

FROM TEACHERS' PERSPECTIVE: IMPLEMENTATION OF LITERACY
MATERIALS IN MIDDLE SCHOOL SCIENCE

by

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A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Doctor of Philosophy
Education

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Date: April 30, 2008

Spring Semester 2008
George Mason University
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Dedication

My dissertation is dedicated to my husband, Wayne. Without you, I could never have completed this project. You have been “the wind beneath my wings” since I first entertained the thought to pursue a doctorate. You have supported my long journey—even standing behind my decision to remain in Virginia a year to complete my data collection before moving to California. You have encouraged me with humor and allowed me the space I needed to fulfill my goal. You are truly my best friend and life companion.

To my sons Ryan, Brendan, and Andrew: May my efforts inspire you to follow your dreams.

I love you all.

Acknowledgements

I would like to express my sincere appreciation to my Dissertation Committee, Dr. Elizabeth Sturtevant, Dr. Kristy Dunlap, and Dr. Joseph Maxwell, for their support throughout this process. I am honored that you are members of my committee.

To my Dissertation Chair, Betty, I thank you for your insightful and thoughtful contributions as I worked to structure my dissertation, and later your attention to detail in my writing. You have been a tremendous mentor, through numerous e-mails, phone calls from the car scheduled around the West Coast time difference, and meetings scheduled during conferences. I thank you for your encouraging words when I needed to know that there was an end. Your support meant more than any words I could write.

To Kristy and Joe, I am so grateful for your willingness to serve as members of my dissertation committee. I appreciate your time and support to complete this project. Kristy, I thank you for your willingness to listen, especially as I tried to finish Chapter Five. Your support helped to bring clarity to my thoughts. Joe, I thank you for your advice and suggestions as I began structuring my qualitative study. Your expertise of qualitative research is immeasurable.

A special thanks to the teacher participants and middle school science coordinator for your willingness to participate in my study. I thank you for welcoming me to your classrooms and generously giving of your time for an interview. Your candid remarks guided my writing of this story. You are an outstanding group of teachers and your remarks will continue to ring in my head.

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Abstract

FROM TEACHERS' PERSPECTIVE: IMPLEMENTATION OF LITERACY MATERIALS IN MIDDLE SCHOOL SCIENCE

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George Mason University, 2008

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Documentation of adolescents' difficulty in comprehending textbooks spans a century. For just as long, researchers have advocated that explicit instruction of reading strategies can help students' comprehension of text; many have recommended that the best place to teach these strategies is within the content classroom (science, math, etc.), and taught by the content teacher. Despite this research, reading strategy instruction in content classrooms is not a common occurrence.

In a large district with 300 middle school science teachers, some science teachers expressed concern about their students' reading difficulties with the district's science text. In response to those concerns, the middle school science coordinator organized a small committee to develop the *Reading Strategies Handbook for Middle School Science for Teachers* (the *Handbook*), believing that this tool would guide teachers' in implementing the Handbook's reading strategies and improve students' comprehension of the text.

This was a qualitative study that explored 11 middle school science teachers' responses to implementing the *Handbook*. Data for this study were gathered through an e-mailed questionnaire, a classroom visitation, and one interview with each teacher participant. The study found that teachers' varied backgrounds influenced their beliefs about teaching and learning, and impacted their classroom practices. Teachers faced their district's expectations to implement reading strategies in the *Handbook* with minimal support and cited influences beyond their control that created tension with their decision whether to implement the Handbook. Teachers commented that a "one size fits all" curriculum and textbook-specific issues influenced their degree of using the *Handbook's* reading strategies. In addition, teachers identified time and pressure to cover curriculum as obstacles to implementing the *Handbook*.

Implications of these findings include: (a) Professional development studies related to content literacy are needed that include attention to teachers' beliefs and attitudes, and (b) Policy makers need to direct funding for the professional development needs of content-area teachers.

1. Introduction

Reading comprehension in content classrooms and students' difficulty in comprehending text in content classrooms are well-known issues in education. In fact, these topics have been the source of many research studies over the last century. However, evidence of attention to these issues by middle school classroom teachers has not been as abundant.

Policies and statements related to content-area reading were dated as early as the 1920s, providing evidence that students' difficulties comprehending text were recognized on a national scale almost a century ago. Gray (1927), a prominent reading educator in his time, wrote that the U.S. Bureau of Education acknowledged that each subject matter area contributed directly to the development of reading competency; he was also instrumental in popularizing the slogan, "Every teacher a teacher of reading" (Moore, Readence, & Rickelman, 1983). Other reading educators contributed to the development of the field of content reading as well. Ernest Horn initiated some of the first studies addressing ways to enhance learning from text. In the textbook he wrote titled *Methods of Instruction in the Social Studies* (1937), Horn "emphasized wide reading in the subject areas in order to enhance meaningful learning and accommodate individual differences" (Moore, Readence, & Rickelman, 1983, p. 425). One of Horn's students, Gerald Yoakam, published one of the first textbooks about the relationship between reading, learning, and

content instruction (Moore et al., 1983). The work of these researchers acknowledged that some of the public were aware of students' difficulties comprehending content text.

Yet eight decades later, literacy researchers continue to address students' difficulty comprehending content text, despite varied resources available to content teachers. These resources included numerous research-based strategies for content teachers to implement in their classrooms, a content-area course requirement for pre- and in-service content teachers in most states, and many research articles and studies addressing literacy in content classrooms.

Many studies of reading comprehension were rooted in observation of good readers (Duke & Pearson, 2002). Over a 12-year period, Pearson, Roehler, Dole, and Duffy (1992) studied what proficient readers did to make sense of text. The difference that emerged between proficient readers and struggling readers was their use of reading strategies. Proficient readers used an array of strategies to help them comprehend text, whereas less proficient readers often did not employ strategies. Pearson et al. determined that from the numerous strategies that had been developed, those most frequently used by proficient readers could be narrowed to seven. Their work in identifying these strategies shaped reading comprehension instruction and gained the recognition of many researchers and practitioners such as Cris Tovani, Janet Allen, Stephanie Harvey, and Kylene Beers.

This awareness resulted in courses developed for teachers planning to teach adolescent students "focused on preparing content-area teachers to infuse literacy instruction with regular content instruction so that adolescent students were prepared to

read and write to learn” (Draper, 2002, p 360). Content-area reading instruction, as advocated by literacy educators, included “modeling and providing explicit instruction in reading comprehension and study strategies across the curriculum” (Moore, Bean, Birdyshaw, Rycik, 1999, p. 104). Draper (2002) commented that when content-area teachers infused literacy instruction with content instruction, they provided support for adolescents to gain necessary literacy skills while deepening their content learning. The International Reading Association (1998) expanded on that, stating that middle school and high school teachers were “responsible for literacy instruction that also promotes content learning” (p. 4).

Other research studies pinpointed that the conceptual density of science text, importance of prior knowledge of the content, and textbook features could influence the comprehension of a science textbook. These findings revealed that content text required a much more strategic approach by readers to construct meaning than from most narrative text (Mallow, 1991).

Draper (2002) remarked that “literacy activities to support students’ strategic reading of print had been included in the literature for over fifty years” (p. 361), citing Betts work in 1946 as one example. Draper added, “Literacy activities provide students with practice as they develop proficiencies necessary to make meaning with content-area texts. These activities were meant to be taught along with content—not in place of content” (p. 361).

However, despite the slogans, the legislation, and the coursework, limited instruction in literacy had occurred in secondary content-area classrooms, according to

Ratekin, Simpson, Alvermann, & Dishner, in 1985. Twenty years later, the statement seemed unchanged: Limited instruction in literacy occurred in secondary content-area classrooms.

Many teachers argued that content could be covered more effectively through activities other than reading (DiGisi & Willett, 1995; Moje & Wade, 1997; O'Brien, Stewart, & Moje, 1995). Consequently, reading researchers concluded that, "It was unlikely that teachers would make informed decisions without an informed understanding of this complexity and the related misconceptions students had about reading science text" (Craig & Yore, 1996, p. 226). Many researchers determined that in order for content teachers to change their practices, professional development must assist them with implementing reading strategy instruction in their content classrooms (Heller & Greenleaf, 2007).

A number of researchers studied individual content teachers' classrooms in order to find out what types of reading activities were occurring in those secondary content classes and why those activities were chosen (e.g. Moje, 1996; Sturtevant, 1992). This research revealed limited use of reading strategies in content classrooms. In some instances, teachers' implementation of reading strategies was inaccurate. Sturtevant (1992) observed two experienced high school history teachers to explore their beliefs about including literacy activities in their classrooms. It was noted that these teachers based their choices and use of literacy activities on their perceptions of teaching and learning, gained from years of experience as teachers and individuals who influenced their lives beyond the confines of the school. Sturtevant (1996) explained that the

teachers' day-to-day decision making required them "to balance conflicting beliefs, contextual demands, and students' needs" (p. 250). This balancing act created a tension for the teachers and students.

Dillon, O'Brien, Moje, and Stewart's analysis of three qualitative studies (1994) conducted in secondary school science classrooms focused on how and why literacy was incorporated into science teaching and learning. This cross-case study found that beliefs connected with instruction and revealed that teachers' philosophies of science and science teaching were related to instruction and learning.

Until recently, according to several reports, nearly all the attention, resources, and research in literacy focused on the achievement of elementary students, leaving adolescent literacy "an orphaned responsibility" (Wise, 2005). However, during the last decade numerous statistics related to adolescent literacy were compiled, revealing that an alarming weakness existed in adolescent literacy. For example, only 31% of 8th graders and approximately the same percentage of 12th graders met the National Assessment of Educational Progress standard of reading "proficiency" for their grade level (National Center for Educational Statistics (NCES), 2005, 2003). Balfanz, McPartland, and Shaw (2002) reported that in a typical high-poverty, urban school, approximately half of the incoming 9th-grade students read at a 6th or 7th-grade level. Such inadequacies in adolescent literacy gained national attention.

In 2005 President Bush vowed to spend over \$200 million on a "Striving Readers" initiative toward improving literacy for middle and high school students; however, the project was first funded \$24.8 million as a Title 1 demonstration program in

FY 2005 and has since seen only slight annual increases. If Striving Readers is signed into law in FY 2008, \$200 million could be authorized with funding increases through FY 2012 (Heller & Greenleaf, 2007).

Reading comprehension instruction in content classes has the potential to make a difference in middle school students' lives (Alvermann, 2001), and has gained attention in the political arena through such programs as Striving Readers. Despite the fact that Striving Readers' annual allocation was considerably less than proposed, introducing the Striving Readers' program was an admission by the federal government that funding was necessary to address this very real issue.

As students move into middle and high school grades, often little or no reading strategy instruction is offered to help them learn from text (Vacca, 1998). Part of this situation stemmed from the view that once students learned to read, their study of reading was complete and they could tackle any reading activity. This was generally not the case. The International Reading Association (IRA) created the Commission on Adolescent Literacy for the purpose of once again initiating attention on reading and learning in middle and high school. The Commission pointed out that between the ages of 10 - 18 literacy learning was especially important for success in school and beyond school. Moore, Bean, Birdyshaw, & Rycik (1999), in a report for the Commission, stated:

Adolescents entering the adult world in the 21st century will read and write more than any other time in human history. They will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives (p. 3).

This same message was echoed in the science literature. To achieve scientific literacy, students must be able to use reading and writing as vehicles to learn science (Glynn & Muth, 1994).

Reading research has documented the need, yet few content teachers seem to embrace the idea of content reading instruction in their classrooms. Researchers cited a number of potential reasons to explain the absence of reading strategies in content classrooms. Some content-area teachers believed that teaching reading was someone else's job. Other reasons for the absence of reading strategies in content classrooms included content teachers' belief that they lacked the ability and/or training to teach reading, or they were bound by time constraints (O'Brien et al., 1995; Ratekin et al., 1985; Stewart & O'Brien, 1989). Some teachers viewed literacy as low priority and the responsibility of the English teacher (Lester, 2000). To learn how and why teachers used literacy in the subjects they taught required exploring their beliefs and allowing their voices to emerge (Moore, 1996).

Yet the questions needing to be answered remained: Why had reading strategy instruction not been implemented in content-area classes on a large scale? What did research reveal about why content teachers had not implemented reading strategy instruction in their content classrooms? Researchers advocated that content-area classrooms were the best place for reading strategy instruction to be taught, and the content teachers who were the subject matter experts should be the teachers (Gouthro, Griffore, & Armstrong, 2003). As noted in their *Think Literacy Success* handbook:

Content area teachers can do the best job of teaching the reading and writing skills required by their discipline. This teaching does not require “time-out” from content-area instruction. It happens side by side with content acquisition. The objective is to increase content learning; the invaluable by-product is overall improvement in students’ literacy skills. (p. 23)

It was well documented that many middle school students struggled to comprehend text. It was also well known that explicit instruction in reading strategies could help students comprehend text. Yet research on reading comprehension in content classes has not made its way to the classroom very frequently.

Purpose of the Study

This study grew from the voices of middle school (seventh- and eighth-grade) science teachers in a large district who expressed their concern for their students’ difficulties in comprehending required science text. Their concerns elicited the attention of the district middle school science coordinator, who orchestrated the development of a small committee of middle school science and reading teachers to create a reading strategies handbook for the district’s middle school science teachers. Hand-picked reading strategies matched to required science text were assembled into a handbook, *Reading Strategies Handbook for Middle School Science Teachers*, which was piloted by a small group of district science teachers that school year. At the conclusion of the pilot year, the *Handbook* was revised and introduced to the district’s 300 middle school science teachers at a district in-service held at the beginning of the next school year. All

middle school science teachers left the in-service with the *Handbook* in hand and the expectation that they were to begin to implement the reading strategies that school year.

My interest in this *Handbook* lay with the teachers as they implemented it. Because research indicated that the quality of teachers' instruction influenced student outcomes (Guskey, 2002), I thought teachers' beliefs and attitudes toward the *Handbook* would impact their implementation of it. I believed this bigger idea may also speak to teachers' implementation of new instructional materials in the classroom.

Research Questions

The following research questions guided this study:

1. What influenced teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers*?
 - a. What were the external influences that influenced teachers' implementation of the *Handbook*?
 - b. What were the internal influences that influenced teachers' implementation of the *Handbook*?
2. How do teachers respond to the introduction of new curricular materials by a school district?

2. Conceptual Framework and Literature Review

This chapter begins with a description of my experiential knowledge as a middle school science teacher, desiring to help my students learn techniques to comprehend their science textbook and achieve scientific literacy. The next section discusses content reading, beginning with a historical perspective, followed by a description of barriers that impact teachers' implementation of reading strategies in middle school science classrooms. The chapter's third section provides a history of professional development, characteristics of effective professional development, and professional development models and designs. Teachers' beliefs are the next topic of discussion. The final section of the chapter focuses on teacher change literature.

Experiential Knowledge

My interest in content reading evolved from my experiential knowledge as a middle school science teacher and was fed by my academic experiences in my master's and doctorate coursework. Inclusion of my experiential knowledge in this chapter explains the background for my interest in content literacy.

As a middle school science teacher for a decade, I witnessed my students' struggle to comprehend required science text. Students insisted they had read the text; yet, they claimed not to understand it. Moving their eyes across the page as they recognized the words did not ensure they gained meaning from those words. I observed

many students' frustration and lack of interest in science when they were required to read science text. I felt my own frustration when directing students' to reread, and often this rereading did not result in students' increased understanding of the text.

My momentum to return to college began in my classroom. From my perspective as a middle school science teacher, my responsibility was to help my students learn how to comprehend the required text readings. I thought if I could help them to comprehend the text, they would learn the science content and have a more positive attitude about middle school science, resulting in improved self-efficacy toward science.

As I learned reading strategies in my master's program, I experimented in my science classroom, implementing several reading strategies aimed at helping my students improve their reading comprehension of required science text. I realized the students often lacked prior knowledge of the topic. Students began to see that reading was not a passive activity, but it required their active engagement to make meaning from those words on the page. When they completed reading, I asked them to reflect on what they had read and how the reading related to what they already knew about the topic.

I began to witness students' increased reading comprehension as they tackled reading required science text. My students began to exhibit more positive attitudes toward science. These experiences contributed to my belief that explicit reading strategy instruction in a middle school science class could improve comprehension of required science text.

Earning my master's degree in reading opened the door for a position as a reading specialist at a middle school. My experience as a science teacher provided firsthand

knowledge of my students' diverse reading levels in a middle school science classroom. Those experiences helped me to see that some students struggle to comprehend science text primarily because of the textbook—not because they are poor readers. I realized that I had gained understanding and tools to use with students. Although many of my colleagues also recognized the problem, they were unsure how to begin. Follow-through was needed as attention to this issue was long overdue.

Additionally, I realized that knowing science was related to more than academic achievement, but was necessary for a lifetime as a member of society. From this perspective, I sought to learn more about scientific literacy.

Scientific Literacy

The National Academy of Sciences (1995) defined scientific literacy as “the knowledge of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity”. This definition recognized the distinction between educating for professional expertise and educating for civic responsibility. Many have argued that regardless of the educational focus a student follows, scientific literacy was not attainable devoid of reading (Hodson, 2002).

The National Academy of Sciences (1995) identified the attributes of scientifically literate students as those who:

- Have the knowledge and understanding of scientific concepts and processes required for participation in a Digital Age Society.
- Can ask, find, or determine answers to questions derived from curiosity about everyday experiences.

- Have the ability to describe, explain, and predict natural phenomena.
- Are able to read with understanding articles about science in the popular press and engage in social conversation about the validity of the conclusions.
- Can identify scientific issues underlying national and local decisions and express positions that are scientifically and technologically informed.
- Are able to evaluate the quality of scientific information on the basis of its source and the methods used to generate it.
- Have the capacity to pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately. (p. 18)

Holliday, Yore, and Alvermann (1994) stated that scientifically literate students must have the reading ability to evaluate text, the writing ability to communicate their ideas to others, and ultimately impact their own thinking. Holliday et al. described reading and writing as conceptual tools for helping students analyze, interpret, and communicate scientific ideas.

As our country's economy shifts from an industrial, manufacturing base to a technological base, more scientifically literate individuals will be needed to fill job demands. This shift will also require workers with a high proficiency in reading and writing (Loranger, 1999). Educators have set a goal for all students to be scientifically literate in the 21st century (Nelson, 1999). To work toward that goal, the issue of reading comprehension of science text must be addressed. Concerns exist about whether U.S.

students will be ready to meet the job demands of the 21st century based on data related to students' reading progress (Rand Education, 2004).

According to data from the National Assessment of Educational Progress (NAEP), the reading skills of fourth grade students improved significantly in recent years, particularly among low-income and minority students. The growth was attributed to the considerable resources and attention that early literacy instruction has received. However, at the secondary level where limited resources have been available, reading scores have remained unchanged since the 1970s when the NAEP was created (Heller & Greenleaf, 2007). The Programme for International Achievement (PISA), a triennial worldwide test of knowledge and skills in reading, math, and science in 2000, was administered to 15-year-olds in the principal industrialized countries. Scores from this test indicated that the United States students lagged behind the achievement of students in many other nations (Allington, 2002; National Center for Educational Statistics, 2001).

Because science will have a powerful impact on the quality of personal lives, on the environment, and the world economy in the 21st century (Glynn & Muth, 1994), students must be scientifically literate and recognize the importance of science throughout their lives to succeed in this century. In addition to public policy issues, scientific literacy will impact students as they enter an increasingly scientifically based workforce (National Academy of Sciences, 1995).

To summarize, the increased attention toward becoming a scientifically literate nation is due in part to the nation's economic shift to technology, requiring a higher level of literacy to meet labor demands. Educational statistics gathered indicate that many

students lag behind other nations in reading, causing educators to question whether students will be prepared to meet job market demands. Scientific literacy is more than listing facts. Shanahan (2003), for example, suggests including multiple texts to teach content and foster scientific literacy. Yet the dilemma is that despite these recommendations, some middle school students struggle to comprehend their science textbooks. The next section focuses on content reading.

Content Reading

For decades, reading researchers have acknowledged that some students experience difficulty comprehending content text and have advocated that content teachers be responsible for teaching the reading skills necessary to comprehend content, since they are most knowledgeable of that content. Yet that suggestion has not gained popularity among many content teachers. Research has revealed multiple factors that may influence content teachers' decisions whether to include or exclude content reading instruction as they teach their content. Therefore, it is important to review the many influences that may impede content teachers' integration of reading and reading instruction in their classrooms.

This section begins with a historical view of content reading and then focuses on influences on teachers' implementation of reading strategy instruction in middle school content classrooms. Influences are discussed in terms of three aspects: teachers, content, and context. The historical perspective of content reading will be discussed first.

Historical Perspective

American schools before the 1900s were predominantly institutions of memorization. Several educators such as Horace Mann and John Dewey offered suggestions for progressive changes that gradually altered American education. As early as the mid 1850s, Horace Mann denounced memorizing passages from a text and popularized the idea of reading for meaning. John Dewey, like Mann (Moore et al., 1983), criticized rote learning. Dewey promoted the idea that school activities be tied to children's experiences, interests, and problem solving abilities. In *How We Think* (1910), Dewey stressed the need to assist students in learning to reason independently.

Huey's publication of *The Psychology and Pedagogy of Reading* (1908) offered yet another new idea to education, that thinking was essential to reading. In his book Huey outlined the reading process with particular attention to meaning. Despite Huey's contribution, the direction of reading research shifted toward an emphasis on words in isolation, and attention to passage comprehension did not resurface until the development of cognitive psychology in the 1970s (Moore et al., 1983).

The slogan "Every teacher a teacher of reading" grew in popularity due to the firm beliefs in content area reading of William S. Gray during the early 1900s (Moore et al., 1983). Gray promoted reading across the disciplines, differentiating "recreational" from "work-type" reading, in a chapter he titled, "The Relation of Reading to Content Subjects and Other School Activities" in the 24th *National Society for the Study of Education (NSSE) Yearbook* (Whipple, 1925).

As interest in the success of American schools increased, standardized tests were developed. Smith (1919) conducted a study comparing students' scores on reading tests to grades earned in English and algebra, concluding that a relationship did exist between reading ability and school achievement. Subsequent studies (e.g. Wagner, 1938) confirmed Smith's findings that content area reading was necessary for students' success in their content subjects.

Qualitative methods, including observations and interviews, were utilized by McCallister (1930), who visited junior high Mathematics, American History, and General Science classes to identify the types of reading skills and activities students were required to complete in those subject area classes. In a later study, McCallister (1932) observed students performing these tasks and categorized the reading difficulties he witnessed. His findings revealed that students experienced difficulty due to the differences that existed between reading and teaching in each content subject. He recognized the benefit of guidance for good and poor readers alike, believing that it was the responsibility of every teacher to provide support to students in reading.

At this same time, psychologists G. Stanley Hall and Arnold Gesell studied the growth patterns of children, and concluded that developmental differences among children accounted for children's varied reactions to situations (Moore et al., 1983). Reading researchers applied these findings to reading and concluded that content-area reading instruction needed to fit individuals' abilities for all grades with various texts and tasks (Gray, 1939). Educators promoted the need for differentiated instruction and

readiness activities, discrediting the assumption held by some teachers of “one size fits all” (Moore et al., 1983).

