?**

This form contains important information that will help you decide whether to join the study. Take the time to carefully review this information.

- You are eligible to participate in this study because you are a middle school science teacher.
- You will be in this research study for approximately ten months.
- About three individuals will participate in this study.

Why is this research being done?

Purpose of Study: the research is being done to explore the experience of middle school teachers who integrate the reciprocal teaching reading comprehension strategy into the classroom.

**Research Participation.**

**You will be asked to participate in the following procedures:**

I understand I am being asked to participate in this study in one or more of the following ways (initial options below that apply):

☐ Respond to in-person; and/or, ☐ telephone Interview questions; Approximate time: ______

☐ Answer written questionnaire(s); Approximate time _____

☒ Participate in a virtual video interview using this video program/app Google Meet or Zoom; Approximate time 2 recorded interviews at a maximum of thirty minutes each. ________

☒ Other, specifically, three classroom observations with the researcher observing virtually while keeping field notes. Observations will not be recorded. Approximate time: three hours _____

You may refuse to answer any question or any item in verbal interviews, written questionnaires or surveys, and, you can stop or withdraw from any audio or visual recording at any time without any penalty or negative consequences.

**Are there any risks, stress or discomforts that I will experience as a result of being a participant in this study?**

COVID-19 refers to the Coronavirus that is being spread across people in our communities. We need to provide you with important information about COVID-19 (direct individuals to local Department of Health information on Covid-19), and to review your study participation because of COVID-19 related risks. To minimize risk, contact with the researcher will only be conducted by telephone and/or video interviews. Non-recorded classroom observations will also be conducted virtually. You will not be asked to meet with the researcher in person.

**Will being a participant in this study benefit me in any way?**

We cannot promise any benefits to you or others from your participation in this research. However, possible benefits may include a better understanding of the reciprocal teaching reading comprehension instructional strategy. In addition, each participant will receive a free copy of *Reciprocal Teaching at Work* by Lori Oczkus.

☐ You will receive _____ for your participation in this research.

☒ You will not receive any payment for participation in this study.

**Confidentiality**

I understand that participation is confidential to the limits of applicable privacy laws. No one except the faculty researcher or student researcher, his/her supervisor and Program Coordinator (or Program Director) will be allowed to view any information or data collected whether by questionnaire, interview and/or other means.

If the student researcher's cooperating classroom teacher will also have access to raw data, the following box will be initialed by the researcher. ☐

Steps will be taken to protect your identity, however, information collected about you can never be 100% secure. Your name and any other identifying information that can directly identify you will be stored separately from data collected as part of the research study. The results of this study will be published as a thesis and potentially published in an academic book or journal, or presented at an academic conference. To protect your privacy no information that could directly identify you will be included.

All data (the questionnaires, audio/video tapes, typed records of the interview, interview notes, informed consent forms, computer discs, any backup of computer discs and any other storage devices) are kept locked and computer files will be encrypted and password protected by the researcher. The research data will be stored for five years. At the end of that time all data of whatever nature will be permanently destroyed. The published results of the study will contain data from which no individual participant can be identified.

Signatures

I have carefully reviewed and understand this consent form. I understand the description of the research protocol and consent process provided to me by the researcher. My signature on this form indicates that I understand to my satisfaction the information provided to me about my participation in this research project. My signature also indicates that I have been apprised of the potential risks involved in my participation. Lastly, my signature indicates that I agree to participate as a research subject.

My consent to participate does not waive my legal rights nor release the researchers, sponsors, and/or City University of Seattle from their legal and professional responsibilities with respect to this research. I understand I am free to withdraw from this research study at any time. I further understand that I may ask for clarification or new information throughout my participation at any time during this research.

I have been advised that I may request a copy of the final research study report. Should I request a copy, I understand that I will be asked to pay the costs of photocopy and mailing.

Participant's Name: ______________________________

Please Print

Participant's Signature: ______________________________ Date: ___________

Researcher's Name: Janet J. Hogan ______________________________

Please Print

Researcher's Signature: ______________________________ Date: ___________

If I have any questions about this research, I have been advised to contact the researcher and/or his/her supervisor, as listed on page one of this consent form.

Should I have any concerns about the way I have been treated or think that I have been harmed as a research participant, I may contact the following individual(s):

Dr. Joel Domingo, Program Director, City University of Seattle, at jdomingo@cityu.edu or 1-206-239-4770.

This study has been reviewed and has been approved by the Institutional Review Board (IRB) of City University of Seattle. If you have questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the IRB at IRB@Cityu.edu.

APPENDIX C

Field Note Template

FIELD NOTES | Participant A B C

Date: | Observation 1 2 3

Location/Setting:

Time in Setting:

| OBSERVATION | NOTES |
|---|---|
| | |