Despite the large body of reading research related to content reading gained during the first half of the 20th century, several decades of stagnation occurred. It was not until the 1960s and 1970s that researchers began to call again for reading instruction in secondary classrooms. Umans (1963), an advocate for content teachers teaching reading, voiced her belief that the responsibility for content reading should rest with those teachers in the subject matter classrooms. She noted:

Studies have shown that the ability to read adequately in one subject area does not in itself insure the ability to read adequately in another subject area. The skills necessary for reading social studies are quite different from the skills necessary for reading mathematics, or the skills needed for proficiency in reading literature.... Reading presents these special problems in the subject area where there are special reading skills required to read and understand the content of the curriculum. Because of this, each subject teacher must teach reading as well as his own subject. (pp. 6-7)

Umans added that since subject teachers typically were not trained to teach reading in their subject areas, it was the responsibility of the principal and the reading specialist, if there was one in the school, to design in-service programs for the subject teachers. Through this training, Umans believed that reading skills would become an integral part of each subject area. Umans admitted that helping subject area teachers teach reading skills in their subject areas was a difficult task, yet a necessary one. Umans

commented that the feeling persisted that reading was always taught “elsewhere” and “at another time” (p. 7).

Herber contributed to the resurgence of content reading in 1970 by addressing the best location for students’ reading instruction: a separate reading class or content classes. His book, *Teaching Reading in the Content Areas* (1970), was the first to focus solely on content reading instruction. As the title suggests, Herber expressed his belief that content teachers should teach reading with their subject matter.

Almost a decade later, Durkin (1978-1979) conducted a study of 24 upper elementary classrooms focused on classroom observations of reading and social studies to determine whether schools were providing reading comprehension instruction. Her study revealed that little comprehension instruction was occurring in those classrooms. Durkin observed over 4,000 minutes of reading instruction; however, she identified only 20 minutes of actual comprehension instruction. Durkin found that teachers tested comprehension, although they did not teach it. Further, students were assigned to read and comprehend text, but they were not taught how to use comprehension strategies to understand the text.

Additionally, social studies teacher participants in Durkin’s study believed their responsibility was to cover content and have students master facts. None of the observed teachers viewed social studies as a time to assist students with reading comprehension. Some researchers attribute Durkin’s study to an explosion of research in reading comprehension instruction in the two following decades, when the skill-based paradigm that dominated reading education from the early 1900s shifted to a cognition and learning

paradigm, which some researchers argue is still present today (Vacca & Vacca, 2001). On the contrary, an explosion of content reading instruction in content classrooms never occurred in 1980s or 1990s as some researchers had predicted (Pressley, 2004). However, a number of researchers (e.g. Moje, 1996; Sturtevant, 1992) did observe secondary content teachers to learn how those teachers used literacy in their content classes. These researchers' findings revealed that teachers' beliefs about teaching and their beliefs related to teaching their content subjects had an impact on the types of literacy activities they chose to use. Teachers' beliefs were influenced by trusted colleagues, other teachers, friends, and early experiences (Sturtevant, 1992).

Throughout the 20th century, reading educators advocated that content teachers should teach reading as it pertains to their subject areas, yet this recommendation has not become a visible component in many middle school science classrooms. Reading researchers continued to advocate that students needed reading instruction beyond elementary school to support students' comprehension of the various reading materials, including textbooks, that are used in middle and high school content classrooms. Reading researchers argued that content teachers were very knowledgeable of their content subjects as well as the skills students needed to know to be successful in those subject areas. Yet a limited number of examples where reading strategy instruction has been implemented in content area classes exist. The next section will review influences researchers have found that may be constraints for content teachers' implementation of reading strategy instruction in their classes.

Influences on Implementing Reading Strategies in Content Classes

Many research studies revealed factors that impact content teachers' implementation of reading strategies in their content classes. These influences or constraints will be discussed in relation to the teacher, curricular issues, and the context. Influences related to the teacher will be discussed first.

Teacher Influences

According to several studies, some middle school teachers' decisions to implement or not to implement reading strategy instruction in their classes were influenced by their feelings of insufficient knowledge to teach reading strategies (Bintz, 1997; Blanton, Wood, & Taylor, 2007; O'Brien et al., 1995). Often teachers' formal education in reading strategy instruction was limited to a content reading course required by a university or state licensure board. Content teachers holding degrees earned prior to state-mandated reading course requirements often had no educational content reading experience.

During the last two decades, the number of states requiring pre-service teachers to take a content reading class has increased dramatically. As of 1996, 47 states and the District of Columbia had a content reading course or competency requirement (Romine, McKenna, & Robinson, 1996). Researchers, unfortunately, report that the course requirement has often not translated to pre-service teachers' implementing reading strategies in their content classes when hired. On the contrary, infrequent transfer of methods from university to secondary classrooms was reported (Laine, Bullock, & Ford, 1998).

Secondary school methods textbooks were cited as another factor contributing to some teachers' failure to implement reading strategies. Draper (2002) conducted a study that examined nine content method textbooks representing three content areas (three from each content area). Her findings pointed out that although literacy was determined to be important in mathematics, social studies, and science textbooks, little information was available about which strategies teachers could use. She also mentioned that the subject area methods textbooks implied reading was a passive activity, conveying a contradictory message about literacy than what appeared in content-area literacy texts. Draper concluded that this may contribute to content teachers' resistance to assist students with reading instruction in their content classes.

Steiglitz (1983) suggested over two decades ago that one course may not be adequate for teachers to integrate reading strategy instruction into their content classes. Alvermann, Hayes, Dillon, and Layton (1985) pointed out that one content course is just a beginning, and follow-up with a mentor teacher or university personnel to witness classroom application of the strategy, along with feedback related to the application's effectiveness may be necessary for content teachers to implement reading strategy instruction in their classrooms. Further, Romine, McKenna, & Robinson (1996) add that "unless courses are supplemented or restructured to encourage actual implementation or effective instructional techniques, little positive change can be expected in U.S. subject matter classrooms" (p. 197).

In 1999 Maryland led the way in the U.S. in making the decision to increase their reading requirement from one reading course to two reading courses for pre-service

teachers. Additionally, as in-service teachers apply for recertification in Maryland, they too need to meet the new requirement offered through either on-site staff development courses or at local colleges (Allen, 2000). This action was prompted by the lagging reading scores of Maryland's middle school students (Maryland State Department of Education, 2001).

The scarcity of reading strategy implementation in middle and high school classrooms has often been attributed to content teachers' perceptions of their role as educators. Many middle and high school teachers may have become teachers due to their intense interest in a discipline. Choosing to follow their passion, many content teachers have not focused on teaching students to learn (D'Arcangelo, 2002). In several studies, secondary teachers rated teaching content their highest priority (Yore, 1991), often perceiving themselves as experts in their field. In a paper Moje (2006) presented, she pointed out that, "Teachers hold cultural beliefs about what the appropriate practices are of their respective disciplines." These beliefs about their content areas may be a cause of teachers' reluctance to implement reading strategies in their content classrooms.

Teachers also held perceptions of reading that affect their instruction. Often they assumed that reading problems were instructional issues; however, reading problems extended to theoretical and curricular issues. Some content teachers viewed their subject area as their number one priority and believed that reading was of lesser importance (Lester, 2000). O'Brien et al., (1995) commented:

the primacy of subject areas, the status hierarchy of subject areas, and the expectations these engender in students and teachers influence attempts at

infusing secondary-school classrooms. However, explicit content literacy strategies directly confront and challenge the dominance of subject area compartmentalization, the status hierarchy among subject disciplines, and the constraining expectations of students. (p. 449)

Although learning reading strategies was one step in the right direction, a commitment was also required by teachers to consider their assumptions about learning and ideas of curriculum. Flood (1986) commented that, “Texts cannot teach children to read, teachers can” (p. 786). Furthermore, Bintz (1997) stated,

[Teachers need] . . . to see their instructional strategies as expressions of their personal values about how people learn in general, and learn to read in particular, and to reflect on the extent to which these values reflect recent advances in learning and reading theory (p. 23).

Although teachers may express dissatisfaction regarding their lack of formal education in reading, some researchers suspected that teachers may feel uncomfortable with teaching reading due to their personal beliefs about themselves as readers. For instance, some teachers did not read very much unless they were reading in their content areas and therefore did not view themselves as avid readers (Bintz, 1997). Consequently, teachers may find it difficult to try to motivate their students to read.

Middle school science teachers may share the belief that students entering middle school science classes learned to read in elementary school, and are dismayed when they realize that many students did not understand how to use reading for learning science content (Santa, Havens, & Harrison, 1996). In addition, even proficient readers may

suddenly begin to experience difficulty reading content texts when they enter middle school (Allington, 2002). A critical issue arises when students are required to comprehend textbooks. Some secondary teachers have blamed parents for not stressing and supporting reading at home from the early grades, or believed teachers in the earlier grades did not do their job and teach students to read (Bintz, 1997). Curricular issues will be discussed next.

Curricular Issues

Researchers cited curricular issues as a second influence to teachers' implementation of reading strategies in their content classrooms, including focusing on the textbook. Studies revealed that textbook-based instruction dominated most science classrooms (Chiapetta, Sethna, & Fillman, 1991; Finley, 1991; Olson & Dishner, 1996) while other studies revealed that students struggled to comprehend science textbooks for a multitude of reasons (Allington, 2002; Ivey, 2002).

One reason is related to students' reading experiences in the elementary grades. Students learned to read through narrative text with familiar topics and story formats (Barton & Jordan, 2001); however, by middle school students were expected to read and comprehend expository text. In elementary schools, students were exposed to a variety of reading strategies to comprehend narrative; however, regardless of the numerous studies advocating and highlighting the importance of comprehension strategy instruction for expository text, this type of comprehension strategy instruction may have occurred only minimally in elementary schools (Block Collins & Pressley, 2002). Many researchers believed that teachers needed to provide direct instruction for students to transition from

comprehension of narrative text to comprehension of expository text (Duke, 2000; Flood, 1986).

With attention focused on content subjects in middle school, emphasis for instruction shifts from learning the process of reading to reading to gain information. Obtaining information from content-area textbooks was a new challenge for students since the information was presented in unfamiliar ways (Barton, 1997). Many students' limited experience with expository text caused them reading comprehension problems (Flood, 1986).

Recently, educators and policymakers' focus on raising academic achievement has caused textbook adoption committees to look to harder textbooks (Allington, 2002). Science textbooks are often written two or more years above the grade level of those students expected to read them (Budiansky, 2001; Chall & Conrad, 1991). Even more alarming is districts' purchase of the same book for all students. The one-size-fits-all approach is not suited for meeting the needs of all students, since all students in a class will inevitably not be reading on the same level (Allington, 2002).

As a consequence, inappropriately leveled text often "ends up" in the hands of middle school students. Students' inability to comprehend the assigned text can result in students not reading the text because they cannot; or they become unmotivated to read when the books they are expected to read are too difficult (Fisher & Ivey, 2005; Ivey, 2002). In fact, inappropriately leveled text may contribute to teachers' bypassing the text for a "telling-lecture" instructional model in an attempt to have concepts covered and avoid "the painful process of coercing students to read" (Fisher & Ivey, 2005, p. 6).

To resolve this issue requires identifying and purchasing appropriate texts that are matched to students' reading levels (Barton & Jordan, 2001; Ivey, 2002). Alternative texts include trade books or magazines that focus on the concepts and processes being studied (Ivey, 2002). Ivey strongly advocates that content teachers and districts address students' reading levels and extend reading materials beyond the scope of "one size fits all instruction":

The textbook, after all, is still the textbook. Even the best strategies in the world will not help students to read something that presents unfamiliar concepts in language far beyond their reach. Instead of creating new and better strategies to help the students read the textbook, why not provide different kinds of materials that students can read with minimal support to build comprehension and interest?
(p. 21)

The result of students not reading the text and teachers choosing a telling teaching style is often a cyclical occurrence (Billmeyer, 1996; Pressley & Wharton-McDonald, 1997). Some students are unable to read the text due to textbook readability issues, while others who can read choose not to read it, knowing from experience that the teacher will lecture on the assigned reading the following class session. Teachers often choose to lecture on the reading assignment regardless of whether students have read the text or not to keep the momentum going as they are pressed for time "to move on" and continue the race to cover the curriculum (Vacca & Vacca, 1999). Hence, the cycle is continued and students miss opportunities to improve their reading skills.

Several features of textbooks, including vocabulary, style, and syntax, may cause difficulty for students. Vocabulary is critical in content-area textbooks for several reasons, yet it can present a number of issues for students (Barton, Heidema, & Jordan, 2002). Attempting to cover it all, textbook publishers bombard students with vocabulary and concepts and then often fail to include adequate explanation for those words and concepts (Daniels & Zemelman, 2004). Many of the major concepts students are required to know are represented by that unfamiliar vocabulary.

Textbook style also often contributes to students' inability to comprehend textbooks (Barton, Heidema, & Jordan, 2002). In an effort to include required topics covered in numerous states' standards, textbook writers provide limited descriptions and explanations to support scientific beliefs, leaving students with inaccurate background knowledge to make sense of key ideas (Finley, 1991). Different structural patterns found in informational texts, such as comparison/contrast, problem/solution, chronological, and proposition/support used to help students understand and organize new information have also been identified as barriers to some students' understanding of their science textbooks (Barton, 1997).

Additionally, text syntax becomes more difficult in the middle grades, along with a greater emphasis on inferential thinking (Allington, 2002). Science textbook writers often imply rather than explicitly state the hierarchy and relationships between ideas. Familiar key words used to indicate the connections among ideas such as first, next, another are frequently absent in science texts, resulting in students' confusion about the

relationships between ideas in the text (Barton, Heidema, & Jordan, 2002; Daniels & Zemelman, 2004).

Attempting to compete with the “hyper-world of the Internet and video games” (Daniels & Zemelman, 2004, p. 41), textbook publishers often create textbook pages that are so busy they interfere with students comprehending the page’s content. Textbook graphics are frequently referred to as distracters since they can interfere with students’ comprehension of the text. This finding was reiterated by American Association for the Advancement of Science (AAAS), who commented that the design for contemporary textbooks is “hyperkinetic” (Budiansky, 2001). Budiansky (2001) stated,

While the substance of the middle-school texts focuses on such dry facts and terminology, the form the books take borders on the hyperkinetic. They are full of sidebars, boxes, and other presumably eye-catching special features bearing such titles as “Flex Your Brain,” “EXPLORE,” “Find Out!” and “Minds On!” The claim is often made that with today’s generation of television-reared, short-attention-span children, books need to offer all sorts of bright, short, attention-getting tidbits (p. 25).

Research studies confirm that for many school districts the textbook is the curriculum, a “one size fits all” approach to content instruction. From the literacy perspective, relying on one textbook leads students to believe it is right to accept one view (Daniels & Zemelman, 2004)—when, in fact, proficient readers rely on multiple sources to gain a balanced understanding. Daniels & Zemelman commented that textbooks become “authoritarian” (p. 43) in nature when the entire curriculum for a

content course is built around one source. Some researchers comment that middle schools contribute to students' reading problems with the "one text" mentality (Allington, 2002).

Middle school students would benefit from a curriculum that utilized multiple leveled and sourced content texts. Allington (2002) recommended using varied multi-leveled texts and other resources based on his observations of classrooms of exemplary teachers. These teachers did not dispose of the traditional textbooks, but rather included them as a component of their content resources.

Since textbooks are costly investments for school districts, textbooks are infrequently replaced. As a result, textbook information is sometimes inaccurate or outdated long before the district adopts a new textbook (Daniels & Zemelman, 2004). Textbook publishing is a business focused on sales and profits, needing to appease multiple individuals, groups, and agencies such as school district personnel, teachers, and state officials. Publishers attempt to please teachers' requests for all the "bells and whistles" they can cram into the new edition (Daniels & Zemelman). Additionally, publishers must attend to the various state content standards which are assessed on the states' high stakes tests (Daniels & Zemelman). Context will be discussed next.

Context

Context is discussed in relation to school structures to include time and a departmental structure as obstacles to implementing content literacy practices (Moje, 2006). Also, O'Brien et al. (1995) stated that the secondary school as an institution needs to be considered as a factor in teachers' decisions whether to implement reading strategies.

According to several studies, secondary teachers may recognize the potential value of reading strategy instruction, but voice concerns about the amount of time required to implement some reading strategies (O'Brien et al., 1995; O'Brien & Stewart, 1992) when the curricula is already crowded (Bulgren, Deshler, & Schumaker, 1997). Some teachers even view teaching reading as an added burden (Readence, Bean, & Baldwin, 1989). However, the time is arguably well-spent, since according to many researchers, explicit reading strategy instruction can considerably improve students' reading abilities (Fielding & Pearson, 1994). According to Fielding and Pearson, the research of the 1980s repeatedly showed that comprehension strategy instruction can be particularly effective for students who struggle to comprehend the text since they are less likely to invent effective strategies independently than are skilled readers. Research conducted by Glynn and Muth (1994) concurred that comprehension strategy instruction can improve science content learning.

Researchers state that comprehension can be taught (Fielding & Pearson, 1994) and integration of reading and subject matter instruction can successfully be learned by most teachers (Blanton et al., 2007). For example, Scanlon, Deshler, & Shumaker (1996) conducted several studies training content area teachers to use literacy strategies in their classes. However, although the teachers were taught explicit strategy instruction, they did not entirely implement those strategies, claiming the reading strategies were too time consuming and implementing them interfered with their teaching key points of their curriculum. Teachers blamed their choices to "cut short" instruction on the amount of

curriculum they were responsible for covering, thus limiting opportunities for students to practice the strategies.

Some researchers have suggested that secondary teachers may view reading strategies as supportive for traditional education practices, such as getting information from text and studying for exams (O'Brien & Stewart, 1992; Vacca & Vacca, 1993). However, this cannot get to the heart of students gaining content literacy. Blanton et al. (2007) stated that:

Reading ability and reading to learn from subject matter text are much more than the mastery of isolated skills. Reading to learn from text is a complex task that requires social interaction among teachers and students in order to understand how reading works and to successfully construct meaning and understanding. Reading to learn from text represents a unification of language to frame the learning task and its purpose, language to regulate the monitoring of reading, application of strategies, and the selection of appropriate information. It is also synthesizing interactions with others during discussion to construct a sense of meaning and understanding for further regulation and the generation of new knowledge. (pp. 79-80)

Content literacy practices may clash with secondary school culture, organization curriculum, and pedagogy (O'Brien et al., 1995). According to Moore (1996), the contextual conditions in the school as well as societal forces may impact teachers' decisions whether to implement literacy practices in their classrooms. High schools are

divided by content areas or disciplines which become subcultures differing greatly from one another. Moje (2006) commented,

Content-areas become sub-cultures of the secondary school, with their own ways of knowing, doing, and believing. The structures of time and space influence how that knowledge can be constructed. Time constraints often cause students to become collection receptacles of information spouted by teachers resorting to a pedagogy of telling to cover the curriculum.

State mandated tests. Throughout the U.S., most school districts are faced with the pressure of high stakes testing and local, state, and federal mandates for student achievement; this can cause strong concerns for the direction of content literacy (Blanton et al., 2007). In reaction, some districts have purchased prepackaged materials that sometimes are formatted to resemble high stakes tests in an attempt to insure success (Blanton et al.). Although publishers tout the materials as aligned with state standards, the materials are often decontextualized, focusing on skills and drill and teacher-directed literal-level questions (Blanton et al.). According to some researchers, high stakes testing has resulted in less time allotted for reading and subject matter instruction, with increased time spent teaching test-taking skills (Ananda & Rabinowitz, 2000; McColskey & McNunn, 2000).

Non-instructional activities. Research studies also describe the non-instructional activities of content classrooms as constraints to implementing reading strategies. For example, a study conducted by Laine et al. (1998) revealed a wide range of non-

instructional activities that consumed an inordinate amount of time which could have been used for reading strategy instruction.

The setting for Laine et al.'s study was a middle school serving 800 students of low to low-middle socioeconomic background in a midwest urban school district. This particular school was chosen because the teachers had strong science backgrounds, the principal maintained a supportive attitude, and the content reading teacher was committed and enthusiastic. The study's four teacher participants volunteered and had participated in the district-sponsored reading across the content area workshops and had a minimum of 10 years of teaching experience.

Laine et al.'s data were collected by a continuous time device designed to monitor time devoted to three activities: content reading instruction, content instruction activities other than reading, and no instruction. Three research assistants were trained to use the time device with checks for inter-rater agreement holding at least 80%. Twenty-four class periods were observed for a total of 18 hours. The research assistants observed the entire 45-minute class period. Each teacher was observed a minimum of 135 minutes over the three class visits, and three teachers were visited for a total of 270 minutes. Observers, the three research assistants, additionally recorded the instructional activities occurring in the classroom, thus validating the observation codes used by the instrument.

This study revealed the distribution of time used during a class session. Laine et al.'s findings revealed that non-instructional activities accounted for 20% or 9 minutes of the average 45-minute class period. These activities included teachers taking attendance, making announcements, responding to visitors at their doors, doing housekeeping chores,

interruptions by public address announcements, classroom misbehavior, visitors with messages, students with tardy passes, and mandated assemblies and pep rallies. Teacher participants were appalled when they heard that on average one-fifth of each class session was monopolized by non-instructional activities, yet they believed the study provided them with a clearer understanding of the enormous amount of time non-instructional activities infringed on instructional time. Boyer (1983) captures this finding in earlier research as well, commenting that the typical secondary classroom “is a swelter of routine procedures and outside interruptions that come to dominate the life of students and teachers alike and in the end, restrict learning” (p. 141).

In summary, historically, the concept of content teachers’ teaching reading related to their content areas has been a topic of concern for almost a century, yet the discussion has apparently yielded minimal results. Influences on implementing reading strategy instruction in middle school content classes are many. The research to date has focused on these issues: the teacher; curriculum issues, especially related to the text; and context of school structures, including time and departments. Professional development is the next topic to be discussed.

Professional Development

Teachers’ professional development has become a major focus of school reform initiatives. Policymakers and researchers promote the significant role professional development plays in teacher effectiveness and student achievement, commenting that professional development is critical to the success of new initiatives. Therefore, it is

important to include a review of the body of literature on professional development when studying the implementation of new curricular materials.

This section begins with literature related to the history of professional development, leading to a synthesis of well-known lists identifying characteristics for effective professional development. Models of professional development are presented, followed by implementation designs; the section concludes with literature related to barriers to professional development.

Historical Perspective

In-service education, staff development, professional development, human resource development (Sparks, 1994), and in-service workshops (Schmuck, 1994) are some of the terms that have been attached to the training of teachers by school districts during the last 75 years. Often, individuals who ran the sessions aimed to alter each participant's knowledge and attitudes about curriculum, learner psychology, or their own teaching skills. Teachers often sat "passively while an 'expert' presented new ideas or trained them in new practices" (Sparks, 1994, p. 26).

Traditionally, professional development was viewed as special events restricted to several days during the school year. In some states, in-service workshops were scheduled for a Friday in October and all following workshops were scheduled for after-school hours during the remainder of the school year (Schmuck, 1994). Teachers infrequently had input into planning these events, and seldom were the ideas presented at these events applicable to their teaching situations (Guskey, 2000). Some teachers viewed professional development as taking graduate courses to earn advanced degrees or opportunities to

advance in the district's salary scale. With standards education becoming the norm during the 1990s, professional development began to experience a paradigm shift.

With standards-based education gaining strength and policy makers beginning to hold educators accountable for students' success, staff development drew increased recognition as a necessary component in education. Staff development was no longer considered an add-on, but rather a necessity for large- and small-scale changes (Loucks-Horsley, 1994). Professional development in education gained importance when President Bush and the nation's governors cited professional development as one of the original six education goals adopted in 1989 (National Education Goals). Goal Four of Eight states that,

By the year 2000, the Nation's teaching force will have access to programs for the continuous improvement of their professional skills and the opportunity to acquire knowledge and skills needed to instruct and prepare all American students for the next century (National Transition Network, 1994).

Looking at the origin for the paradigm shift in professional development, Sparks (1994), the executive director of the National Staff Development Council since 1984, attributed the larger educational and political changes to the emergence of results-driven education, systems thinking, and constructivism. These changes, he believed, resulted in the paradigm shift in professional development. These changes will be discussed respectively.

Results-driven education is defined as outcome education and has altered the way success is measured. Traditionally, educational success was judged by the courses that

students took or the grades they received; however, results-driven education focused on what students knew and could do as a result of their time in school (Sparks, 1994). Staff development from this new direction meant that staff development success would be evaluated by whether the altered instructional component benefited the student. The impact of results-driven education on staff development required teachers and administrators to acquire new instructional knowledge and skills (Sparks). Consequently, the goal of staff development shifted to improved performance by students, staff, and the organization (Sparks & Hirsh, 1997).

Secondly, systems thinking, defined as thinking of the organization as a whole rather than parts, recognized the “complex and interdependent relationships among the various parts of the system” (Sparks, 1994 p. 27). Traditionally, educational leaders thought in parts, rather than in terms of a system with the connectedness of all parts (Sparks). From this approach, minor changes in the system have the potential to significantly impact other parts of the system, positively or negatively; however, it is conceivable that the effects of a change may not be visible for an extended period of time. As a result, observers may not make a connection between the minor change and the effect of that change (Sparks).

For example, a number of researchers have criticized schools for their fragmented approach to school change, commenting that school improvements are often based on fad rather than a clear vision of the school system’s future. The one-shot staff development session is cited as action without vision, lacking planned follow-up activities or connecting the session to previously taught information. Professional development

models limited to a single session or lasting two to three days do not provide time necessary for change to occur (Guskey, 2003).

Thirdly, the introduction of constructivist teaching led to constructivist staff development. Historically, constructivism can be traced to an 18th century philosopher, Giambattista Vico, who believed that people can only clearly understand what they themselves have constructed (Fosnot, 1993). More recently, constructivism is apparent in the work of John Dewey and Jean Piaget (Fosnot, 1993). Constructivists believe that knowledge must be constructed in the mind of the learner, unlike the traditional teacher “tell and direct” method (Sparks, 1994). Sparks commented that the movement toward students’ constructing knowledge was new for many teachers and required opportunities for teacher and administrators to learn. He advocated that constructivist teaching was best learned through constructivist staff development, inviting collaboration between teachers, administrators, peers, researchers, and students to make sense of what is to be learned in their own context. Therefore, staff development from a constructivist’s viewpoint should include activities such as action research, peer discussions about beliefs and assumptions that guide their instruction, and reflective practices.

According to Sparks and Hirsh (1997), result-driven education, systems thinking, and constructivism have contributed to large changes in staff development. For example, the emergence of some school districts, individual schools, and departments strategically planning has contributed to the development of mission statements and measurable objectives expressed in terms of student outcomes.

Synthesis of Characteristics for “Effective” Professional Development

The recent attention to professional development prompted researchers and research agencies, teacher associations, national education associations, and the U.S. Department of Education to develop and publish lists of characteristics supportive of “effective” professional development for their organizations (Guskey, 2003).

In search of a universal model of professional development, Guskey (2003) and several prominent researchers conducted a meta-analysis of 12 lists known to researchers and practitioners as a representative sampling of current lists. The *Standards for Staff Development* list published by the National Staff Development Council (2001) was chosen as the exemplar model for comparison. A synthesis of characteristics for effective professional development was created.

The committee identified and compared 21 characteristics collected from the lists. Six characteristics appeared in more than half of the lists as well as the *Standards for Staff Development*. The remaining traits or characteristics appeared on less than half of the lists and may or may not have appeared on the list of *Standards for Staff Development*. Of the 15 remaining traits, 7 characteristics were mentioned on three or fewer lists.

The characteristic of effective professional development most often mentioned in the studies that were reviewed was the enhancement of teachers’ content and pedagogic knowledge, appearing in 10 of the 12 lists as well as the *Standards for Staff Development* list. The repeated inclusion of this characteristic on lists emphasizes that most list developers believed that aiding teachers’ deeper understanding of the content they teach

and the ways students learn that content is an important component of professional development (Guskey, 2003). Additionally, a study conducted by Wenglinsky (2000) revealed that professional development that focused on higher-order thinking skills, mentioned in relation to improvements in student learning within a subject, had the potential to be effective. These findings were related to student progress in mathematics and/or science (Cohen & Hill, 2000; Kennedy, 1999; Wenglinsky, 2002).

A second characteristic, appearing on 9 of the 12 lists and the *Standards for Staff Development*, included the need for sufficient time and other resources for professional development. In most instances, this characteristic was directed toward teachers needing time to deepen their understanding, analyze student work, and develop new approaches to instruction (Guskey, 2000). Based on information collected by Birman, Desimone, Porter, and Garet (2000), “activities of longer duration have more subject-area content focus, more opportunities for active learning, and more coherence with teachers’ other experiences than do shorter activities” (p. 30) and are therefore important. However, all list developers were not in agreement on this characteristic, disagreeing as to whether time spent in professional development activities was a factor for improving student outcomes (Wenglinsky, 2002). The study’s committee concluded that the list developers who included the need for sufficient time for effective professional development agreed that the time needed to be well organized, carefully structured, and purposely directed (Guskey, 1999).

Collegiality and collaboration were also recurring topics on the 12 lists as well as the *Standards for Staff Development* list, highlighting the importance teachers assign to

opportunities to work together, reflect on their practices, exchange ideas, and share strategies and expertise (Guskey, 2003). In addition, King and Newmann (2000) noted that, “Teacher learning is most likely when teachers collaborate with professional peers, both within and outside of their schools, and when they gain further expertise through access to external researchers and program developers” (p. 576). Birman et al. (2000) added that, “Professional development activities that include participation of teachers from the same department, subject, or grade are more likely to afford opportunities for active learning and are more likely to be coherent with teachers’ other experiences” (p. 30).

Specific evaluation procedures were rated equally on the lists with collegiality and collaboration. Evaluation procedures have become commonplace with educators at all levels recognizing the need to collect formative data regularly to direct program improvement (Guskey, 2000, 2002). Additionally, the demands for accountability in professional development by policy makers contribute to the attention on evaluation (Killion, 2002).

The need for professional development activities to align with other reform initiatives and model quality instruction appeared on half of the lists as well as the *Standards for Staff Development* list. Attention to this characteristic grew from research related to similarities in the learning patterns of adults and children (Darling-Hammond & McLaughlin, 1995; Fullan, 1993).

According to Guskey (2000), well-planned and carefully organized collaboration between district-level personnel who view the problem from a broader sense and the site-

based educators who are cognizant of the primary contextual characteristics appears necessary for effective professional development. An integrative design that includes district personnel and site-based experiences improves the efficiency and effectiveness of the professional development (Guskey, 2000). Despite half of the lists mentioning that professional development should be school- or site-based, this characteristic was not included in the *Standards for Staff Development* list.

Building leadership capacity was also included on five of the lists and the *Standards for Staff Development* list. This highlights the current emphasis on developing teacher leadership with attention to developing instructional leaders at all school levels (Guskey, 2003).

Professional development that is driven by analyses of student learning data appeared on slightly fewer than half of the lists, but was included in the *Standards for Staff Development* list. Minimal mention of this characteristic seems counter to the current reform initiative to improve student performance (Linn, 2000).

Similarly, limited inclusion of follow-up and support was also noted. These characteristics were excluded from the *Standards for Staff Development* list as well. The same is true about “best” available research evidence; however, this characteristic was included on the *Standards for Staff Development* list. A characteristic appearing on fewer than three lists was excluded as evidence by Guskey (2003) or other researchers referring to this study.

A conclusion that can be drawn from this study is that “the characteristics that influence the effectiveness of professional development are multiple and highly complex”

(Guskey, 2003, p. 19). According to Guskey, “It could be argued that these lists were prepared for different audiences and those differences could likely affect how the lists were configured” (p. 15); further, no one list of characteristics for professional development seems to exist and it is questionable whether a single list of characteristics will ever be possible (Guskey). However, agreement on the criteria for “effectiveness” and clear descriptions of important contextual elements for professional development can lead to progress in improving professional development (Guskey, 2003).

Models of Professional Development

Researchers have identified multiple models of professional development. Loucks-Horsley, Hewson, Love, and Stiles (1998) identified 15 models for professional development experiences as compared to Sparks and Loucks-Horsley’s (1989) list of 5. The models chosen for discussion represent current popularity. The 6 models include: training, literacy coaching, mentoring, study group, involvement in an improvement process, and observation with assessment. These models will be discussed respectively.

Training

Training is the most common form of professional development and the most familiar model to educators (Guskey, 2000). The training model is structured with a presenter or a team of presenters, sharing their ideas and expertise in a variety of group-based activities which may include large group presentations and discussions, workshops, seminars, demonstrations, role playing, or simulations (Guskey). The most successful training sessions are organized with clear objectives or participant outcomes in mind. Effective training usually includes exploration of theory, demonstrations or modeling of

skills, simulated practice, feedback about performance, and coaching in the workplace (Joyce & Showers, 1995).

The training model's structure allows ideas to be shared with a large group at a time, making it the most efficient and cost-effective model of professional development. However, this model's structure limits opportunities for choice or individualization. Additional features necessary to support this model include multiple sessions spaced over time and the option for additional follow-up activities to allow for the feedback and coaching innovations (Guskey, 2000).

Literacy Coaching

Literacy coaching is a relatively new form of professional development performed by coaches who serve in a variety of capacities within the school. According to Sturtevant (2003), one of the most important roles of the literacy coach is to help teachers understand that their students “can develop content knowledge at the same time that they are improving in literacy” (p. 10). Literacy coaches are regarded as expert teachers, knowledgeable of literacy as well as understanding the specific literacy demands of each content area (Standards for Middle and High School Literacy Coaches, 2006).

The position as a literacy coach involves collaboration with teachers, administrators, and district officials providing ongoing job-embedded professional learning (Shanklin, 2006). Literacy coaches' responsibilities may include one-to-one assistance with teachers as they make improvements in their teaching and reflect on those efforts or assist teachers' review of student work and teacher learning. Other responsibilities of a literacy coach may include classroom observations; however,

researchers recommended that these observations are conducted as supportive of the classroom teacher rather than evaluative. Literacy coaches may work with groups of teachers by departments, in inquiry groups during professional development periods where teachers study particular topics, and during weekly after school planning meetings, sometimes helping to coordinate and provide follow-up support for a department or individual teachers following school-wide professional development related to literacy (Sturtevant, 2003). They may also lead professional development activities for the entire staff and school in-service programs.

Literacy coaches' responsibilities may also extend beyond the school to attendance at district- and state-level meetings to gain information about new ideas for curriculum revision to share with the school site (Sturtevant, 2003). This enables schools to have direct access to new ideas related to literacy.

Researchers are encouraged that literacy coaches will improve the quality of professional development; however, the number of literacy coaches is limited in secondary schools to date (Sturtevant, 2003). In schools where literacy coaching has been implemented, the results have been positive, but more research and evaluation is necessary as to the effectiveness of this approach.

Mentoring

Mentoring can be traced to Odysseus 3,000 years ago when he entrusted the education of his son to an advisor and friend named Mentor. Although the origin of mentoring is rooted in mythology, this model has been evident throughout the history of education of students, teachers, and administrators (Janas, 1996). The mentoring model

of professional development usually involves pairing a veteran (a very successful teacher) with a novice (a less experienced colleague). A schedule is developed to discuss various topics such as professional goals, ideas and strategies on effective practice, reflection on current methods, classroom observations, and suggestions for improvement. This model seems to be most effective when the mentor and mentee collaboratively develop the plan, and works best if both parties hold similar professional responsibilities (Guskey, 2000). A willingness to allocate sufficient time to work together by the participants is critical to the model's success. The individualized approach of the mentoring model of professional development can benefit both individuals. However, mentoring as a sole means of professional development may limit opportunities for broad collaboration and collegial sharing.

Study Group

This model of professional development can involve the entire staff at a school or a group of six to eight teachers. Group leadership can be shared, rotating for each group meeting. Equal participation by all members of the study group is crucial to success. The study group's primary purpose is to implement curricular and instructional innovations, collaboratively plan school improvement efforts, and study research on teaching and learning (Murphy, 1992, 1997). Typically, this model requires a year-long commitment by group members. Study groups reinforce the idea of a school as a community of learners for students as well as teachers engaged in continual and ongoing professional development (Guskey, 2000). In order for the study group model to be effective, homogeneous or heterogeneous groups of six to eight members are formed. Each group

must be well-organized, focused, and have adequate time allotted to completing their tasks. Opportunities to share findings and discuss recommendations are necessary components to this model.

Development With Improvement Process

This model recognizes that teachers are often asked to participate in developing or reviewing curriculum, designing new programs, planning strategies to improve instruction, or solving a particular problem (Guskey, 2000). However, this model is generally limited to a small number of participants who are developing the improvement in comparison to the total number of teachers who will use the developed process.

Depending on the purpose of the task, teachers may need to acquire new knowledge or skills through reading, research, discussion, and observation. Interest in reaching a solution to a problem or issue is usually the motivation for participation in this type of professional development (Guskey, 2000). Collaboration, unlike the isolation of a classroom, is an essential component in this model as participants increase their knowledge and share in decision making. Participants develop their knowledge based on researched evidence about best practices rather than being influenced by others' opinions.

Observation With Assessment

This model involves teachers observing other teachers, or a teacher being observed by a teacher and receiving feedback from that observation. Mutual benefits exist for the participants (Guskey, 2000). The observer gains professional expertise while watching a colleague, offers feedback of the observation, and can discuss similar experiences with the observed teacher following the observation. The observed individual

is offered a colleague's point of view, benefits from new insights, and is provided with helpful feedback (Showers & Joyce, 1996). Although many strengths exist for this model, it requires strong commitment by both the observer and the one being observed to coordinate their schedules. Implementation designs will be discussed next.

Implementation Designs

Two major implementation designs exist: a district-wide design and a site-based design. A third design, an integrated design, has also emerged and has been labeled as possibly the most effective professional development design (Guskey, 2000). The district-wide design will be discussed first, followed by the site-based design, and concluding with discussion of the integrated design.

District-Wide Design

One feature of the district-wide implementation design is that it offers a broader vision for improvement than the school-based design. Secondly, more opportunities for sharing ideas and resources are available at the district level. Teachers and administrators indicate that an opportunity to share resources and interact with colleagues who have similar responsibilities in other schools enables educators to broaden their perspectives, share materials and ideas, and expand their repertoire of professional practices (Fullan, Bennett, & Rolheiser-Bennett, 1989).

A third benefit of the district-wide design is the chance for teachers to collaborate across grade levels or content areas. As accountability for student outcomes continues to be a pressing topic, the need for teachers to articulate across all grade levels heightens (Guskey, 2003).

A fourth advantage of district-wide professional development is efficiency in sharing expertise. Professional practice in education is improved through increasing the knowledge base. Teachers have an opportunity to understand their content knowledge with educators who share common interests.

Despite the stated benefits of this design, minimal success in implementing new practices utilizing this type of design are noted for several reasons (Guskey, 2000). Frequently, these designs involve one-shot presentations, offering little that is related to the day-to-day problems of teachers and administrators, such as ongoing discussion of concerns related to implementing new practices (Goldenberg & Gallimore, 1991; Lawrence, 1974). Secondly, district-wide designs may fail to provide follow-up and support for successfully implementing the new practice (Guskey, 2003).

School-Based Design

The emphasis for the school-based design is on improvements at the school level. This design of professional development includes the entire staff sharing a common goal and seeking small annual gains. A three to five year span of time is allowed before expecting a significant change to occur, since most staff development programs that impact teaching behavior are spaced over time (Berman & McLaughlin, 1978). Teachers need time to become comfortable with an innovation and work through any difficulties implementing it. This takes time. As teachers try new techniques, they adapt and modify them to fit their specific teaching situation. The result can be a gradual change of the new technique and setting.

Integrated Design

The Integrated Design combines the positive features of the district-wide and site-based designs. A range of approaches have been tried to determine what effective professional development is. Some researchers have attempted to isolate factors that influence the effectiveness of professional development (Sparks, 1983). Other researchers have studied reports and tried to identify elements related to successful implementation (McLaughlin & Marsh, 1978), while other researchers have used research summaries as guidelines for effective practice (Showers, Joyce, & Bennett, 1987).

A growing number of learning activities designed and implemented at the school level are emerging, relying on the district staff development to supply technical aid and act as a service center to support the school's work. Support by the school's principal is a key component of this design. Time is a limiting factor at school-based designs to remain current in the views of professional development along with the opportunity for teachers to share ideas with other teachers who work at the same site.

Laine et al. (1998) suggested including the integrated model of professional development that recognizes teachers' expertise and provides follow-up support. The study's researchers advocated that teachers who actively and successfully use the skills and can provide realistic, concrete examples from their own classrooms can provide the instruction in content reading strategies. They additionally suggested "collaboration between university teacher trainers and district teachers to allow for a potentially successful blend of theory and on-going practice" (p. 17). The topic of barriers to effective professional development will be discussed next.

Barriers to Effective Professional Development

Researchers have identified a number of factors that can interfere with effective professional development. The factors may include the structure of the professional development and the impact professional development has on a teacher's time, professional development content, school factors, district factors, and costs (Garet, Porter, Desimone, Birman, & Yoon, 2001); these will be discussed in the order they were presented.

The structure of the professional development and teachers' time are often barriers to teachers' involvement in professional development activities. According to some studies, teachers prefer professional development activities that occur during the school day, during the school year, and are often hesitant to commit to professional development activities that extend the school day or are beyond the school year calendar (Garet et al., 2001). Some teachers find professional development not conducted on professional release days unsuitable, citing family commitments as reason for their hesitancy (Supovitz & Zief, 2000).

The content of professional development sometimes is another barrier. When professional development focuses on teachers' knowledge of content and classroom practices, some teachers are hesitant to share their beliefs and understanding with colleagues or supervisors (Garet et al., 2001; Supovitz & Zief, 2000). The classroom insulates teachers' weaknesses and difficulties from others (Lortie, 1975), making some teachers uncomfortable revealing their beliefs and understanding with others.

A third factor which sometimes interferes with designing and implementing professional development programs is the rigid structure of teachers' work days, which limits the amount of time available for collaboration to occur (Garet et al., 2001; Supovitz & Zief, 2000). Additionally, experienced teachers may resist the cyclical nature of reform, often commenting, "as the pendulum swings" (Supovitz & Zief, 2000, p. 27). This can interfere with these teachers' willingness to participate in professional development.

Another factor identified by researchers relates to the school district. Some teachers perceive district reforms as "fragmented and uncoordinated" (Supovitz & Zief, 2000, p. 3), limiting teachers' voluntary participation in professional development. In addition, when school districts offer too many professional opportunities, teachers may be "spread too thin to make substantial changes in practice" (p. 26).

Lastly, cost is sometimes a barrier to implementation of professional development. The estimated cost for quality professional development averages \$512 a year per teacher, which is greater than twice the amount typically spent by districts (Birman et al., 2000).

To summarize, views on professional development have changed in recent years. Multiple characteristics for effective professional development appear on a number of lists developed by various organizations. Despite the many overlapping characteristics, no one list is available at the present time—and there may never be just one master copy of effective characteristics for professional development. Organizations need to design professional development that is best suited for their needs, with attention to

characteristics for effective professional development embedded in an appropriate model and design. Research indicates that in order for professional development to be successful, teachers' beliefs about teaching and learning need to be considered because they influence teachers' practices. Teacher beliefs are the next topic to be discussed.

Teacher Beliefs

Research indicates that teachers' beliefs play a significant role in the decisions teachers make in their classrooms. Specifically, teachers' beliefs may influence teachers' acceptance or rejection of new approaches, techniques, and activities in the classroom. Therefore, it is necessary to review the body of literature related to teachers' beliefs to gain an understanding about how teachers' beliefs may impact teachers' implementation of new materials.

This section of the chapter begins with a definition of beliefs followed by general information related to beliefs. Next, the origin of beliefs will be discussed, followed by a discussion of self-efficacy. The section concludes with a discussion of teachers' beliefs about teaching.

Beliefs Defined

Rokeach (1968) defined beliefs as "any simple proposition, conscious or unconscious, inferred from what a person says or does, capable of being preceded by the phrase, 'I believe that . . .'" (p. 113), adding that all beliefs have "a cognitive component representing knowledge, an affective component capable of arousing emotion, and a behavioral component activated when action is required" (p. 314).

Rokeach explained three assumptions related to beliefs. First, beliefs differ in intensity and power. Beliefs vary along an outermost boundary. Thirdly, beliefs that are more central are more resistant to change.

Beliefs are unlikely to change unless they are challenged or cannot be incorporated into existing beliefs, resulting in an anomaly. For a belief to change, Rokeach (1968) believes four conditions must be met. First, an individual must realize that the new information does not agree with his or her existing beliefs. In other words, the person must arrive at the realization that an anomaly exists. Secondly, the individual must believe that the new information can be compatible with the existing beliefs. Thirdly, the individual must want to reduce the inconsistencies among the beliefs. Finally, the individual must perceive that incorporating the new information with the existing information is not possible. If these four criteria are met, the new belief is tested for effectiveness; however, the new belief can be discarded if it is found ineffective.

Guskey's (1986) findings related to staff development programs are consistent with this explanation. If teachers can be "talked into" using a new practice and find that it improves student achievement, tremendous change in attitude often occurs. However, if teachers do not use the new practice or do not see any change in student achievement when using the new practice, the new practice is often discarded. This supports Guskey's staff development model, "change in beliefs follows, rather than proceeds, change in behavior" (p. 321).

Origin of Beliefs

Nespor (1987) identified various features of beliefs in an attempt to provide insight to their origin. The features were: existential presumption, alternativity, affective and evaluative loading, and episodic structures.

Existential presumption was a term used to describe a belief of “personal truth everyone holds” (Pajares, 1992, p. 309). These beliefs were extremely personal and not affected by persuasion. They could be formed by chance, an intense event, or a number of events, and include feelings about oneself or what others are like. Existential presumption beliefs were viewed as unchangeable entities. For example, if a student did not read a science chapter from the textbook, the teacher believed that the student did not read the text because he could not read.

Alternativity is a second belief whereby someone attempts to create an ideal that, for whatever reason, may differ from reality. For example, a teacher desired professional recognition, possibly related to high-stakes testing. The teacher devoted an inordinate amount of class time to test preparation, believing that this would lead to all students achieving above average scores on the high-stakes tests; however, it is at the cost of not covering the content curriculum.

Thirdly, beliefs have stronger affective and evaluative components than knowledge and function independently of knowledge. Unlike knowledge, beliefs do not require validity or the approval of appropriateness from a group agreement. Nespor (1992) pointed out that beliefs, regardless of their idiosyncrasies, are more influential than knowledge as predictors of behavior, as evidenced when a teacher teaches a course

according to the values he holds for the course's content. According to Bandura (1986), the effort the teacher employs to teach a course is often determined by the combination of affect and evaluation.

Lastly, episodic structures are events or episodes that influence the understanding of subsequent events. They are memories from experience of cultural sources of knowledge. For example, Calderhead and Robson (1991) suggested that pre-service teachers resort to images from their experiences as students to influence their interpretation of classroom procedures and content knowledge.

Self-Efficacy

Bandura (1994) defined self-efficacy "as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 71). Self-efficacy beliefs determine many aspects of people's lives such as how they feel, think, motivate themselves, and behave.

To explain self-efficacy in terms of teaching, teachers who have a strong sense of self-efficacy believe they are successful teachers who understand their content and can help students to learn that content. They approach difficult tasks as challenges to be mastered. In contrast, teachers who have low self-efficacy related to their teaching abilities may doubt their capabilities and avoid difficult tasks, viewing them as obstacles.

According to Bandura (1994), people's beliefs about their efficacy is developed from four sources: mastery experiences, vicarious experiences, social persuasion, and psychological indicators (e.g. somatic and emotional states).

Mastery experiences are the most effective way to create a strong sense of efficacy. Successes build a positive belief in one's personal efficacy; on the contrary, failures can minimize someone's sense of efficacy. A second way to create efficacy is through vicarious models. Seeing someone similar succeed following continued effort allows the observer to begin to think he or she can do it too; however, an unsuccessful similar model can cause the observer's efficacy to be diminished. Thirdly, social persuasion can also raise a person's efficacy, believing they have what it takes. Verbal persuasion can result in the person putting forth greater effort and sustaining it to the end of the task. Negative comments, however, can result in a person's avoidance of challenging activities. Psychological indicators can also influence a person's judgments of his or her personal efficacy. Bandura (1994) commented, "Positive mood enhances perceived self-efficacy, despondent mood diminishes" (p. 74).

Teacher Beliefs About Teaching

Pajares (1992) defined teachers' beliefs as their attitudes about education, such as schooling, teaching, learning, and students. The body of literature on teacher beliefs reveals the complexity of those beliefs derived from what teachers think and what they do. Fang (1996) noted,

Educators are now beginning to realize that teachers (pre-service teachers, beginning or experienced) do hold implicit theories about students, the subjects they teach and their teaching responsibilities, and that these implicit theories influence teachers' reactions to teacher education and their teaching practice (p. 51).

Lortie (1975) conducted extensive research using interviews and questionnaires to study elementary and secondary teachers in the United States involving thousands of teachers. Despite 30 years since Lortie's study was conducted, his findings are often evident in today's teaching (Richardson, 1994). His studies provided the following results:

- Teacher training does not adequately prepare teachers for the reality of the classroom.
- The attempt at simulation in an internship or in a particular setting does not necessarily hold true for all contexts.
- Teachers who struggle with problems in their classrooms do so privately because of the cellular organization of the schools, each classroom being a separate cell.
- Teachers do not easily share knowledge and practice because, in part, of the cellular organization of the school. When a teacher needs help, he most often receives it from fellow teachers who provide "tricks of the trade." (p. 77)

Teachers' beliefs about literacy are filtered through teachers' beliefs about learning and the context in which they teach (Duffy & Anderson, 1984). Evidence supporting Duffy and Anderson's finding is evident in an earlier-mentioned cross-case analysis of three qualitative studies focused on how literacy was used in secondary teachers' science classrooms (Dillon et al., 1994). Their findings revealed that teachers' beliefs about literacy could not be separated from their beliefs about science, students, and learning. Researchers noted that the type of literacy activities differed from one

science teacher to another and reflected teachers' idiosyncratic beliefs about their subject matter—and students implementing literacy are but one factor that teachers consider. Their findings are captured by the Readence, Kile, and Mallette (1998) description of Cone's (1992, 1994) teacher inquiry studies in which they commented that “beliefs shape practice and practice often shapes beliefs” (p. 143).

Origin of Teacher Beliefs

Richardson (1996) described three primary sources for teachers' beliefs: personal experience, experience with school and instruction, and experience with formal knowledge to include subjects and pedagogical knowledge.

Personal experiences include aspects of life that contribute to developing a world view, understanding the relationship of schooling to society, and a range of aspects such as family, cultural understandings, and beliefs about self in relation to others. Researchers have explored the relationship between personal experience and how one approaches teaching. Factors such as ethnic and socioeconomic background, gender, geographic location, religious upbringing, and life decisions can impact a person's beliefs, and may affect a person's learning to teach and teaching. Clandinin (1986) suggested that personal experiences are encoded in images conveying moral, emotional, personal, private, and professional dimensions, and that those images affect practice.

Crow (1987) conducted a case study to explore the development of teacher role identity of pre-service teachers. A finding of her study was that models of former teachers and early childhood family experiences had a strong influence on forming teacher role identity.

Experience with schooling and instruction addresses experience as a student and educator. These beliefs, according to Lortie (1975), are developed through an “apprenticeship of observation” that occurs during their 12 - 13 years at school as observers. Students observing teachers in the context of their classrooms influence their view of what it means to be a teacher. An extensive review conducted by Kagan (1992) reviewed 40 studies and confirmed that pre-service teachers enter teaching programs with personal beliefs about what constitutes a good teacher, images of themselves as teachers, and memories of their experiences as students. However, these beliefs did not necessarily match what teacher program educators want prospective teachers to learn (Florio-Ruane & Lensmire, 1990).

Pajares (1992) explained that when pre-service teachers enter teacher education programs they have an “insiders” view of teaching. The college classrooms, professors and practices may equate to their past experiences as students and offer little that is different from their previous educational experiences. Pajares noted,

The reality of their everyday lives may continue largely unaffected by higher education, as may their beliefs. For insiders, changing conceptions is taxing and potentially threatening. These students have commitments to prior beliefs, and efforts to accommodate new information and adjust existing beliefs can be nearly impossible (p. 323).

Consequently, pre-service teachers often believe they have little to learn about teaching except from their student teaching experiences. These pre-service teachers hold beliefs that learning to teach is a product of experience (Richardson-Koehler, 1988). They

rely on their “childhood observations of good teaching” in the classroom for comparing new practices (Pajares, 1992):

Evaluations of teaching and teachers that individuals make as children survive nearly intact into adulthood and become stable judgments that do not change, even as teacher candidates grow into competent professionals, able, in other contexts, to make more sophisticated and informed judgments. (p. 324)

The beliefs that pre-service teachers bring to teacher education programs affect what they learn from teacher education and how they learn it (Calderhead & Robson, 1991). Preexisting beliefs are so influential that efforts to alter teaching styles are often unsuccessful, unless the beliefs are directly questioned (Johnson, 1988). The earlier a belief is added to the belief system, the more difficult it is to change (Pajares, 1992). Beliefs that are formed early in one’s life and embedded in their belief system can significantly influence the interpretation of new experiences (Nespor, 1987).

Researchers add that experiential effects of personal life, previous schooling, and student teaching have a greater influence on the development of pre-service teachers’ conception of teaching than the formal pedagogical education gained from teacher education programs (Feiman-Nemser, 1983). According to Hall and Loucks (1982), reading and applying findings from educational research do not often result in change of teachers’ beliefs. Teacher beliefs, both pre- and in-service, are most influenced by practice, either their own or that of their peers (Zahorik, 1987). Pre-service teachers, however, may be more influenced by their cooperating teacher, the teacher whose class

provides the student teaching experience, than by their college supervisors or university courses (Calderhead, 1988).

Lastly, experience with formal knowledge focuses on school subjects and pedagogical knowledge. The least powerful factor affecting beliefs and conceptions of teaching and the teacher role is experiences with formal knowledge. However, Featherstone (1993) mentioned the possibility of a “sleeper effect” in teacher education: “The voices of teacher educators sometimes echo forward into the first years of teaching; the novice sometimes rehears, with a new ear, propositions which seemed to make little impact on them at the time they were offered” (p. 110).

In summary, the development of a belief system is complex and often influenced by multiple factors. Teachers’ beliefs about learning, teachers, teaching, students, and subjects begin to develop long before prospective students enter teaching training programs. It is those other experiences which seem to have a greater impact on teachers’ beliefs than their education courses. Understanding the development of teachers’ beliefs can contribute to staff developers’ understanding of how teachers change. Teachers’ self-efficacy can influence how they perceive their abilities as a teacher, teaching, and teaching particular content subjects. Teacher change is the next topic to be discussed.

Teacher Change

Change is a learning process, both developmentally and often experientially based. Inclusion of teacher change literature is important when studying implementation of new materials. Knowing what brings about teacher change and potential barriers to

teacher change can pave the way for successful implementation of the new materials or innovation.

Teacher change is the final section of Chapter Two to be discussed. Approaches to change will be discussed first, followed by a discussion of change process. The third topic to be discussed in this section is actions contributing to teacher change. The final portion of this section concludes with a discussion of mechanisms to affect change.

Introduction

Prior to the early 1990s, much of the literature on teacher change described teachers as “recalcitrant” (Fullan, 1985) or resistant to change. The literature suggests that teachers feel uncomfortable about change, desiring to “cling to their old ways” (Richardson, 1998, p. 1). Some literature suggested that teachers failed to “adopt teaching activities, practices, and curricula that were suggested or mandated by those who were external to the setting in which the teaching is taking place: administrators, policy-makers, and staff developers” (Richardson, 1998, p. 1). However, more recent teacher change literature indicates that teachers change all the time (Richardson & Placier, 2001).

In order for change to occur, understanding what brings about change and what support and guidance staff development can provide to facilitate that change are necessary. No guarantee exists that change will occur, but researchers have discovered several approaches that are promising.

Approaches to Change

Chin and Benne (1969) advocated for three types of change strategies: empirical-rational, normative-reeducative, and power-coercive. Examples of the empirical-rational and normative-reeducative approaches are present in teacher change literature.

Within the empirical-rational approach, teachers are viewed as resistant to change. According to this approach, teachers are told about the change topic, it is demonstrated to them, and they are expected to implement the change in their classrooms (Richardson & Placier, 2001). From this traditional approach to change, teachers were viewed as “recipients and consumers of research and practice” (p. 906), and someone other than teachers controls the change.

Chin and Benne’s (1969) second approach, the normative-reeducative approach, has recently gained attention. This approach focuses on how individuals make sense of and contribute to the situations in which they live and work. The normative-reeducative approach follows the assumption that “change is enhanced through deep beliefs and practices” (Richardson & Placier, 2001, p. 906).

The power-coercive strategy focuses on influencing individuals and systems to change through legislation and external pressures where various types of power are dominant. According to Chin and Benne (1969), power coercive strategies emphasize political, economic, and moral sanctions, with the focus on using power of some type to persuade individuals to adapt to change. Examples of strategies used include: nonviolent protest and demonstrations, use of political institutions, such as state-level legislation or

judicial, and/or the power elite (electing people to support an intended change). One example of this strategy may be the state mandated SOL tests.

Change Process

Change requires unlearning negative “mental models” and learning new ones (Duffy, 2003). Preskill and Torres (1999) describe mental models as a set of personal opinions, perceptions, and views of the world.

These values, beliefs, assumptions, and knowledge develop over time and are thought of as “truths” guiding people in their everyday lives. They are manifested behaviors in the taken-for-granted behaviors by which we function and often are manifested in the opinions we hold. (p. 66)

Mental models guide a person’s actions productively or destructively (Preskill & Torres, 1999). According to this theory, when middle school science teachers are introduced to implementing reading strategies in their content classrooms, teachers are likely to measure this new idea against what they already know about teaching science to determine if the new information fits with their existing mental models. If the new information fits, it can be added to the existing mental model. However, if implementing reading strategies in their content classrooms does not fit their existing mental model, the individual must make a choice. The new information can be discarded as irrelevant, unimportant, or wrong, even if the existing mental model is dysfunctional or not correct. Mental models are not discarded as long as they seem to offer some reasonable results (Kuhn, 1962).

Staff developers must focus on individual and organizational mental models. In order to work toward a change of beliefs and practice, dialogue is viewed as a vital component in this approach (Richardson & Placier, 2001). This “dialogue” may occur between other teachers, with a critical friend, or with “others,” including staff developers, administrators, change agents, or consultants. In order for staff developers to initiate unlearning mental models, Starbuck (1996) suggested beginning with a discussion of dissatisfaction, then presenting the new idea as an experiment to gain interest. Duffy (2003) mentioned that it is helpful to encourage people to think that there is more to know than they presently know.

The dilemma for staff development is that existing mental models can resist new practices and become barriers to creating and supporting change in the school. Educators must unlearn existing mental models that are dysfunctional or wrong before learning new ones—or at least learn to make their mental models open to change.

For educators to unlearn mental models, individuals must see that the models no longer depend on their present knowledge, beliefs, and methods. In order for a teacher to change, then, the new practice must appear “understandable, sensible, beneficial in particular situations and be in tune with the teachers’ goals” (Davis, 2001, p. 6).

Actions Contributing to Teacher Change

Davis conducted (2001) a four year study at a middle school of 685 students on a military base with a high rate of military transfer. The focus of the study was to identify factors key to teacher learning and the implementation of new practices that benefited all students.

In a review of existing literature, Davis (2001) identified five actions that can contribute to teacher change when implementing a new practice. First, teachers need to reflect on their preexisting knowledge and beliefs about teaching, learning, learners, and the subject matter in order to integrate new ideas into their existing constructs. Secondly, teachers need opportunities to deepen and broaden their subject matter knowledge (Borko & Putnam, 1996). Without adequate subject matter knowledge, it is difficult for teachers to learn strategies and techniques necessary to assist students' learning about the subject matter (Davis, 2001).

A third factor is attention to pedagogy through engaging learning activities that mimic the types of activities teachers will use to implement the new practice with students in their classrooms (Borko & Putnam, 1996). This is particularly important since new and veteran teachers' experiences as students may have been in traditional classroom settings and these teachers may hold beliefs and understanding about the nature of science, the discipline, and how they are best taught and learned that are opposed to the principles of the new instructional approaches (Borko & Putnam).

Another factor focused on the need for teacher learning to occur in the context of the school and the classroom. For new as well as experienced teachers, strong links between personal learning and the classroom context are necessary for teachers' beliefs to change (Davis, 2001).

Lastly, a research and professional development team is essential as teachers begin new practices (Davis, 2001). Additionally, if teachers are beginning a new practice,

leaders need to allocate time and support for reflection as the teachers move through the implementation process.

Data for the study were collected from more than 40 on-site visits over 9 months through classroom observations, observations of faculty meetings, interviews with program developers, administrators, teachers, students, university site-coordinators, science curriculum materials, and state and district documents related to the reform. The study revealed several issues were important for effective reform. Davis concluded:

Teacher learning activities must begin with their knowledge, beliefs, and skills. Therefore, learning settings for teachers must enable them to reflect upon their beliefs and understandings about learning, teaching, students, and the subject matter. The professional development model employed must provide educators with a bridge to new understandings. (p. 27)

Mechanisms to Affect Change

Researchers recognize that change is a complex process, influenced by multiple factors. Richardson and Placier (2001) group the mechanisms that affect change in individuals into three categories: voluntary and naturalistic changes, stages of development, and formal programs for preparing teachers and improving teaching.

The category of voluntary and naturalistic change includes change related to biography, personhood and experience, and differences among teachers in their approaches to change. Butt, Raymonds, McCue, and Yamagishi (1992) conducted a study that explored the relationship between teachers' biographies and the development of their personal practical knowledge. Researchers' findings stated that the development of

teachers' personal practical knowledge is affected by various forms of experience. Those influences include "experiences as children, peers, parents, and teachers; experiences within a particular cultural background; and personal and professional experiences" (Richardson & Placier, 2001, p. 908).

Kegan (1994) proposed three styles of learning for adults. An adult with an instrumental style envisions the trainer as an expert who can provide the correct answer. The adult with a socializing style learns from others, viewing the trainer as a mentor. Lastly, the learner with a self-authoring style learns independently and acknowledges that no right answer may exist.

Joyce (1983) categorized teachers as learners and consumers of professional development in a study she conducted of K-12 teachers' motivation to participate in professional development. Joyce based her categories on teachers' participation of three domains or professional development activities: formal systems, informal systems, and personal activities. Formal systems included courses, workshops, coaching, or supervision. Exchanges with other teachers and professionals were listed as informal systems, and personal activities included leisure activities such as reading. To describe teachers' "states as learners," Joyce (1983) chose five categories.

- Omnivores – Teachers who "actively use every aspect of the formal and informal systems available to them" (p. 163).
- Active consumers – teachers who keep busy in one or more of the domains or systems.

- Passive consumers – teachers who go along with professional development activities that arise but do not seek them out.
- Entrenched teachers – teachers who are suspicious of change and take courses only in areas where they already feel successful. They may openly or privately oppose new ideas.
- Withdrawn teachers – teachers who are actively opposed to participating in one or all three domains. (p. 163)

Joyce pointed out the power of various types of learners. An entrenched or withdrawn teacher with influence within the school from the informal system can become a “gatekeeper” to change and therefore impact implementation of innovations.

Additionally, teachers’ organizational factors such as the school, program, or the system can hinder or support teacher change. “People don’t like to change what they think they know” (Duffy, 2003, p. 31). They will often resist change, especially if they think they already know something. Research indicates that when school leadership promotes a positive culture, teachers’ attitudes change naturally when they see how and whether the new practice enhances students’ learning (Sparks, 1995). According to Zimmerman (2006), “Unless teachers understand and appreciate the need for change in their schools, their interest in maintaining the status quo will undoubtedly take precedence over their willingness to accept change” (p. 239). Smith and Gillespie (2001) state:

Even the best professional development will not have an impact if there is a poor culture in the school; one in which there is a poor fit between teachers’ states of

growth and the culture that could support growth and new ideas for professional development. (p. 228)

Teachers do change; many factors can influence change. Many researchers agree that change involves altering mental models. Recognizing that people are different and influences in peoples' lives vary can help to explain why a person changes or does not change, and also that change does not occur for everyone at the same time.

Summary of Chapter Two

Research literature provides much information regarding the problem of implementing reading strategy instruction in middle school content classrooms. Numerous research studies during the last century attest to this problem, though it remains an unresolved issue.

Many researchers have identified research-based strategies that can improve students' reading comprehension; however, knowledge of reading strategies is not the only factor that influences teachers' implementation of reading strategies in their content classrooms. Other factors that may influence teachers' decisions whether or not to implement reading strategies in content classrooms include teacher education, teacher beliefs, curriculum, and context related to time and school structure.

In addition, implementation of new materials is often contingent on the professional development available for the teachers implementing the innovation. Thousands of professional development articles and books have been written highlighting many models, several implementation plans, and numerous characteristics for effective professional development; however, no cookie cutter model of professional development

exists. Researchers do agree that successful implementation of new practices is dependent on tailoring a plan to meet the needs of the teachers it will impact. General consensus does exist for some characteristics that seem to be effective for professional development. Concern for time to implement the new practice, along with support, modeling, practice, and feedback can increase the chances that the professional development will be successful.

Successful professional development requires attention to teachers' beliefs, since a person's beliefs are a more affective and evaluative component than knowledge. Beliefs that are formed early are more immune to change. Lortie (1975) explained that teachers began developing their beliefs about learning, teachers, teaching, and content subjects during their 12 - 13 years of education prior to college. Those beliefs became so strong that teachers often believe there is little they can learn about teaching, except possibly during their internship. Attempting to introduce a new practice to teachers can be a monumental task, yet teachers do change.

Initiating change can begin with dialog to uncover teachers' beliefs. Teachers need time and support from the school to help with implementing new practices. Multiple factors impact teachers' willingness to change at any stage of their career.

Therefore, this study is in answer to a call for more research related to the implementation of new materials in authentic settings. In this case, the authentic setting was a large school district. This study addresses the need to implement reading strategies in content classes, a publicized, yet until recently a neglected topic. This study is told from the teachers' perspective and reveals influences that supported or hindered their

implementation of the new materials and their reactions to the implementation of the new materials. In addition, this study adds to the body of research on professional development. As Moore (1996) suggested, it is an area of study providing an opportunity for teachers' voices to emerge that reveals their beliefs and how those beliefs interact with practices in the instructional context of middle school science.

3. Study's Design

This chapter describes the study's design. It first provides a history of the *Reading Strategies Handbook for Middle School Science Teachers* and the background leading to its introduction to the subject district's teachers. The study's methodology is described as well as the researcher's role in the setting. The chapter concludes with a discussion of validity and a summary.

Background to the Study: History of the *Reading Strategies Handbook*

To maintain anonymity of the district and participants in this study, all personal names are pseudonyms. The same is true of all locations mentioned.

Need Identified and Committee Created

During the interview the researcher conducted with Karen March, the district appointed Middle School Science Specialist, Karen revealed the Handbook's origin. She explained that at the district's first monthly department chairpersons' meeting she led she asked the attendees to prioritize the concerns they wished to address that school year. It was almost unanimous that students' comprehension of required science text was at the top of their list. To further explore this topic, the Middle School Science Specialist, Karen March, e-mailed all science department chairpersons, asking them what teachers at their school were doing to help students comprehend required science text. Several

teachers responded; some named specific strategies that were being used, but most teachers responded that there was nothing specific being used. Karen then e-mailed all middle school science teachers to inform them that she was acting on their request to address the issue of students' difficulty in comprehending required science text. Teachers interested in participating in developing a reading strategies handbook during the summer, or piloting the resulting handbook in the fall, were to notify her. From the handbook committee applicants, she selected four science teachers—two seventh and two eighth grade teachers—who had indicated in the original e-mail they were already using several reading strategies in their classrooms. Additionally, two of the four science teachers were enrolled in reading certificate programs.

Coincidentally, while I, the researcher, was working as a reading teacher in a middle school in that district, I heard about the project from the science department chairperson at my school. My interest in the project was immediately piqued for a number of reasons. A handbook of reading strategies to be developed for middle school science teachers was especially interesting to me since I had 10 years experience as a middle school science teacher in the same county prior to becoming a reading specialist. Practically, I was searching for an internship to meet a doctoral program requirement; this project seemed to be the perfect fit.

I e-mailed the Middle School Science Specialist regarding my decade of experience as a middle school science teacher in the county prior to my reading specialist position, my interest in content literacy, and developing a handbook. I wanted to know if she would allow me to participate in the project to fulfill my university's internship

requirement. She e-mailed me that Ellen Harris, another reading teacher in the district, had already agreed to join for a portion of the project, but she was sure there would be plenty of work for two people if I wanted to participate. Ellen and I knew each other from our district department meetings and I knew she was well respected in the district.

Karen, Ellen, and I met prior to the first committee meeting to discuss the project's direction. Karen reiterated that the project was teacher driven, developed from needs recognized by middle school science teachers. Her vision for the project was developing a handbook of reading strategies for middle school science teachers with each strategy embedded in authentic grade-level content. This teacher-friendly format would allow teachers to pick up the handbook and find directions to implement each reading strategy, followed by an example of an authentic reading activity with the embedded reading strategy. The teacher could then photocopy the corresponding student worksheet for the strategy and he or she was "ready to go" that day.

In Karen's overview at the first committee meeting, she explained the purpose of the committee of reading and science teachers was to pinpoint the types of reading activities that students struggled to comprehend, and select appropriate reading strategies to help students comprehend those types of text. Karen urged the committee to select no more than six or seven strategies for the handbook, believing that more than that number would be too overwhelming for the science teachers. The strategies would be embedded in curriculum for each grade level and assembled into a handbook.

Once the handbook was completed over the summer, approximately 15 teachers from various locations around the county would pilot the handbook during the 2003-2004

school year. Based on their feedback, the handbook would be revised the following summer and implemented in all district middle school classrooms during the 2004-2005 school year.

Science Texts and Reading Strategies Identified

Although Karen had shared with Ellen and me that the committee's science teachers were committed to the project, Ellen and I met prior to the beginning of the summer project to outline where we should initially begin at the first meeting with the science teachers. We agreed that at the first meeting the science teachers needed no introduction to reading in science classrooms, as they were already using some reading strategies in their classrooms to help their students comprehend required science text.

The committee members developed a plan for the project. The first task required the science teachers to list the types of science text students struggled to comprehend at each grade level and explain the context to the committee. At this point the committee divided: The science teachers worked to locate specific labs from their grade level manuals and required textbook readings for examples of the types of text students struggled to comprehend. Ellen and I worked to narrow the list of reading strategies we thought would be most suitable to address difficulties with these identified types of text.

Several criteria were considered in selecting strategies to match with required text. Ellen and I looked to the work of Pearson, Roehler, Dole, and Duffy (1992) that compared characteristics of proficient readers to struggling readers. Their study revealed that proficient readers automatically used many reading strategies to make sense of text—unlike less proficient readers who used few strategies. Pearson's list of seven strategies

has widely been accepted in the reading research community and is evident in the work of many researchers and practitioners, such as Janet Allen, Kylee Beers, Stephanie Harvey, and Cris Tovani.

We also reviewed Alvermann's (2001) "Effective Literacy Instruction for Adolescents," commissioned by the National Reading Conference (NRC). Alvermann stated, "Adolescents respond to the literacy demands of their subject area classes when they have appropriate background knowledge and strategies for reading a variety of texts." Members of the National Reading Panel (NRP) (2000) had also identified strategies as effective ways to teach comprehension in middle grades, and possibly into high school, based on experimental and quasi-experimental research on reading conducted in grades 3 - 8. Their list included comprehension monitoring focusing on when understanding broke down, and fix-up strategies were available. Also included on that list: cooperative learning, graphic and semantic organizers, answering questions, generating questions, using text structure, and summarizing.

We also looked at *Science Learning: Processes and Applications* (Santa & Alvermann, 1991) to learn about the kind of reading skills required to comprehend science text. Padilla, Muth, and Padilla's chapter discussed the commonalities of science and reading. They explained the importance of making inferences, making predictions, drawing conclusions, and thinking metacognitively.

Consideration of these major resources guided the selection of reading strategies for the handbook. Reviewing these sources identified a number of commonalities between the types of reading skills necessary to comprehend science text and skills used

by proficient readers. These resources solidified our decision to use Pearson et al.'s (1992) list of strategies as a guide in our selection process.

A second factor for consideration was instructional framework: before, during, and after the strategies were to be implemented. As strategies were chosen, the time when each strategy could be used to support the reading process was considered: to introduce the reading, to raise during the reading, or to implement after the reading was completed. The diversity of the selected reading strategies covered the three aspects of the instructional framework. Cognizant that several strategies are often used simultaneously, we elected to introduce each strategy individually to avoid confusion and anxiety for the science teachers learning new skills.

When the reading and science teacher groups had individually completed their tasks, both groups rejoined to look closely at the identified text and strategies suggested. Collaborating on the materials, a consensus was reached as to which reading strategies were the best matches to the types of reading activities students struggled to comprehend. Agreement was reached on seven reading strategies and contexts for embedding these strategies. With these ideas in place, the committee set to the task of writing the handbook.

Writing the Reading Strategies Handbook

As the reading teachers worked to make the strategy sheet of directions explicit, and wrote clear, concise directions to implement each strategy in the content, it became evident that vocabulary was also an area of difficulty for the middle school students in science classes. Since vocabulary plays such a large role in helping students understand

science concepts, vocabulary strategies and activities were added. Additional items included in the *Handbook* were Read Alouds, Think Alouds, and grade level lists of fiction and nonfiction books related to curriculum units. These supplementary materials were included to provide a more complete array of literacy materials to support middle school science.

The reading teachers, in discussion with the science teachers, agreed that science teachers would appreciate the vocabulary strategies and activities as being optional. Karen was very receptive to including vocabulary strategies and activities, introduced with an explanation for inclusion grounded in research emphasizing students' need for repeated exposures in order to learn vocabulary. Karen's emphasis on developing a handbook of reading strategies was influenced by her own experiences as a science teacher. She believed that science teachers would use the *Reading Strategies Handbook* if it was direct and right to the point with no frills.

Karen allowed the committee to work uninterrupted the next several weeks, stopping by to see if the committee needed anything or had any questions. She reiterated that the project had developed out of teachers' concerns for their students' difficulty to comprehend required science text, and she wanted the *Handbook* to be a teacher product. She was pleased with the final product, suggesting one addition.

Karen suggested adding a table displaying each strategy title across the top. Below each title, the required science text with embedded strategy would be listed, followed by two additional examples of required science text where the strategy would be applicable. The upper half of the table was for seventh grade and the lower half for eighth

grade. She felt this table would give science teachers an overview of the *Handbook* at a glance and help teachers get started using the strategies.

Pilot Project

Karen made sure copies of the spiral-bound Handbook were available for the pilot teachers at the district's annual middle school science in-service meeting before the beginning of the 2003-2004 school year. All committee members except Ellen, who presented at a Language Arts meeting, participated in the one-hour session introducing the *Reading Strategies Handbook* to the piloting teachers. As one of the project's reading specialists, I presented the *Handbook's* history and the research supporting integrating reading in middle school science classes. The science teachers introduced and briefly discussed specific strategies in the *Handbook*.

To gain feedback as pilot teachers implemented the strategies during the school year, pilot teachers were expected to complete evaluation sheets which required feedback for implementing each strategy, and its strengths and weaknesses from the teacher's perspective. Modifications and suggestions were welcomed and completed sheets were sent via inter-school mail or e-mail to Karen. Karen also posted the *Handbook* on a district website which enabled piloting teachers to modify pages as they chose.

A midyear evaluation meeting for pilot teachers scheduled on an in-service day was cancelled due to inclement weather. It was impossible to reschedule the in-service day, so the evaluation meeting was rescheduled as an after school meeting. Although pilot teachers were given a month's notice, only approximately half of them were able to attend the rescheduled meeting.

Since Karen asked me to lead the meeting, I thought it necessary to state that my presence at the meeting was partially from a researcher's perspective. My interest in the *Handbook* had exceeded its original intent as an internship. I was very involved in following this project, believing that it was a worthwhile and valuable tool for teachers. Yet, I was cautious about stating that belief publicly since I was not implementing it myself in the classroom. I believed the teachers who were implementing the *Handbook* would determine its value and usefulness.

The meeting's purpose was to speak openly about each strategy, citing positives or negatives. The meeting proved to be an opportunity for teachers to share their experiences using the strategies as committee members recorded teachers' comments. The scheduled one-hour meeting stretched into 90 minutes at the attendees' request to cover all strategies.

Outcomes from this meeting included teachers identifying one strategy that they believed was not as useful as was expected. Based on the teachers' decision, it was recommended that the strategy be removed from the *Handbook* when it was revised that coming summer. Additionally, some teacher participants expressed interest in arranging time for teachers to share students' work with other district teachers and have an opportunity to share their reading strategy implementation experiences related to using the *Handbook* strategies with various student populations.

During the spring, Karen contacted the original *Handbook* creation committee about their willingness to participate in revising the *Handbook* during the summer workshop. All members agreed except Ellen, who had another commitment.

Handbook Revision

Using the feedback from the midyear evaluation meeting and remarks collected for the evaluation sheets, revisions were made to the *Handbook*. It was then ready for district-wide implementation.

A second task for the committee during that summer workshop was to prepare a presentation for the in-service meeting where the *Handbook* would be introduced to all district middle school science teachers. To be most beneficial for teachers, the committee decided to make sessions grade specific. This enabled the presenters to use actual grade-level required reading text to present the strategies; seventh grade teachers would observe the presenters modeling the strategies using seventh grade text, and the same for the eighth grade teachers.

District-Wide Implementation

Karen required all middle school science teachers to attend one of the sessions introducing the *Handbook* they were expected to implement during the 2004-2005 school year. Two of the *Handbook* developers and I participated as presenters for the sessions. Each of us was paired with a teacher who had piloted the *Handbook*. The teamed presentation allowed for feedback about all strategies discussed from at least one teacher who had piloted the project. Rather than being spiral bound, the revised *Handbook* was hole-punched and stapled together so teachers could easily insert the reading strategy pages into their spiral-bound teaching manuals.

Follow-up support for middle school science teachers was expected to come from schools. Karen and I presented the *Handbook* at the fall district's Middle School Reading

Teachers meeting. The meeting's intent as described by Karen was to gain support and be a resource for the science teachers as they worked to implement these strategies in their classrooms. The district's middle school reading teachers were especially interested in the project and receptive to the idea of aiding science teachers at their schools to implement the strategies in their classrooms, applauding the Middle School Science Specialist's effort to integrate reading strategy instruction in science. Recognizing the diversity of the reading teacher's position at each middle school, formal and informal opportunities to meet with the science teachers were suggested.

In summary, the *Reading Strategies Handbook for Middle School Science Teachers* was developed as a collaborative effort of a committee of middle school reading and science teachers. It was designed to address concerns expressed by middle school science teachers in the district. Design of the *Handbook* was specific to the district's Program of Studies and aligned with the state's Standards of Learning. It was piloted, revised, and required to be implemented by all middle school science teachers throughout the district, with full implementation expected to take three years.

Methodology

This was a study of teachers' actions toward implementing new district-mandated materials in their content classrooms. Those new materials, combining reading strategies with science content, were unlike other content materials the district had previously sanctioned. The research literature, as discussed in Chapter Two, identified many influences on teachers' decisions whether or not to implement reading strategy instruction in their content classrooms. Some researchers believe that learning how and

why teachers use literacy in their content subject requires examination of their beliefs in the context of their classrooms (Moore, 1996) According to Fenstermacher (1979), the subjective nature of beliefs requires the individuality of qualitative research. A qualitative approach allows a researcher to look more deeply into the thinking processes of pre-service and in-service teachers with consideration for context (Richardson & Placier, 2001). Qualitative research also allows the researcher to understand and to interpret the participants' perspective and how that influences their behaviors (Maxwell, 1996). Therefore, a qualitative study was most suitable for providing rich data necessary to answer the study's research questions.

Research Relationship

A qualitative study utilizing interviewing methods required serious consideration of the relationship the researcher must establish with each interviewee to gain the data needed to answer the research questions. Maxwell (1996) commented that the researcher-interviewee relationship has the potential to aid or hinder aspects of the research design such as sampling and data collection. He added that the researcher's investment of time and effort to develop rapport would pay off in the collection of "rich data" (p. 95).

Gaining entrance to the district's middle school science community was necessary for me to develop rapport with the interviewees. As a former middle school science teacher within the district where the research was conducted, I was granted acceptance as an insider. This acceptance was evident in written and verbal remarks made by Karen, the district's Middle School Science Specialist, when she introduced me to the science teachers who would be working on developing the *Handbook* as "she's one of us."

Trust was important for both parties. As stated by Glesne (1999), “Rapport is tantamount to trust, and trust is the foundation for facilitating full and detailed answers to your questions” (p. 83). I needed to convey to the interviewees that I was trustworthy for the interviewees to feel comfortable that what they said would be confidential and their identities would remain anonymous.

It was therefore my responsibility to explain to interviewees the various roles I held related to the *Handbook*, just as I had done for the pilot teachers described earlier. I was an author of the *Handbook* and a presenter at the district’s in-service meeting when the *Handbook* was introduced to the middle school science teachers; however, my role as interviewer was to learn about the teachers’ experiences implementing the *Handbook*. I explained to each interviewee that he or she was “the expert” because he or she was implementing the *Handbook* with the students. I believed that stating this up front informed the interviewee that although I played a central role in the *Handbook*’s development, I was not in the classroom using it with students. The interviewee had to truly believe I was interested in his or her responses to the *Handbook*, regardless of whether they were positive or negative. In my opinion, this admission contributed to the interviewees’ willingness to speak freely about the *Handbook* rather than withhold negative comments.

I assumed the role of a learner in this study: asking the interviewee questions, listening to the responses, and seeking clarification when needed. I clearly stated to the interviewee that the questions had no right or wrong answers. Thus all interview questions were open-ended with no definitive correct or incorrect answer. I explained to

the interviewees once again that they were the experts: They were familiar with their students, they were implementing these strategies with their students, and they were aware of the responsibilities they had at their school. I was interested in what they had to say. The purpose was to allow the interviewee to tell the teacher's perspective to me, the researcher.

Prior to the interview, I would maintain the role of a spectator during a classroom visit, witnessing firsthand the teacher's implementation of a strategy. The classroom visit was planned prior to the interview, enabling me to ask questions related to the visit during the interview.

Benefits for the interviewee by participating in the study included the interviewee's satisfaction in believing his or her voice would inform research about implementing the *Reading Strategies Handbook* in middle school science classes. Some teachers may have viewed participation as an opportunity to vent their frustration at having "another thing to do." Still other teachers might not believe that reading strategy instruction had a place in a middle school science classroom. Because each interviewee's contribution to the body of research related to teachers' implementing the new district-approved practices was valuable, my goal was to develop relationships with the interviewees that would encourage them to speak freely.

Sampling

Since all middle school science teachers attending the annual September in-service meeting were required to attend a session introducing the *Reading Strategies Handbook for Middle School Science Teachers*, the event provided an opportunity to

recruit interviewee volunteers. Nine sections with three sessions running concurrently were offered to introduce the *Handbook* to the district's approximately 275 middle school science teachers. As stated earlier in the Handbook History section of this chapter, each session was led by a team of two science teachers: a *Handbook* author and a teacher from the pilot study conducted the previous school year. I participated in one of the three teams with a former pilot study teacher in the capacity of *Handbook* author.

In preparation for the in-service sessions, the presenters attended a training session led by the *Handbook* designers to discuss introducing it. The agenda for the in-service session was reviewed to insure consistency among the sessions. The 90-minute session would include a 20-minute introduction to the *Handbook* focused on the history behind its development, theory for selection of particular reading strategies, and a brief overview of the *Handbook's* organization. The remainder of the session concentrated on presenters explaining several of the reading strategies and allowing teachers time to practice those strategies.

As teachers entered the session, they were directed to pick up a number of materials on a table near the room's entrance. The materials included a copy of the *Handbook of Reading Strategies for Middle School Science Teachers*, a grade-specific packet of reading selections for modeling the strategies during the session, an in-service survey for the *Handbook* session (Appendix B), and a half sheet of yellow paper titled, "Looking for Interviewees" (Appendix A).

Each session began with the presenter explaining the purpose for the various materials teachers picked up as they entered the session. The half sheet of yellow paper,

“Looking for Interviewees” was introduced as an optional sheet to complete. Attendees were told that a researcher would be conducting a study to gain feedback from teachers implementing the *Handbook of Reading Strategies for Middle School Science Teachers*. The presenters stated that the researcher was looking for volunteers to participate in a one-hour interview. If teachers were interested in participating in the optional research study, they could complete the form and place it in a box as they exited the session. At the conclusion of the in-service sessions, 21 participants returned interview sheets. All teachers attending the *Handbook* sessions were asked to complete a survey (Appendix B) related to the session. Information from these anonymous forms was used to formulate several interview questions.

Two months later, I e-mailed each of the 21 teachers who completed a “Looking for Interviewees” (Appendix A) sheet. The purpose for the e-mail was to remind the teachers of the study, who I was, and ask them several questions related to their implementation of the *Handbook* (See Appendix C). The e-mail included a cover letter followed by the survey. I believed teachers’ responses to the questions would assist my decisions regarding exactly who would be interviewed. My goal was to select a sample of teachers that represented a cross-section of the district’s diverse backgrounds and teaching assignments. Teacher gender was also an important consideration because as I already stated I wanted a cross section of the district’s teachers.

I also conducted an informal interview (Appendix E) with Karen, the Middle School Science Coordinator. Prior to the interview, I gave her a copy of the *Handbook’s* history and asked her to read and verify whether I had accurately captured the story. I

wanted to listen to her recollection of the *Handbook's* origin as well as her thoughts about the *Handbook* to date. I anticipated that she would be very willing to participate in the interview since we had established a solid working relationship.

Interviewee Selection

The interviewee selection process included a series of events: volunteers completing a "Looking for Interviewee" sheet, my telephone call to potential interviewees confirming their interest in the study, interviewees' completion of an e-mailed questionnaire, and a Lay Summary (Glesne, 1999) also conducted via telephone. Along the way, the data collected from these various sources was charted to create a visual for the researcher to use in selecting study participants.

Information collected on the "Looking for Interviewee" sheet included the teacher's name, work location, and grade level taught. Teachers were also asked to list a telephone number where they could be reached, preferably a home telephone number to maintain participants' confidentiality. Several teachers who returned sheets worked at the same school. Of the 21 sheets collected, potential interviewees taught at 11 different work locations, representing approximately half of the district's middle school sites.

Once I received the necessary approvals from my dissertation committee, the George Mason University Human Subjects Review Board, and the school district's Office of Program Evaluation, I called each potential interviewee introducing myself and reminding them of the "Looking for Interviewee" sheet they had completed at the district's in-service day at the beginning of the school year. I inquired whether they were still interested in participating in my study. Of the original 21 teachers who turned in a

“Looking for Interviewee” sheet, 17 expressed interest in participating following my telephone call. The 4 teachers who stated they did not want to be considered as potential study participants indicated various reasons such as lack of time or confusion about what they had signed.

For those teachers willing to participate, I stated that my phone call did not mean that they were selected as participants, but rather potential participants. I explained that I was looking for a cross-section of the district’s middle school science teachers to gain their perspective as they implemented the *Handbook* in their classrooms. I added that a questionnaire would be e-mailed to them in several weeks which would be used in the selection process. I then began making a chart and listing the information I knew about each potential interviewee from the “Looking for Interviewees” sheet and phone conversation to date. Categories for the chart included name, grade taught, work location, and gender.

Several weeks later, I e-mailed a letter to my list of potential interviewees along with the questionnaire (Appendix C). I had access to the teachers’ e-mail addresses through the district directory. In the e-mailed letter I reiterated that information provided in the questionnaire would be used in the participant selection process for my study, and asked teachers to complete the e-mail in a timely manner. Of the 17 teachers who indicated interest in the study during the telephone call, 15 responded, representing 9 schools. I sent a follow-up e-mail to the 2 teachers who did not respond to the questionnaire; however, I received no response from them. I did not want to pester them, so I concluded that they had decided not to participate in the study. Within the following

week, I received an e-mail from 1 of the 15 potential interviewees indicating that she was not going to be able to participate in the study due to an unexpected medical condition. A second teacher called and explained that she had too many responsibilities at this time and decided to not participate in the study. At this point my pool of potential interviewees was 14.

Based on information collected from the questionnaire, I added several columns to my participant selection chart: years teaching experience, years teaching middle school science, and any reading courses taken. Regarding number of years teaching experience, one potential participant indicated on his e-mailed questionnaire form that teaching was his second career. Consequently, I thought that was valuable information. Although the questionnaire was already sent, I made note of that information to ask all teacher participants about their work experiences during the interview.

Using the information from the chart, I was able to make a decision regarding my interviewees. Two potential interviewees were new teachers, and although it would be interesting to talk with them, I thought I could gain a clearer picture from teachers with a minimum of several years teaching experience. When I called teachers to tell them whether or not they had been one of the 12 selected to participate in the study, 1 of the 14 teachers told me that a personal situation was going to prevent her from participating in the study. Consequently, there were 11 interviewees.

Eleven teachers participated in the study (Table 1), representing 7 of the district's 22 middle schools. Four of the locations had two teacher participants. Of those 7 schools, two participants taught at schools with Centers for Emotionally Disabled Students. Since

the centers function separately from the middle school, I thought the two special needs teachers were important to include in the study. At the other two schools where two teachers were selected, in one situation the two teachers varied by gender, grade level taught, and teaching was a second career for one of those teachers. In the other situation where two teachers worked at the same school, there were variations in the student population they taught: Although both teachers taught eighth grade, one taught predominantly Gifted and Talented (GT) and Honors students and one English Speakers of Other Language (ESOL) class, while the other teacher taught a GT class and general education classes with Learning Disabled (LD) students.

Table 1

Teacher Participants' Backgrounds

Name	Gender	Years of Teaching Experience	Years of Experience Teaching Middle School	Content Reading Course/ In-Service Courses Taken	Setting	Grade Level Presently Teaching	Teaching is a Second Career
Wanda	Female	15	2	Yes/Yes	Fresno Center	8	
Abigail	Female	6	4	Yes/Yes	Walden Middle School	7	
Daniel	Male	6	6	Yes/Yes	Simon Middle School	8	Yes
Robert	Male	6	6	Yes/No	Glendora Center	8	Yes
Kelly	Female	15	15	No/Yes	Ludlow Middle School	8	
Pamela	Female	7	4	Yes/No	Simon Middle School	7	
Paige	Female	13	13	No/No	Hanford Middle School	8	
Crystal	Female	20	20	No/Yes	Glendora Middle School	7	
Vanessa	Female	25	12	No/No	Fresno Middle School	7	
Irene	Female	14	14	No/Yes	Ludlow Middle School	8	Yes
Victoria	Female	20	20	No/Yes	Monroe Middle School	7	

Note. All teacher and setting names are pseudonyms. Daniel revealed on the questionnaire that he was a second career teacher. Robert explained that he was a teacher and left for several years for a private sector position, but decided that was not for him. Irene described during the interview that teaching was a second career.

I believed this group of teachers represented a cross-section of the district's middle school science teachers' diverse characteristics. Based on this information, I decided which teachers to include in my study and sought advice and received approval from my committee.

Interview Location

Selecting the location for the interview was important, and I was influenced by Glesne's recommendations. Glesne (1999) identified three criteria that should be considered: convenience, availability, and appropriateness. She pointed out that any one of those factors could impact the willingness of the potential interviewee to participate in the interview.

Offering to conduct the interviews at the interviewee's work location, at a convenient time for the interviewee, was a considerate gesture toward the interviewee (Glesne, 1999). Several other reasons contributed to my suggesting the interviewee's workplace as a possible location for the interview. First, when I conducted interviews in a pilot study, I found interviewing at the workplace very informative. Going to the interviewee's school allowed me to informally gather information about the school and the teacher's classroom that could not be acquired in an outside setting.

From the interviewee's perspective, conducting the interview at their work location was convenient. Although, for any number of reasons such as rush hour traffic or home responsibilities, I was open to the possibility that the interviewee may want the interview's location to be more convenient and centrally located, or possibly closer to his

or her home. However, all teacher participants elected for the interview to be conducted in their classrooms either during their planning period or after school.

On the other hand, there were several potential reasons why this may not be a good idea. Confidentiality was critical. I was concerned that meeting the teachers at their schools and “signing in” could jeopardize that privacy, but no interviewees seemed concerned about that. In fact, during one late after-school interview, the school’s principal knocked on the door and walked in to hand-deliver forms related to the interviewee’s non-instructional responsibilities. He apologized for the interruption, although the interviewee seemed unaffected by his appearance.

Overall, I maintained flexibility for the needs of the interviewees because without them there would not have been any interviews, data, or a study.

Data Collection

All potential interviewees were notified by telephone that they have been selected to participate in the study. During the telephone conversation, I conducted a “Lay Summary” as described by Glesne (1999), who explained that the Lay Summary could be written or oral and its purpose was to explain some points:

- who the researcher is
- what the researcher is doing and why
- what will be done with the results
- how the study site and participants were selected
- the potential for benefits or risks to the participants in the study
- assurance of confidentiality and anonymity of participants and site

- whether the researcher will be conducting an observation or interview
- request to tape record the interview. (p. 35)

The telephone conversation conducted with each potential interviewee began with my explanation that I was a doctoral student conducting a research study related to the district's science teachers' implementation of *The Reading Strategies Handbook for Middle School Science Teachers*. I reminded the potential interviewee of the communication to date: He or she had completed and submitted a yellow information sheet at the in-service meeting, and an e-mailed survey for the *Reading Strategies Handbook* that he or she had completed and returned to me. I explained that participants in the study were selected from information supplied on these forms. Factors considered in the selection process included work locations, gender, grade level taught, years teaching experience, years experience teaching middle school science in the school district, and any reading courses or in-service training they had taken.

I explained that the *Handbook* was developed as a result of some district science teachers commenting that many of their students could not read the text. The *Handbook* was a tool to address this issue. I stated that I wanted to explore teachers' responses to integrating the *Reading Strategies Handbook* in their content classrooms, since they were directly responsible for implementing the reading strategies with their content students. I further explained that the study's results would be included in my dissertation and used to inform research and practice.

I then explained that a classroom visitation would precede a one-hour interview. The purpose of the classroom visit was to see the teacher implementing the strategy; it

was not evaluative in any way. I would take notes of my visit to help capture the teacher's implementation of the reading strategy. The notes were intended to remind me of questions I would ask the teacher during the interview. My role in the classroom was solely that of a spectator, witnessing the teacher implement a reading strategy.

Further, I explained that the purpose of the interview visit with each participant was to gain the interviewee's perspective of the *Handbook*. To ensure that I did not leave out any details of the interviews from my analysis, the interviews were tape recorded. I informed the potential interviewees that tape recording was their choice, but if they did not want to be taped I would not be able to include them in my study. I explicitly stated that I would not share the tapes or transcriptions with anyone, and that to maintain confidentiality each interviewee would be given a pseudonym. Once the tapes were transcribed with the pseudonym, the tapes would be erased.

Conducting the Lay Summary via telephone served two purposes. It enabled me to begin to develop rapport with the interviewee by providing some pertinent information about myself and the study. Secondly, the interviewee learned what to expect prior to the interview, which in some cases relieved their anxiety. Lastly, since the teacher participants' work locations were scattered around the district, telephone contact was more efficient. To maintain confidentiality of teacher participants, calls were made to their homes or other off-campus phone numbers. During that telephone call, I was ever mindful of the necessity for my flexibility as I discussed the date, time, and location to schedule the interview and classroom visitation.

As noted earlier, a short interview was also conducted with Karen March, the district's Middle School Science Coordinator and the person who decided the *Handbook* should be written. Karen was given the researcher's account of the project's development (titled in this document as Handbook History) to read prior to the interview in order to receive validation from Karen that I had accurately captured the *Handbook's* history and development. I wanted to hear her remarks about that document in an interview setting to allow for an open discussion.

When writing the interview questions, I tried to anticipate the interviewee's responses. This is a technique that Maxwell (1996) calls "thought experiments," aimed to determine if the interview questions would actually provide the desired information. Additionally, I asked one of the pilot teachers (who was not participating in the study) to conduct a mock interview with me. She was a good candidate for this exercise since she was familiar with the study. This activity helped me to determine whether there were gaps in my questioning.

I took notes during each interview to include any aspects of the interview that were not recorded, such as body language or environmental factors. After the interview was completed, I returned to my car and I added to my notes when necessary.

In order to gain data that would answer my research questions, I went to the interview prepared to ask my pre-selected questions (Appendix D); however, depending on the answers given by the interviewee, I had to modify some of those questions to follow the interviewee's responses. The focus of the interviews was to collect "rich data" for my study and modifying those questions allowed me to do that.

I had planned to conduct the interviews within a two-month period, allowing teachers about the same amount of time to have implemented the *Handbook*. However, inclement weather and teacher obligations extended that time frame an additional month, resulting in the interviews being conducted over a three-month time frame.

Data Analysis

Data analysis began with listening to each tape recorded interview as soon as possible after the interview. Maxwell (1996) comments that “listening to interview tapes prior to transcription is an opportunity for analysis” (p. 78). There were two other advantages: The interview was refreshed in my mind and there was an opportunity to record any additional facts as notes about the interview. Listening to the tape, I was able to focus solely on the development of the interview, whereas during the actual event, listening to the interviewee was accompanied by generating the questions, responding to the interviewee, and attempting to maintain the flow of the interview.

Transcribing the interview followed within days of the interview. As each interview was transcribed, I wrote a memo about the interview, bulleting highlighted key points from the interview. This process provided an opportunity for me to “facilitate analytic thinking” (Maxwell, 1996, p. 78). Maxwell advocates memo writing to not only capture the researcher’s analytic thinking about the data, but to use as a springboard for thinking beyond the data. He adds that memos provide a paper trail so the researcher can know where he or she has been, decide where to go, and what to do next—all are important to validity. Memo writing following each interview is one way to think on paper about the interview.

As interviews were transcribed, I read the transcripts to begin contextual analysis. Maxwell (1996) describes contextual analysis as a means to focus on relationships that join statements and events within a context. Beginning analysis at this point or waiting until all interviewed are transcribed is an item of debate. Seidman (1991) recommended the latter to avoid the reading of an earlier interview biasing the later readings. Maxwell (1996) disagreed with this point, believing comparability of interviews was not as important as the benefits of early analysis.

I agreed with Maxwell. Reading transcripts as they were completed in relation to each other served several purposes. It enabled me to see if my interview questions were eliciting information that would help me to address my research questions. If they were not, then I needed to review my interview questions. The responses that I got for a particular question helped me to determine whether I needed to ask several additional questions to delve more deeply. This practice also helped me to see the emergence of a theory early on. Waiting until all interviews were completed could have resulted in a missed opportunity.

I repeatedly listened to the tapes and reread the transcripts to gain familiarity with what each interviewee said. I felt I needed to gain a comfort with the transcripts to know what teachers were telling me.

The next step was coding, breaking the interview into categories. These categories can come from existing theory or the actual interview questions and could be considered emic (Maxwell, 1996, p. 79) categories. Listening to the interviews as I read the transcriptions, I looked for those authentic words and phrases from which categories

begin to appear. Following the first interview, I began to develop a matrix using categories from theory, and later words from the interviews. After the transcription of each interview, I coded the interview and filled in the matrix's existing categories, adding additional categories when needed.

When I looked at the completed matrix, I felt that I only had snippets of information, stripped of context. True, the matrix helped me to code the data and I was easily able to see what each interviewee said or did not say about a particular category. But my next step was to look at those categories in context. I wrote each category from the matrix on the top of a separate sheet of paper and then spread them out on my kitchen counters. I then listened to each tape again and followed along with the transcript. When I heard a category, I stopped the tape recorder and marked the transcript, assigning a code number to the item in context. I listed that assigned number on the sheet of paper with the assigned category. Additional categories emerged from my repeated listening to the tapes.

Once I had completed this process for all interviewees, I took each sheet of paper with numbered items tied to each transcript for each category, and located the transcript on the computer to copy and paste the teacher's responses in context for each category. The result was that all teachers' responses related to each category were clustered together, allowing me to read all responses for a particular category within their own specific contexts. I found this technique better than the matrix because I had the context for teachers' remarks centralized. When this process was completed, I reread all teacher participants' remarks for each category, looking for similarities and differences. This

helped me to cluster comments for each category and to begin thinking about subcategories.

After I had identified most of the categories and subcategories, I laid them on the counter, looking for some way to determine major headings. As I thought about my categories, I began to see that some items were beyond teachers' control; others focused on teachers' beliefs and who or what influenced those beliefs. From this observation, I began to think in terms of external and internal influences. External influences included categories that were out of the teachers' control, yet influenced their decisions whether to implement the reading strategies or not. Internal influences included influences inside the teacher, such as their beliefs. Within this category I also included statements related to influences on these beliefs.

At this point, I realized that my original research questions did not match the data I was analyzing. My original research questions had been:

1. How do teachers respond to the introduction of new curricular materials by a school district?
2. How do teachers' beliefs about literacy and attitudes toward the *Reading Strategies Handbook for Middle School Science Teachers* influence their implementation of it?

The data was more extensive and required question two to take primacy, as well as be rewritten and subdivided: What influenced teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers*?

- a. What were the external influences that influenced teachers' implementation of the *Handbook*?
- b. What were the internal influences that influenced teachers' implementation of the *Handbook*?

My original question one then became question two: to answer how teachers actually responded to implementing the new materials.

I continued rereading the transcripts to make sure I did not leave out important information and that I had accurately categorized teachers' responses. I also checked to see if others were saying similar things or if differences were emerging.

Validity

Validity is a primary concern in research design (Maxwell, 1996). To avoid inaccuracy or incompleteness of data, as noted earlier, all interviews were tape recorded. This reduced the chances that information would be left out or inaccurately described.

In the case of research projects where the researcher assumes multiple roles, research bias can present particular concern for the study's validity. This was applicable to my study, making it especially important that I described the various positions I had held throughout the project. According to Maxwell (1996), the lack of explicit attention to validity threats is a frequent reason for the rejection of a research proposal. Based on my deep involvement in the project, some readers might be skeptical about my objectivity to conduct such a study. In regard to such concerns, while I believed the *Handbook* potentially was a helpful tool for teachers, I was not implementing the *Handbook* in the classroom. My role as researcher reminded me that I was relying on

feedback from the teachers who were implementing the *Handbook* in their classrooms. As a teacher, I also had a high regard for the importance of understanding teachers' true experiences, dilemmas, attitudes, and beliefs.

A second concern was reactivity, or the researcher's influence on the interviewees. Hammersley and Atkinson (1983) pointed out that reactivity cannot be eliminated, nor should it be. It must be understood and used effectively. It is important to point out that my experience as a middle school science teacher who used reading strategies developed from my desire to try some of the strategies I was learning in my content reading course; therefore, reading strategy instruction in my middle school science classroom was my choice—unlike the *Handbook's* required implementation by all middle school science teachers in the district at the time of this study.

Including reading strategy instruction in my own science classroom had been based on my belief that reading strategy instruction could help students, and I had seen the benefits. For this study, I understood that all middle school teachers did not share my beliefs. My purpose for the study was to understand their reactions to the required implementation of the *Handbook*.

There are a number of ways a researcher can attempt to rule out validity threats. Triangulation, collecting data from multiple sources, provides one way to rule out validity threats (Maxwell, 1996). Triangulation was achieved in this study through the use of documents, observation, and interviews. An e-mailed questionnaire (Appendix C) sent to interviewees provided the researcher with information about teachers' implementation of the *Handbook* to date, some of their educational background

information, as well as their reasons for volunteering to participate in this study. Reference to this e-mailed questionnaire helped to initiate a more in-depth understanding of the interviewee's implementation of the *Handbook*. A classroom visit provided an opportunity for me to witness the interviewee implement a strategy and then discuss the lesson with the teacher. This observation served as a guide for several of the interview questions. Each interview represented one person's experience with the same tool, the *Handbook*. Interviewing provided "rich data" that was recorded for repeated listening, which can be helpful in member checks, which are the single most important way to minimize the potential for misinterpreting the meaning of what the interviewees are saying (Maxwell, 1996). Data analysis continued to evolve as the study progressed.

The combination of all of these methods and procedures builds confidence in the study. When the researcher recognizes a potential threat and discusses it, credibility in the study is strengthened. Methods and procedures do not verify the researcher's conclusions; rather, they test the validity of the conclusion and the possibility of possible threats to those conclusions (Campbell, 1988).

Summary of Chapter Three

This was a study of teachers' implementation of school district-developed materials in their classrooms. Eleven teachers were interviewed from a very large district to gain an understanding of their decisions related to implementing these materials. Qualitative methods of document review, observation, and interview were utilized. The researcher-participant relationship was important to this study since the researcher had participated in the materials' development. Interviewee search, selection, and interview

location were discussed. Data collection and analysis methods were explained along with threats to validity of this study. The next two chapters will address the results of the study.

4. Results: External Influences

The results of this study will be discussed in Chapters Four and Five. Chapter Four will answer Part A of the study's first research question: What were the external influences that influenced teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers*? In this chapter, teacher participants' comments related to implementing the *Handbook* will be discussed. Refer to Table 1 (Chapter 3) for teacher participants' characteristics. The discussion will focus on external influences—those beyond the teacher participants' control—that influenced their implementation of the *Handbook*

External Influences

External influences were defined as factors beyond the control of teacher participants' that influenced their implementation of the *Handbook*. Teachers' comments focused on four areas beyond their control that specifically impacted their implementation of the *Handbook's* reading strategies: time, curriculum design, required instructional materials, and support (Figure 1).

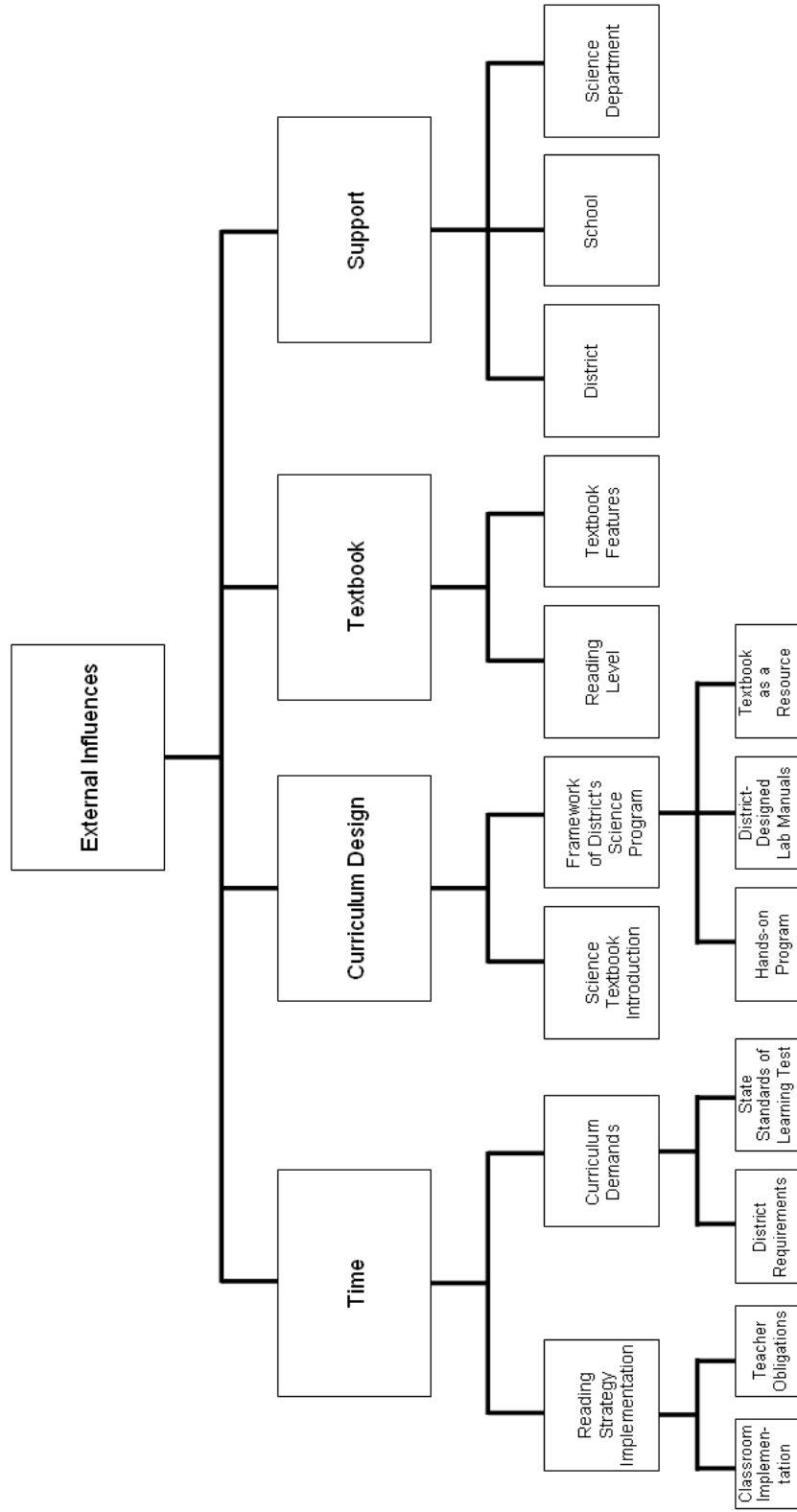


Figure 1. External influences affecting teachers' implementation of the Reading Strategies Handbook for Middle

School Science Teachers.

Time

All teacher participants identified time as a factor that influenced their decision to implement reading strategies from the *Handbook*. Kelly reinforced that when she said, “Time, the only thing is more. That’s another four letter word.” Teacher participants commented about time in two contexts: reading strategy implementation and the district’s curriculum demands.

Reading Strategy Implementation

Teachers discussed implementing the *Handbook’s* reading strategies in terms of classroom implementation and teacher obligations. Classroom implementation will be discussed first.

Classroom implementation. Six of the 11 teacher participants (55%) expressed their concern related to classroom implementation of reading strategies from the *Handbook*. Four of the 6 teacher participants (67%) questioned whether the time required for implementing a reading strategy from the *Handbook* was justified.

For example, Pamela compared the amount of material she covered in one class period implementing Four Square Insert Note Taking, a reading strategy from the *Handbook*, to the amount of material that she typically covered. Using Four Square Insert Note Taking actually slowed her down: Implementing the strategy caused her to cover considerably less material. “You saw today we got through one section, one paragraph in a section in one class session. If we had used what we usually use the students probably would have gotten through at least four pages.”

Wanda expressed similar concerns for the amount of time it took her students to implement See the Steps, a reading strategy recommended for use with reading lab directions from the district's lab manual. Wanda stated, "I thought it was good, but it was terribly time consuming. We spent an entire period reading one lab page and drawing little pictures. I can't afford that kind of time."

Paige also expressed concern for the amount of time needed to implement a reading strategy from the *Handbook*, Before, During, and After (BDA). Paige explained that the strategy required students to initially write a list of what they already knew about the topic prior to their reading of the textbook passage. Some of her English Second Language (ESL) students had little background knowledge of topics prior to the reading. She stated, "Many ESL students have never been exposed to the terminology or the concepts themselves." She pointed out that after reading the textbook selection, students usually had a lot to write because of what they had learned from the reading—so much that it usually required lengthy class time to record the new information students learned. Paige acknowledged the merit in allowing students to list what they learned and see how much they gained from reading. However, she questioned whether she could take so much class time to allow students to write it. Paige stated, "So many of my kids know so little [about a science topic]. Yes, it is good for them to say, 'Look how much more I know now,' but it takes so much time when they are writing it down."

In agreement with other teacher participants, Kelly expressed concern for the amount of time implementing a reading strategy often required. She viewed time as a critical factor influencing her choice of reading strategies, and stated that she would only

implement reading strategies that required a minimal amount of time. Kelly cited examples of reading strategies she had used that were quick. She named one from the *Handbook*, Four Square Insert Note Taking, and another strategy she had used prior to the *Handbook's* introduction, Anticipation Guide. Those strategies, Kelly felt, were suitable because they met her criteria, "quick."

Somehow, they're [the district's *Handbook* designers] going to have to give us some strategies that are quick. I would use the one I used today, Four Square Insert Note Taking. Often, I would use the Anticipation Guide. That's a quick one. I can do it in 10 minutes. Those are obviously quick even with my slower classes. I used it today. I probably spent 15 to 20 minutes on it by the time that they did it, but I can not afford to spend the whole class period on a reading strategy usually. So it's got to be quick.

Two of the 6 teacher participants (33%) who commented about time expressed concern related to the length of selected textbook passages students were required to read. Abigail commented that some of the textbook readings matched to reading strategies were too long, that the number of pages students were expected to read in conjunction with the reading strategy was too time consuming.

One thing that I found overall was that the sections in the book tend to be long for these. If we had more time and there was some way to break it up and do just a few pages at a time as opposed to a whole section that would have been even better.

Victoria's comments were also related to the length of the passages suggested for use with a particular strategy. She cited time constraints as the reason her students' classroom reading was limited to "introductory paragraphs for the labs or maybe an article or two relevant to the subject matter." She stated that time prevented reading most textbook passages in class; therefore, she assigned most textbook reading as homework. Since she had to resort to assigning textbook reading as homework, she infrequently used the textbook.

If we [the teachers] give time to read those pages in class, we will never finish. So we have to leave it [the reading] to the kids. We can do it sometimes, but it is very hard and that is why they [the students] don't use the textbook that much We can't do it [the readings] in class.

Summarizing, several teachers remarked that although they found some reading strategies to be helpful for students, they questioned those strategies' value in light of the time needed for their implementation. Two other teachers felt that some of the selected textbook passages required too much class time to complete.

Teacher obligations. Teacher participants also noted that their decisions to implement the *Handbook* were influenced by their instructional and non-instructional obligations. Two teachers (18%), Paige and Victoria, commented on instructional issues that impacted their implementation of the Handbook. Time for teacher preparation was a consideration when deciding whether to implement a reading strategy. Paige commented that she needed preparation time to become familiar with the strategy and feel confident that the strategy would work before introducing it to her students: "It's time to really be

familiar with it [the reading strategy] before I introduce it to my kids and I want to make sure it is going to work before I do it with the kids.”

Victoria also commented that she needed preparation time before she could implement reading strategies. She viewed implementing the reading strategies as being “creative” and felt she lacked the time necessary to actually feel confident that she was ready to use a strategy with her students. She said, “All of the things that I have to do here, when do I get time to be creative? It’s in my head, but to get it into action.”

Even though reading strategies in the *Handbook* were matched with labs and selected text readings, and handouts were ready to be copied, the teachers felt that they needed time to become familiar with the strategy before introducing it to their students in class.

In addition to teachers’ comments related to their instructional obligations, four teachers (36%) mentioned various non-instructional obligations requiring their time that impacted their use of the *Handbook*.

For example, Paige commented that test scores and her school’s low-achieving student population had resulted in the administration’s decision to implement many initiatives at the school. She wished that these initiatives were less demanding of her time, so she could focus more time on her students.

Because of our population in general and our test scores, there are so many initiatives coming down. Try this, try this. Now we are an International Baccalaureate school (IB). We have Positive Behavior Strategies (PBS). [There are] all these different initiatives that want our feedback. Try this and answer all

these questions about it. It is just hard. Sometimes I just want to scream. Can I just teach?

Paige continued, adding that feedback for these initiatives had taken time away from her using the textbook with her students. She believed it had also prevented her from having the time to adequately implement the reading strategies.

It just seems like we are asked to do more and more and give proof and lots and lots of paperwork to show what we are doing and it just takes that much more time away from being able to take the book out and go do the reading strategies properly.

Victoria also commented that responsibilities beyond instruction interfered with her implementing the reading strategies from the *Handbook*, adding that two of her colleagues were in the same situation. She identified time spent trying to learn a new grading system as a deterrent from her implementing the reading strategies.

I am not getting out of here [my classroom] every day before five o'clock. That's what happens. [It's the] same thing with Sally. [It's the] same thing with Sarah. We are just so busy doing our own things, getting the lab learning [ready], and [learning] a new grading system.

Another non-instructional concern related to time identified by some teachers was posting the *Handbook* on the district's Blackboard website. The district's Middle School Science Specialist had posted the *Handbook* on the Blackboard website based on teachers' requests. She believed teachers' direct access to the document would allow them to easily modify worksheets for their classes, and would create an opportunity for

middle science teachers throughout the district to easily post questions or share ideas with district colleagues. However, some teachers did not view using the district's Blackboard website that way. Four of the 11 teacher participants (36%) mentioned their satisfaction that the *Handbook* had been posted on the district's Blackboard website, acknowledging that it would enable them to easily modify student worksheets for different labs. However, 2 of the 4 teachers (50%) who expressed their satisfaction with the posting also voiced concerns with finding the time to actually access Blackboard. They felt that the Blackboard posting would not help them implement or modify a reading strategy if they did not have time to access it.

For example, Paige commented that it was a plus to have the *Handbook* on Blackboard, but she was unsure when she would have the time to get to Blackboard: "It's just you have so many hours in the day and to sit and go through it, you just don't have that much time."

Irene shared the same views expressed by Paige about the *Handbook* being posted on Blackboard. She thought that everyone was too busy to even check Blackboard: "No one has time to go on Blackboard anymore."

Therefore, regarding teacher obligations, some teachers commented that professional obligations interfered with their implementation of the reading strategies. Instructional obligations related to time necessary for teachers to familiarize themselves with a reading strategy prior to its implementation was cited as a reason for teachers' hesitancy to implement the reading strategies. Non-instructional issues impacting teachers' implementation of the reading strategies focused on administrative expectations

at the district and school levels. Although some teachers noted a benefit to implementing these reading strategies regardless of teacher obligations, time was the decisive consideration in their decision.

In summary, teacher participants noted various contexts where time was a factor related to reading strategy implementation. Several teacher participants questioned whether the time investment necessary to implement a strategy was worth it. Some teachers who commented about the amount of time required to implement a reading strategy noted that the length of selected textbook readings was a determining factor in their decision whether to implement that reading strategy. Additionally, teacher obligations related to instruction, such as time for teacher preparation, was mentioned. Non-instructional responsibilities, including administrative demands such as the implementation of other initiatives and the availability of the *Handbook* on the district's website, were identified as time-related factors in teachers' decisions to implement the reading strategies. The next section will explain another category related to time, curriculum demands.

District's Curriculum Demands

Teachers mentioned curriculum demands in terms of district requirements and state Standards of Learning (SOL) tests. District requirements will be discussed first.

District requirements. All 11 teacher participants (100%) identified curriculum demands as a problem that held them back from implementing reading strategies from the *Handbook*. Their comments focused on the volume of content in the curriculum at both seventh and eighth grade levels.

All 5 seventh-grade teacher participants voiced concern related to the amount of material they were required to cover. Abigail succinctly explained the dilemma she faced attempting to implement the reading strategies with her students, while maintaining the pace of the curriculum. Recognizing that her instruction was already behind the district's seventh grade proposed timeline for seventh-grade science, she felt that implementing the reading strategies in the intended manner would only put her further away from covering the required curriculum.

These reading strategies, I think, take time to actually incorporate into the class. You need a good half hour to 40 minutes to do it [implement the reading strategy] and do it well and sometimes you just don't have that much time. To give up half of a block so that the kids can try to read and then go back afterwards explaining it all, it really does monopolize a lot of time. I think that it's valuable, but as it is we're about one and a half month behind the schedule of where we should be according to the guidelines for middle school seventh-grade science and we feel like we are moving faster than we have ever. So to slow down even more for this [reading strategy implementation] would make it even harder. I think if we had all the time in the world we'd want to do all of them and do them exactly the way they should be done.

Vanessa explained a similar situation. Like Abigail, Vanessa tried to implement the reading strategies and keep up with the curriculum timeline. She explained that she usually spent one class period on a reading strategy, then moved into the lab. She added that she did not go back and refer to the students' note taking, a student worksheet

designed for the reading strategy. She believed that she should, but felt pressured to meet the goals set by the seventh grade Program of Studies (POS).

I don't go back and refer to their [note taking] and I should. I'm not saying that I shouldn't. I should do that. We just get going and we have this time factor. We have a time frame to get these [the labs] done and we are trying to meet those goals. So it is a matter of me getting what I have to get done according to my POS.

Paige also explained the dilemma she faced attempting to keep up with the labs determined by the curriculum and including a reading strategy as she developed her lesson plans. She explained that she must allow adequate time for directions, conducting the lab activity and clean-up, and then determine whether there is time available for reading. She stated, "If I only have a certain amount of time to do a lab, I've got to do the directions, I've got to do clean-up, you know. Do I have time to do the reading?"

Pamela thought her colleagues had determined the only way they could keep up with the required curriculum: They strictly followed the lab book to complete the labs, limiting reading to only what was absolutely necessary. They believed that following that course would enable them to complete the lab books and then proceed to the material that does not have a lab book associated with it. Pamela thought that completing the lab books would be an opportunity for her science department colleagues to focus more on the reading strategies.

We have figured out the only way we are going to keep up with the scope and sequence of the curriculum is if we stick to the lab and the lab book. So we don't

[deviate from the lab and the lab book to include reading strategies from the *Handbook*]. Our tests are lab tests. Our teaching is teaching them just enough background knowledge to understand the ramifications of the lab that we are doing. So we just stick to the lab and the vocab [vocabulary] associated with the lab. We do textbook reading only as it pertains to specific ideas for that specific lab. So when we get beyond the lab books and we have to start the Chino Bay ecosystem unit and things like that, I can see us using the reading strategies a lot more then.

Victoria expressed her concern for the amount of curriculum students were expected to learn—not only in science but other subject areas. Her concerns revealed the pressure she felt from the district to cover the curriculum. Victoria was torn between district expectations of students and district requirements for the teacher.

We are putting so much material at them and it is not just one subject. We are not giving them the skills that they need because we don't have the time and we are behind [the district's planned timeline]. We need to give them time so that they will not be left behind. As teachers, we have to make sure that we cover the subject matter or the content and do the kinds of creative things or things that will make a difference. We need to have time.

The following comments from eighth-grade teacher participants echo remarks made by the seventh-grade teachers. Eighth-grade teachers also cited the volume of content in the curriculum as having an influence on their implementation of the reading strategies from the *Handbook*.

Ralph, an eighth-grade teacher, shared comments similar to those expressed by Victoria. He questioned the number of required labs for eighth graders, and suggested reducing the labs to a more reasonable number.

Focus on the essentials. You know, 34 labs is a little far away from the essential. These are eighth graders. These are not high schoolers. They should be able to write. They should be able to read and if we could only do 10 labs, fine. I mean, obviously, we should try to find a happy medium.

Both Kelly and Robert believed the district must reach a “medium.” Kelly directly stated that she did not have time to include textbook reading in her lessons when the district continued to add curriculum.

I think if they [district administration] want us [the teachers] to use more of the reading strategies, they [the district administration] can't keep giving us more to do, more curriculum to teach. I just don't have the time to incorporate the textbook into my lessons.

Another eighth grade teacher, Daniel, expressed concern for being behind the scheduled timeline of the eighth grade curriculum. He commented that implementing the reading strategies with an already stretched curriculum was, “going to be hard to shoehorn in more things.” The only way that he saw that he could cover the curriculum was to take some short cuts and trim the curriculum: “What could hold me back is all the information that I have to get through. We are way behind the normal timeline for this. We're going to have to crunch.”

Wanda also expressed her belief that there is a lot of curriculum to cover in the eighth grade and admitted that she knew that she was not keeping up with the timeline. She said, “The eighth-grade science curriculum is packed full and I don’t know if you know where we are supposed to be, but I am way behind.”

Irene acknowledged that she has a lot of curriculum to cover, but attributed falling behind the timeline to the teaching techniques she needed to use with her mixed class of regular education students and ESL students. She explained that this class required very directed instruction and guidance. She described the method she used with the students, saying, “We [the teacher and the students] read the lab directions in preparation for a lab.” Irene explained that she routinely asked students to get out their highlighters and directed them to highlight specific words. This technique took an inordinate amount of time and slowed down the momentum of the class; therefore, it impacted whether she would be able to cover all of the required curriculum. She stated, “It takes us forever to cover any material because it is at a much slower pace, but then I have all this material to cover. So it is quite a challenge.”

All 11 teacher participants (100%) shared the opinion that the extensive curriculum was a factor impacting their implementation of the *Handbook’s* reading strategies. They commented that adding reading strategies to this already large curriculum resulted in teachers having to make choices as to what to teach and what would have to be left out. The next section will focus on time related to preparation for the state Standards of Learning (SOL) test.

State Standards of Learning (SOL) test. At the time this study was conducted, eighth-grade students were required to take a state SOL test in science, but seventh-grade students did not have this requirement. Two of the 5 eighth-grade teacher participants (40%) identified the state SOL test as a factor that influenced their decisions whether to implement the reading strategies as presented in the *Handbook*. Teachers explained that in addition to their pressure to cover the district's curriculum, they felt pressured to prepare students for the state SOL test.

Daniel described his dilemma whether to implement one of the reading strategies as he considered the amount of material he must review with his students in preparation for the eighth grade SOL test. He explained as an eighth-grade teacher he had the responsibility to review sixth- and seventh-grade material as well as eighth-grade material, and he was restricted by the time factor to do that. He contemplated his choices to reduce review to a concept sheet and quiz, which he believed students would not complain about, or assign reading and a reading strategy. He admitted he leaned toward the concept sheet and quiz, believing that it was the easiest choice.

As an eighth-grade teacher I have to reinforce them on seventh-grade stuff and some sixth-grade stuff. So what's easiest, [to] take out the little quiz for the preparation for the SOL test and give them a worksheet and already-sifted-through concept sheet, or have them go read the book? The concept sheet they'll not balk. I'll get more reading time even if it is just highlights. So I'll tend to get away from the strategies and go to the easier way of accomplishing it. It gets me there faster.

Kelly, also an eighth-grade science teacher, reiterated feelings teachers expressed in regard to content volume and the impact that this created to meet the district's curriculum expectations and readiness for the state's annual SOL test. She explained that she was unable to complete all of the district's required labs before students took the SOL test: "We don't finish all the labs before its time for the SOLs. We are always pressed for time and we always feel we're behind."

To summarize, teachers commented about the state Standards of Learning test, eighth-grade science teachers expressed feelings of pressure to review sixth- and seventh-grade concepts as well as eighth-grade content in preparation for the state test. Adding to their concern was the district's expectation that they implement some of the *Handbook's* reading strategies. The result was teachers having to make decisions about what to teach and what they would not be able to include/teach.

Overall on the issue of curriculum demands, the teacher participants expressed concern for the amount of time needed to implement the *Handbook's* reading strategies. Their concerns centered not only on time to implement an actual strategy, but also the length of the selected reading passages tied to the labs. In addition, teachers commented about their obligations, mentioning the need for teacher preparation time prior to implementing a strategy. Teachers also expressed concerns for non-instructional obligations, feeling these too cut into their time to prepare and use the strategies. Teachers commented about curriculum demands established by the district, addressing two issues. First, all teacher participants expressed feelings that there was too much curriculum to teach. Some teachers commented that adding reading strategies to that

expectation resulted in teachers having to make decisions about what they needed to teach and what they could leave out. Secondly, the eighth-grade teachers faced an additional responsibility: They needed to review content from the sixth- and seventh-grade science programs as well as the eighth-grade material in preparation for the state SOL test. The next section will focus on the district's curriculum design.

Curriculum Design

Teacher participants mentioned curriculum design in terms of the timing for introducing a science textbook as a component of the district's program and the overall framework of the district's science program. Science textbook introduction will be discussed first.

Science Textbook Introduction

The materials used by the district's upper elementary (grades 4-6) school science program included hands-on experiences, science trade books, videodiscs, and web sites correlated to each science unit. Science textbooks were not issued in the elementary grades. It was not until seventh grade that students were issued a science textbook. Four of the 11 teacher participants felt that introducing the science textbook in the seventh grade contributed to students viewing science in middle school as different from their familiar elementary program.

Abigail thought students' perception of science was altered by introducing the science textbook in seventh grade. She suspected that students viewed adding the textbook as eliminating the fun from science. Abigail remembered her own experiences

as a student, commenting that she always had a science textbook to reference and suggesting that students without that experience were missing out on something.

I always had a textbook for everything. I know we complain that the kids have to lug everything around, but there was always a book that you could go to as a reference when I was in elementary, middle, and high school and the kids don't have that now. I wonder if for them they see this as a burden. Science never had a book before and now we have a book. That takes the fun out of it [science]. Now, it's a whole different situation.

Crystal described her students' surprised reaction when they initially opened the textbook and saw the page layout. Their remarks depicted the contrast between the elementary school science materials and the introduction of a textbook in the seventh grade. Crystal additionally commented that postponing inclusion of a textbook until middle school withheld opportunities for students to interact with science text.

For instance in seventh grade, they don't see a text until they get to seventh grade for science. . . . So there is a disconnect. The first thing they say, that [the textbook] doesn't look like what we had last year. . . . Perhaps it doesn't allow an opportunity for our students to interpret text and if it is a situation where they are not used to a text, such as in science, when they get a text it is a rude awakening for some of them because some of them say, "All of that goes on that one page? All of that is there?" Yes, it is. Oh. That is just too much.

Victoria also mentioned the district's timing for introducing a textbook to the science program. She stated that a gap existed between the elementary and middle school

programs, that students moved from an elementary experience in science without a textbook to a middle school program where students were issued a textbook and expected to know how to use it. Victoria also indicated that a textbook was not the only difference students encountered between the two programs. The middle school program included a more rigorous curriculum and extended class time allotted for science.

I think that the major problem here is that until they get to seventh grade they don't have a textbook. They don't know how to use a textbook and I think that really fifth and sixth graders are ready. I think they should be introduced to a textbook, to know how to use one because we are expecting them to use it [the textbook]. They're [the district] giving them so much curriculum and content in seventh grade all of a sudden and they don't even know how to use a textbook. There is a very wide gap there. If they didn't have as much content like in elementary school where a science teacher comes twice a week for 40 minutes [it would not be so different].

Kelly expressed similar comments. Kelly remembered an articulation meeting with high school teachers she attended a number of years ago at which high school teachers were asked what skills they wanted students to have when they entered ninth grade. Kelly expected the high school teachers would name specific information related to science topics woven through the science curriculum. To Kelly's surprise, high school teachers responded that they wanted students to be able to read a science textbook. Kelly remarked that students were not issued a textbook in elementary school and they were not

taught in middle school how to use one. She felt that students were often entering high school without that skill.

The only thing they [the high school teachers] said was that they [students] need to know how to read a science textbook. They [the high school teachers] didn't care if they [the students] knew metric measurement. They [the high school teachers] didn't care if they [the students] knew experimental design. None of that—because they [the high school teachers] said they could teach them [the students] that but they [the high school teachers] didn't have time to teach them [the students] how to read a textbook and the children don't know how.

In summary, some teacher participants voiced concern for withholding the introduction of a science textbook to students until seventh grade. Teacher participants wondered if the district's policy contributed to students viewing science as less fun. They also wondered if the science textbook structure overwhelmed students. Several teachers questioned whether the textbook's postponement was a missed opportunity for students to gain some experience interacting with science text. The district's science program framework will be discussed next.

District's Science Program Framework

The middle school science program was hands-on. District-developed lab manuals provided the framework for the program, supplemented by the district-approved textbook, a basal instructional text for each grade level. Specific text readings were listed in the lab manuals to go along with labs. The purpose of these readings was to provide

background knowledge about topics and extend detail to support information in the lab manuals.

The materials issued to each seventh grade student included a copy of the seventh grade textbook and copies of the three student lab guides along with materials to support a unit on nearby Chino Bay. Each eighth grade student was issued a copy of the eighth grade textbook and copies of the four student lab guides for the eighth grade science program.

In addition, the district had approved two informational books for seventh grade and one for the eighth grade. Each grade-level classroom was issued a class set of the grade-appropriate informational books.

Teacher participants explained the program's framework in terms of three categories: hands-on instruction, district-designed lab manuals, and the textbook as a resource. These topics will be discussed respectively, beginning with hands-on instruction.

Hands-on program. Three of the 11 teacher participants (27%) commented favorably on the district middle school science program as being hands-on. Vanessa believed that allowing students' opportunity to engage in science activities was important in generating students' interest in science. She viewed a hands-on program as a means for gaining students' curiosity in science.

I do love the program. It is so hands-on for these kids. I do think that science must be hands-on. I do like the lessons that create the "Wow" in kids. I want them to learn the concepts, but I want them to be interested in science. I want them to ask

questions. “Why did this happen? Where do we go? What happens, if this happens?” That to me is more important in science, so I do love the program because it is so hands-on.

Paige shared similar feelings toward a hands-on program, and felt that the discovery approach was well suited for middle school aged students: “I strongly believe that it has to be hands-on. A discovery-based curriculum for this age group in particular is the best way [for the students] to learn.”

Robert, a teacher of emotionally disturbed students, also stated that “science must be hands-on”—although his comment came from a different context. When he discussed implementing Four Square Insert Note Taking, a reading strategy from the *Handbook*, he mentioned that the reading strategy required students to use sticky notes to write the main idea, a supporting detail, a question they had about the reading selection, and a connection they made to the selected reading passage. He viewed this reading activity as hands-on, actively involving the students in reading. Based on his student population, though, he decided to forego using of sticky notes. He believed several of his students would view the use of sticky notes as demeaning. He regretted not following the sticky note suggestion, explaining that he believed writing is another way of engaging students in the learning process.

Actually, I wish that I did the sticky notes, had I known that I was only going to have those four kids. I say that because it gets them more physically involved. Science is all about hands-on. I feel like if you are writing something on a sticky

note and you are actually putting it down it is another step your brain has to take on. Maybe 20% of that information gets shoved into their brains.

Several teachers commented favorably about the hands-on program. Teacher participants believed that a hands-on program provided students with an opportunity to participate in science. District designed lab manuals will be discussed next.

District-designed lab manuals. Four of the 11 teacher participants (36%) commented favorably about the district-designed lab manuals. Teachers stated that the program emphasis was on the district designed lab manuals and that was where it should be.

Victoria commented positively about the district's lab manuals, particularly pointing out instructional features. She appreciated the inclusion of clearly written plans for the teacher, explicit student directions for conducting the labs, and suggestions for enrichment activities.

The lab books, we love them because there it is. You know exactly what you are supposed to do for enrichment. They have suggestions that you do this, this, this. You can do a couple. If you don't want to do any, that's fine too, but it is right there. And this is what you do and this is what is required You don't have to sit down and say "I'll have to plan this now and what do I need for it?" So I like the structure like that. I really do.

Wanda was positive about the lab manuals. Her remarks about the lab manuals, however, were focused on features that impacted students' learning.

I really like the labs. I like the way the lab books are set up [with] basically, some information that introduces it [the lab activity]. It kind of gets the kids thinking about it [the lab]. The materials are listed, the steps are listed, there is a place to write in the results, and they [the students] have practice using data tables. I really like the science program.

Irene's comments focused on the readability of the lab manuals. She stated that the lab manuals were easy to read, unlike the textbook: "I think our text is pretty complicated and high level. We tone it down in our manual. The manuals are very simple to read."

When Abigail remarked about the district-developed lab manuals, her comments were connected to her science educational experiences. She believed students became engaged in science by doing, unlike her academic science experiences which were limited to reading and writing.

I think the lab work is really important because I think that is what really turns kids on to science and with that gone [students lose interest]. I know when I was in seventh- and eighth-grade science, we never did anything like that. It was all reading and worksheets and not a whole lot of activity. I think the activity is fun for them, but I think it still needs structure.

Teacher participants spoke favorably about the district-developed lab manuals and specific features within the lab guides. They mentioned the value for students to actively participate in science through lab activities. This section will conclude with a discussion of the textbook as a resource.

Textbook as a resource. The district structured the middle school science program, designating the textbook as a “resource.” Lab guides referred to textbook pages intended to supplement the labs. The purpose of the selected readings was for students to gain background knowledge or more information related to a topic students were learning about in a lab. Teacher participants were clear that the textbook was a resource for the district’s middle school science program. Vanessa added that the textbook was “a tool to get the information that they [the students] will need to do the lab.”

Teacher participants explained that the program framework was grounded in the district-developed lab manuals and supported by the district-approved textbook. Four of the 11 teachers (36%) clearly stated that the lab manuals were central to the hands-on middle school science program and the textbook was the resource. Kelly, in a few words, said it all: “Our curriculum is not textbook-oriented. It’s lab manuals.”

Pamela described her school’s science department’s adherence to the framework of the district’s program: “We stick to the lab and the lab book We do textbook reading only as it pertains to specific ideas for that specific lab.”

Irene explained the purpose of the textbook for the middle school program: “In addition to our manual, we need to go into our textbook as another resource so we do need to get in-depth information. It is a much higher level.”

A fourth teacher, Vanessa, echoed what other teachers had stated about the program framework. She commented that the lab book was the foundation for the program and the textbook was the resource for the labs.

Our program is based on the lab book . . . The textbook is the reference. Our science is not based on the textbook . . . It is based on the lab book. So when they [the students] read the information from the textbook, it is to get the information for them [the students] to do their lab.

The teachers identified the district's science program framework as an influence in their implementation of the *Reading Strategies Handbook*. Comments expressed by the teachers were favorable about the decision for a hand-on science program for middle school students. They also spoke favorably about the district-designed lab manuals, remarking that the lab manuals explicitly directed the teacher's science instruction. When it came to the textbook, teachers stated in a factual manner that the district-approved textbook was a resource for the program.

Summarizing the theme of curriculum design, teacher participants expressed concern that it was not until seventh grade that students in the district were exposed to a science textbook. They felt this delay may have contributed to students' viewing middle school science as less enjoyable than elementary science. The district had developed a hands-on program for middle school science students with lab guides as the foundation and determined that the textbook would serve as a resource for the curriculum. The next section will be devoted to a discussion of required instructional materials, another factor teachers identified as influencing their decision to implement or not implement reading strategies from the *Handbook*.

Required Instructional Materials

Apart from the textbook being a resource, teacher participants expressed their discontent with the district-approved textbooks for the seventh- and eighth-grade science programs. General comments from the teachers at both grade levels centered on the issues of textbook reading level and textbook features. The textbooks' reading levels will be discussed first.

Textbook Reading Level

Ten of the 11 teacher participants (91%), representing both grade levels, cited the readability level of their science textbook as too difficult for their students. Kelly, an eighth-grade teacher, considered the textbook "extremely hard to read." Victoria remarked, "it [the eighth grade science textbook] is much harder than they [the students] can read." Abigail, a seventh-grade teacher, agreed with those remarks. She stated, "it [the seventh-grade science textbook] is way over their level, but they need a book. They need to understand what they are reading." Vanessa also agreed that "reading the textbook is not easy for these kids."

Irene shared the same remarks related to the textbook's high reading level. She discussed one student's unwillingness to take a risk trying to read the textbook for fear of failing. Irene stated, "The textbook is very high level, and rather than try and fail he doesn't even try it. He is afraid of taking a risk. He is afraid of being embarrassed, so he makes excuses not to do it [read the textbook]."

Paige and Robert labeled the science textbooks as high school level. Paige commented, "I have heard that this one [the district-approved textbook] is more of a high

school level, but I don't know if that is true or not." Robert remarked, "I think the textbook that we are using right now is way too hard. It's a good text for me as an adult. It's really something for high school or college level, not for our kids."

Crystal and Daniel commented on the textbook's readability, stating a specific grade equivalent. Crystal stated, "Our textbook is written at the 10.8 grade level. Well, a lot of our kids are not at 10.8 . . . probably most . . ." Eighth-grade teacher Daniel explained that during his master's degree program he had conducted a readability test on the eighth-grade science textbook and determined that the textbook was written for a student with the reading level of a 10th- or 11th-grade student. Daniel stated, "I have surveyed this book . . . It's a 10th or 11th grade book and that's one thing I had to do when I was getting my degree."

Wanda stated that due to the high reading level of the science textbook, in her opinion, the text was beyond the reading level of many average readers—and certainly less capable readers. It was better suited to Gifted and Talented (GT) students. Wanda commented, "I think that this textbook is probably great for the GT kids . . . it's written at an awfully high level so it doesn't really hit the average student and it certainly doesn't hit the kids who are struggling to read."

Teacher participants expressed similar remarks related to the textbook's high readability. They stated that the textbook was not suited for many of their students because it was written at a higher level than many of their students could read. Textbook features will be discussed next.

Textbook Features

Six of the 11 teacher participants (55%) mentioned problems with textbook features that they felt impacted students negatively. Their remarks revealed their dissatisfaction with district's directed use of the textbook and the textbook's features.

Vanessa and Abigail expressed dissatisfaction with the examples used in the textbook. Vanessa stated, "their [the textbook's] examples are not very good." Abigail felt that the examples were not student-focused, and thought that if the examples were more student-focused, students may have had more interest in reading the textbook. Her remarks were influenced by her observing her students' enthusiasm as they read *Science World* magazines in her classroom.

I don't always think that the examples they show in the book are always very interesting or things that apply to the kids. If they could find examples that have more to do with them [the students], then that would wow them more, excite them more. They [the students] might want to read into it [the textbook] more and get more out of it. Because the *Science World* magazines the kids love to read. They ask me as soon as they are done with quizzes and tests, "Can I get a magazine?"

Paige remarked that textbook page layout was sometimes not suitable for her learning disabled (LD) students. She found some pages were too busy for her students and prevented them from being able to focus and read.

As much as I enjoy the pictures and the bright colors, for my huge LD population, it is a very distracting book for them . . . I think the visuals are wonderful because

it helps. Some kids really need the visuals to help them understand what the reading is about, but in some cases it distracts them from doing the actual reading.

Daniel and Vanessa expressed concern for the text's small print size, identifying it as a factor that could impact students' reading of the text. Daniel referred to his experiences as a reader and his reaction to small print, admitting that he avoided small print: "Thinking back to me trying to read a textbook, not being a great reader myself, if the words were too small, I'd shy away from it, even when I had good vision."

Vanessa commented similarly. She compared the size of print in the district's approved textbook to the previous district textbook and felt that "size of the letters" influenced students' reading of the text—the smaller the letter size, the less reading.

Vanessa and Daniel also shared similar feelings related to the way information was presented in the textbook, both stating that they did not think that the textbook presented the information clearly. When describing their dissatisfaction with the textbook, both teachers compared the present textbook to a previous textbook.

Vanessa, in reference to a previous text, commented that the older text presented the information more clearly than the district's current textbook. For that reason she thought the older text was better suited to her students. She stated, "I felt like it [the information from older text] was clearer to them [the students]. I think that [the older text] is a better book."

Daniel's comments echoed what Vanessa said about the current textbook, commenting, "the book does not cover the material well enough . . . That is why I go to the previous version and I use it because it is more straight forward."

Four teacher participants (36%) expressed dissatisfaction with the textbook's correlation to the curriculum; however, the textbook and lab manuals were not presented as a set. The curriculum was thematically structured with a separate district-developed lab manual for each theme. The textbook provided background information to do the lab and follow-up readings after the laboratory exercises were completed.

Wanda and Robert expressed displeasure with lack of correlation between textbook information and the curriculum. Wanda expressed her dissatisfaction with the textbook because it did not match the district's curriculum. She recognized that the district was preparing for textbook adoption and that they would be addressing textbook issues. Wanda commented, "I really don't like the text. It doesn't match up with our program particularly well. So we have this very expensive book and all these workbooks that don't match our curriculum very well."

Vanessa commented that there was no sequence to the way the textbook was used, and she believed that students needed to become familiar with building concepts in an organized manner, that students needed to experience the sequencing of concepts found in a textbook.

We are jumping around the chapters all the time which I kind of don't like because I felt like kids need sequencing. I know that we're hands-on based . . . but when it comes to the flow of the book, the sequencing of the book, the kids need that. They also need to know cause and effect. It's like this chapter falls back to this chapter, falling back on the information in the first chapter, and it repeats,

which helps you to remember or refer to the previous chapter and then it flows into the next concept.

Paige also expressed that there was no continuity with the text and the curriculum. Students were unable to gain an understanding of textbook arrangement without a correlation to the curriculum.

The textbook flips back and back. You know our curriculum follows a certain pattern and the textbook doesn't correlate at all with the way our curriculum is designed. The kids are like, "What chapter are we on?" The parents will say, "You were on chapter one and now you are on chapter nine." They can't follow it either if they want their kids to sit and read at home . . . You'd never find a textbook to go along exactly . . .

Robert also felt that the textbook and the curriculum needed to be more compatible. Additionally, he remarked that, like Abigail, he did not find the text or examples to be student focused. Robert remarked, "It is not linear. It does not follow our curriculum . . . Number two, [It is too] high level. I'm sorry. It must be high interest, low level. There has to be more wiz bang in this."

Teachers identified text features such as page layout, print size, and concept coverage that interfered with students' use of the text. Teachers also expressed displeasure with the textbook's lack of match with the district's program, which prevented students from gaining familiarity with textbook organization.

Summarizing the theme of required instructional materials, teacher participants expressed concern that the district-approved textbook did not meet the needs of all of

their students for several reasons. Teachers identified readability as one reason for their dissatisfaction with the textbook, commenting that the textbook was written at a higher reading level than many of their students could read. Additionally, some teachers were dissatisfied with various textbook features, remarking that some textbook features were not mindful of middle school students. The final section in external influences to be discussed is support.

Support

Teacher participants commented on the support they received to implement the *Reading Strategies Handbook*. On a pre-interview e-mailed survey, teacher participants were asked, “Is there anyone or anything that is helping you implement the *Handbook*? If so, please describe.” The interviewer used the teachers’ responses to this question to further explore the topic of support during their interviews. Teacher participants’ comments revealed that support to implement the *Handbook* came from three sources: district, school, and school-based science departments. The sources will be discussed respectively, beginning with support from the district.

District Support

Four of the 11 teacher participants (36%) mentioned support offered from the district. Their comments were focused on the district-wide in-service held prior to the beginning of the school year. Middle school science teachers were required to attend one of the 90-minute sessions offered on the in-service day to gain familiarity with the *Handbook* they would implement that school year. Three of those 4 teachers commented

positively about their in-service session. The fourth teacher acknowledged attending the in-service, but did not indicate whether or not she benefited from it.

Two of the three teacher participants who spoke positively about the in-service session discussed the workshop's content, stating that they benefited from trying several of the reading strategies during the session. Paige commented that the in-service session enabled her to become familiar with the strategies, unlike other in-services she had attended that did not allow time to try the new techniques before being expected to implement them in the classroom.

We actually tried some of them and that was helpful because that is my problem with a lot of the in-services. When we go and a lot of people talk to you and you don't really get a chance to practice and so you go back to your school and then boom you are being bombarded with things you don't really get a chance to let it sink in and get the time to plan it.

Irene commented similarly: "I did get a firsthand chance to try it out . . . so I have a little bit of experience with it already."

Another teacher who commented positively, Robert, explained that he was especially interested in the in-service session because he knew Jillian, one of the presenters. He respected Jillian professionally, believing her involvement was an indication to him that the *Handbook* must be useful.

One of the presenters is an old friend of mine. When I took the in-service and I saw her, I love her style, her technique. You know when she was bought into this,

I thought, “I’ve got to try what Jillian does because if it works for her, it is going to work for me.”

A fourth teacher participant, Wanda, also commented about attending the in-service session. Prior to her two years experience as an eighth-grade science teacher, Wanda had taught reading at the middle school level. She explained that the only support to implement the *Handbook* that she received was the in-service session, although she did not indicate whether she found the in-service helpful. Wanda remarked, “I just do it on my own. I went to the training last fall. There was a workshop. I guess everybody did, it was required, just that.”

To summarize, when teacher participants were asked whether they received any assistance in implementing the *Reading Strategies Handbook*, some teacher participants mentioned the district’s in-service session introducing the *Handbook*. Several teachers specifically mentioned that they benefited from trying the strategies during the session, and another teacher commented that he was interested in the in-service when he saw that a respected colleague was one of the presenters at the session. The next section will focus on the comments of teachers who mentioned their school when asked whether anyone or anything had helped them implement the *Handbook*.

School Support

The researcher categorized school support for the *Handbook* to include the school’s administration or any department at that school, excluding science. When the interviewer asked the teacher participants whether anyone was helping them to implement the *Handbook*, 8 of the 11 teachers (73%) commented about their school.

Remarks from those 8 teachers focused on the following sources at their schools: teachers in the reading department, school administration staff members, and teachers in the special education department.

Five of these 8 teachers mentioned teachers in their school's reading department when asked by the interviewer whether they had assistance to implement the *Reading Strategies Handbook*. Additionally, 3 of those 5 teachers described previous experiences when they had received assistance from their school's reading teacher to implement a reading strategy. They all concluded that no assistance was offered by their respective school's reading teachers to implement the *Handbook*. It should be noted that all middle schools had at least one reading teacher; however, the responsibilities of reading teachers were determined by each school's administration.

For example, Paige, a seventh-grade teacher, commented that even though there were two reading teachers at her school, their responsibilities did not include assisting teachers in the science department to implement the *Handbook*. Both reading teachers at her school fulfilled many responsibilities: "We do have two reading teachers now, but I think they are used in a lot of other capacities in the building, so we have not really had any direct support this year."

Similar remarks were expressed by Victoria, another seventh-grade teacher, who commented that although there was a reading teacher at her school, she had other responsibilities: "One reading specialist for the school and I think she has demands from the administration. I haven't really gotten together with the reading specialist this year."

Daniel, an eighth-grade teacher, also mentioned that he did not have any assistance from the reading department of his school to implement the *Handbook*, unlike the two previous years where the staff was given a handout of five strategies to try. Daniel commented that support was not an option this year, believing that the reading teachers were very involved with remedial classes. He stated, “They’d give us a handout at the beginning of the year and you really didn’t have any feedback . . . It wasn’t offered this year because they are deluged with remedial classes.”

When asked whether they had received any assistance to implement the *Handbook’s* reading strategies, two teachers mentioned their school’s reading teacher, commenting that they were given several handouts with reading strategy suggestions last year. However, the teachers indicated that was not offered for the present school year because the reading teachers were too busy teaching reading classes.

Unlike most of the teacher participants, Irene and Kelly commented that their newly hired reading teacher had offered to help them implement the reading strategies. Irene noted that the school’s new reading teacher had attended a Professional Learning Committee (PLC) meeting and she had offered to help teachers in their department implement reading strategies. Irene stated, “Evelyn has been able to come in [attend a PLC meeting] and brought up reading strategies.”

Kelly, another science teacher from the same school, echoed Irene’s comments, mentioning the reading teacher’s willingness to assist with reading strategies. Kelly also pointed out that the new reading teacher had already attended several of their PLC meetings and offered to help the science department implement reading strategies.

She was actually in here when we were doing our Professional Learning Committee (PLC) and we were talking about what we should do about reading strategies and she was in here. So she will come to a PLC and she was willing to help us.

In addition to mentioning the reading teacher's willingness to assist science teachers' implementation of reading strategies from the *Handbook*, Kelly expressed her satisfaction with the administration's action to hire the reading teacher, thus filling a two-year vacancy. Kelly further stated that she viewed this decision by the administration as their acknowledgment of the need for a reading teacher. Hiring a reading teacher was an answer to the faculty's request and, as Kelly viewed it, a step in the "right direction." Kelly's comments regarding her concern for a two-year reading teacher vacancy followed years of support from a previous reading teacher at the school. Kelly's beliefs will be further discussed in the section on internal influences related to teachers' beliefs about reading.

We have a new reading teacher on board and she has had a few staff development sessions on reading strategies. I think we are starting to get back on track. We have been without a reading teacher for almost two years and we finally said to the principal [that] we have to have a reading teacher. He promised us one and he hired one. So I think we are getting back on track and it will help with reading strategies.

Kelly also cited school support from the Parent Teacher Association (PTA). She explained that the administration announced that the PTA had additional money they

wanted to spend and suggested teachers submit a request if there was something they wanted. Kelly believed that purchasing the science trade books listed for eighth grade in the *Reading Strategies Handbook* would be very helpful. She chose the word “desperate” to describe, in her opinion, the need for books to complement the eighth-grade curriculum. Kelly wrote a mini-grant to cover the cost of purchasing the trade books and submitted it to the PTA. Her request was accepted, enabling her to purchase all the books listed for eighth grade in the *Reading Strategies Handbook*, which totaled \$1,000. She felt that the acceptance of her proposal by the community organization demonstrated their support of reading. Kelly described the steps she took to obtain the books.

Our administration said, “The PTA has extra money. Is there anything you want?”

So I took your *Handbook* and I listed everything I could find at Amazon and I wrote just a little mini-grant and they approved it.

School administration was also mentioned by another teacher participant—however, unfavorably. Robert commented on the approach taken by an administrator regarding the implementation of the *Handbook*. Robert stated that he resented being told to implement reading strategies.

The only thing that I don’t like about it [the *Handbook*] . . . Someone told us that we have to do it . . . We were actually told by our department chair and the principal of the school that we have to try a couple of these. And again I don’t like being told that you have to do something. I feel like that kind of locks you in.

Two of the eight teacher participants who mentioned receiving support to implement the reading strategies from the *Handbook* commented about teachers in the

Special Education Department. Daniel and Vanessa felt that their special education co-teachers had been instrumental in their implementation of several of the reading strategies.

Daniel, who indicated that no assistance was offered by the reading department, unlike previous years, credited a resource teacher, Grace, for assisting him with implementing reading strategies. He co-taught several classes with Grace and believed that she knew her students and their needs. He relied on her decision whether or not to use a reading strategy and how that reading strategy should be implemented. As an aside, Daniel commented to the interviewer that he trusted Grace's decisions about reading strategies because she had previously taught English.

Between myself and Grace's resource adaptations, [as a] special ed teacher she helps me push [to implement reading strategies] because she knows her kids' needs, and skills . . . I am trying to balance what we are doing with other teachers that I work with, my resource teacher, her adaptations . . . If she [Grace] doesn't like it, I don't like it. I sort of want to cooperate that way. When we plan, I say, "What would you want to do with this? Let's take a look at the *Handbook* . . ."

Vanessa also acknowledged a special education teacher, Jillian, with whom she co-taught a class, for assisting her with implementing several reading strategies. Their experience with the *Handbook*, however, began the previous year as participants in the pilot study. Jillian was the presenter at the district in-service whom Robert credited for his interest in the *Handbook*. Vanessa commented that Jillian was a resource as she

implemented the *Handbook* strategies and described their collaborative effort to implement the List, Group, Label strategy.

We did talk about them [the reading strategies] together. She being the LD teacher plus getting her master's. We did talk about how we can, for example, use the List, Group, Label strategy . . . We sat down and said, "Let's use this List, Group, Label strategy with the metric system because of all the words." She and I were the ones who came up with the idea of putting them on the construction paper and all that stuff.

Crystal had a unique situation. A school-wide reading initiative was initiated at her school the same year the *Handbook* was introduced, so her school did not provide support to implement the *Handbook* because they were engaged in that school-wide reading initiative. The school as a whole was focused on implementing four reading strategies throughout the school year, one per quarter. Their decision to limit the number of strategies being used at a time was to narrow down which specific strategies were effective and which were not. Crystal felt pulled between the requirements of the school's initiative and the expectations from the district science department to implement the *Reading Strategies Handbook*. Crystal explained that she chose to use Read Alouds because she thought that strategy would fulfill both requirements, since it was a strategy being implemented by her school and it was included in the *Reading Strategies Handbook*. Crystal also mentioned SQ4R, a reading strategy included in the *Handbook* matched with labs. She explained that a new quarter had just begun, so she had not tried SQ4R at the time of the interview.

As a school we have identified several strategies we are trying to apply throughout the school year. We have found that if we do too many we will not be able to understand what is working. So we basically identified four that we have to use [by the end of the year] and we will be introducing one each quarter. So the Read Alouds are something that everyone across the board is doing and the other one is SQ4R . . . So in support of the school and what we are trying to tie in with the science curriculum, this is what I am using . . .

For clarification, the Read Aloud strategy was included in the beginning of the *Reading Strategies Handbook* along with several suggestions for its use in the classroom. However, unlike the seven reading strategies recommended for both seventh and eighth grade, the Read Aloud strategy was not matched to any of the labs for either grade level.

Crystal mentioned showing the *Handbook* to her school's reading teacher and literacy coach. Remembering that conversation, she described why she felt using Read Alouds was a way to meet the requirements of her school and her science department.

I took this to the reading specialist and also we have a literacy coach here. He was like, "WOW . . . this is one thing that we are using," and he went to the Read Alouds because that is something they [reading specialist and literacy coach] are really pushing, believing that it will help support the curriculum as well as support our school goal mission.

To summarize, teacher participants commented about their school's support or lack of support to implement reading strategies from the *Handbook*. Some teachers who mentioned their reading department were simply doing so to let the researcher know that

their reading department was not involved with their implementation of the *Handbook*, stating that reading teachers had other teaching responsibilities that accounted for their time. Several teachers acknowledged receiving assistance to implement reading strategies from their special education co-teaching partners. Schools' administrations were also mentioned as supportive by a few teachers; however, one teacher commented about pressure to implement the *Handbook*. Another teacher felt pressured, although it was due to her school's reading initiative simultaneously being initiated with the district's *Handbook* implementation. The next section will discuss the support offered by the school-based science departments.

School-Based Science Department

When teacher participants were asked by the interviewer who or what had helped them implement the reading strategies, 6 of the 11 teacher participants (55%) mentioned their school's science department. Five of those 6 teachers indicated that help had been offered during their science department meetings. That was the case for Wanda. She stated that on several occasions the reading strategies had been mentioned at her school's weekly science department meetings; however, she was not impacted by the discussions, since she had already used the suggested reading strategy mentioned. Wanda reiterated that she was not looking for additional support; she was independently implementing the strategies.

It [the *Reading Strategies Handbook*] has come up in our science department meetings. We have been encouraged to use them [the reading strategies]. One of our science chairs specifically suggested we use a particular strategy with a

particular unit, but I was already using it [the reading strategy] so it didn't impact me. That's the only place it has come up. It has come up a couple of times to use the reading strategies in our weekly departmental meeting, but I haven't sought help, or had help. I'm just doing it.

Irene also mentioned that reading strategies are mentioned at her school's science department meetings. She explained that reading strategies were discussed at their PLC meetings, discussing their progress with implementation.

We meet once or twice a week and we plan together so we are going to teach this activity, reinforce with this reading strategy, because it is a hard lab and we are going to have them draw the pictures along the side . . .

A third teacher, Robert, also stated that reading strategies were mentioned at his science department meetings, explaining that teachers were encouraged to use a particular reading strategy, although he was not guided how to do the strategy.

I should say there was no one who was giving me direct [support], like "Hey, Robert, do this." You know, I got gentle nudges from my fellow science teachers in this building. I could go to them and ask, "Have you done this and it is good?" Actually at one of our PLC meetings, we all planned to use the List, Group, Label strategy for the Invisible Atom lab.

Robert proceeded to explain that the next week at the science department meeting teachers were asked for feedback on their experience implementing the reading strategy. Robert stated, "We came back the next week and touched base about it." Unfortunately, although Robert had prepared to implement the strategy, a large number of his students

were involved with a behavioral issue and missed a week of school. Time prevented Robert from implementing the strategy with that lab because he had to move to the next topic.

Kelly also mentioned that reading strategies were discussed at her science department meetings with support for the *Reading Strategies Handbook* gained from colleagues at her school. Joan, a seventh-grade science teacher, had piloted the *Handbook* the previous year and had shared ideas with Tom, another seventh-grade science teacher at the school during the pilot year. Their experience with the reading strategies had provided the department with guidance for implementing several reading strategies at several department meetings. Kelly explained:

Joan piloted the *Handbook* and she shared the strategies with Tom. During some science department meetings we had asked if anybody had some strategies. So Joan and Tom were wonderful resources for a couple of ideas.

Pamela also mentioned support for implementing reading strategies coming from her school's science department. She stated that her school's science teachers were all knowledgeable about reading strategies and that they were support for one another.

We have a very strong team in this school and we meet every single day. During second period, the entire science department is off, so we meet and discuss this, hash it out. We are a very strong support system for each other. We have all been trained in different reading strategies because we are all very experienced teachers. We have all had the content reading course, so I feel we are not without resources; we rely on each other.

The content of Victoria's department meetings was different from those already described. Victoria stated that her school's science department meetings were focused on determining what materials would be necessary for upcoming labs over the next month rather than discussing implementing reading strategies from the *Handbook*. She commented that she knew that her department was split on implementation: Some of the teachers were implementing the strategies, while several teachers were like herself and had not begun yet.

I know a couple of the seventh-grade teachers [at our school] are using them. One or two are just like I am [have not begun to implement the reading strategies yet]. When we do meet, we do have a grade-level planning period this year, but we don't really talk about or share these things [reading strategies]. It [our meeting] is more geared toward what we will be doing in the next four weeks. Do we have the supplies? Those meetings are for that rather than [asking us] "What reading strategies are you using?"

In summary, teacher participant comments related to support for the *Handbook* project from their school's science department were varied. Some teachers explained that reading strategies were mentioned at their weekly science department meetings and they were encouraged to use them; however, offers for assistance to implement a reading strategy were rare, as were feedback or discussion following a strategy's implementation.

Summary of Chapter Four

As noted earlier, this study explored the following research questions:

1. What influenced teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers*?
 - a. What were the external influences that influenced teachers' implementation of the *Handbook*?
 - b. What were the internal influences that influenced teachers' implementation of the *Handbook*?
2. How do teachers respond to the introduction of new curricular materials by a school district?

This chapter answered Part A of the first research question. In answer to that question, it was found that external factors influenced teachers' decisions about whether they would or would not implement a reading strategy from the *Handbook*. Teacher participants identified some external influences that may have contributed to their decisions whether to implement reading strategies from the *Handbook*. They unanimously commented that time influenced whether or not a reading strategy was implemented. Time was discussed by some teachers in relation to achieving a level of comfort with the reading strategy prior to its implementation in the classroom. Teachers also identified non-instructional obligations that demanded their attention. Some teachers identified these responsibilities as time limiters, thus reducing the likelihood for reading strategy instruction.

Teachers also voiced concern for the amount of curriculum they were expected to cover, commenting that implementing reading strategies would compound their problem

in meeting the district's timeline. At the time of this study, eighth-grade teachers were additionally required to prepare students for a state Standards of Learning test.

The district's curriculum design was also a concern for some teachers. Some teachers questioned the district's decision to postpone introduction of a science textbook until the seventh grade, commenting that it contributed to some students' inexperience with expository text. In addition, many teachers voiced dissatisfaction with the approved district textbook for seventh- and eighth-grade programs, claiming that the texts' readability levels were considerably above many of their students' reading levels and some of the textbook features were not considerate of middle school students' needs.

Teacher participants' comments suggested that they received limited support for implementing the *Handbook*. Some teachers mentioned an initial training session offered by the district to introduce the *Handbook*; however, the support offered at the school level was minimal and varied from school to school. Several teachers mentioned collaborating with a co-teaching partner from the special education department. It was reported that a reading teacher from one school offered to attend PLC meetings and assist the science teachers' implementation of some reading strategies from the *Handbook*, although direct support from the administration was missing. Support from each school's science department was also varied. At best, one pilot teacher from the previous year guided her science department members through a practice session for one of the *Handbook's* reading strategies; at the other extreme, one science department totally bypassed the topic of reading strategies. The majority of the science departments

supported the initiative through verbal reminders at their department meetings to implement the reading strategies.

5. Results: Internal Influences and Teacher Response to External and Internal Influences

This chapter will answer Part B of the first research question: What were the internal influences that influenced teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers*? This chapter will also answer the second research question: How do teachers respond to the introduction of new curricular materials by a school district?

Internal Influences

Internal influences were defined as factors specific to each teacher which influenced his or her implementation of the reading strategies. These factors included teachers' beliefs and who or what influenced their beliefs related to reading (Figure 2).

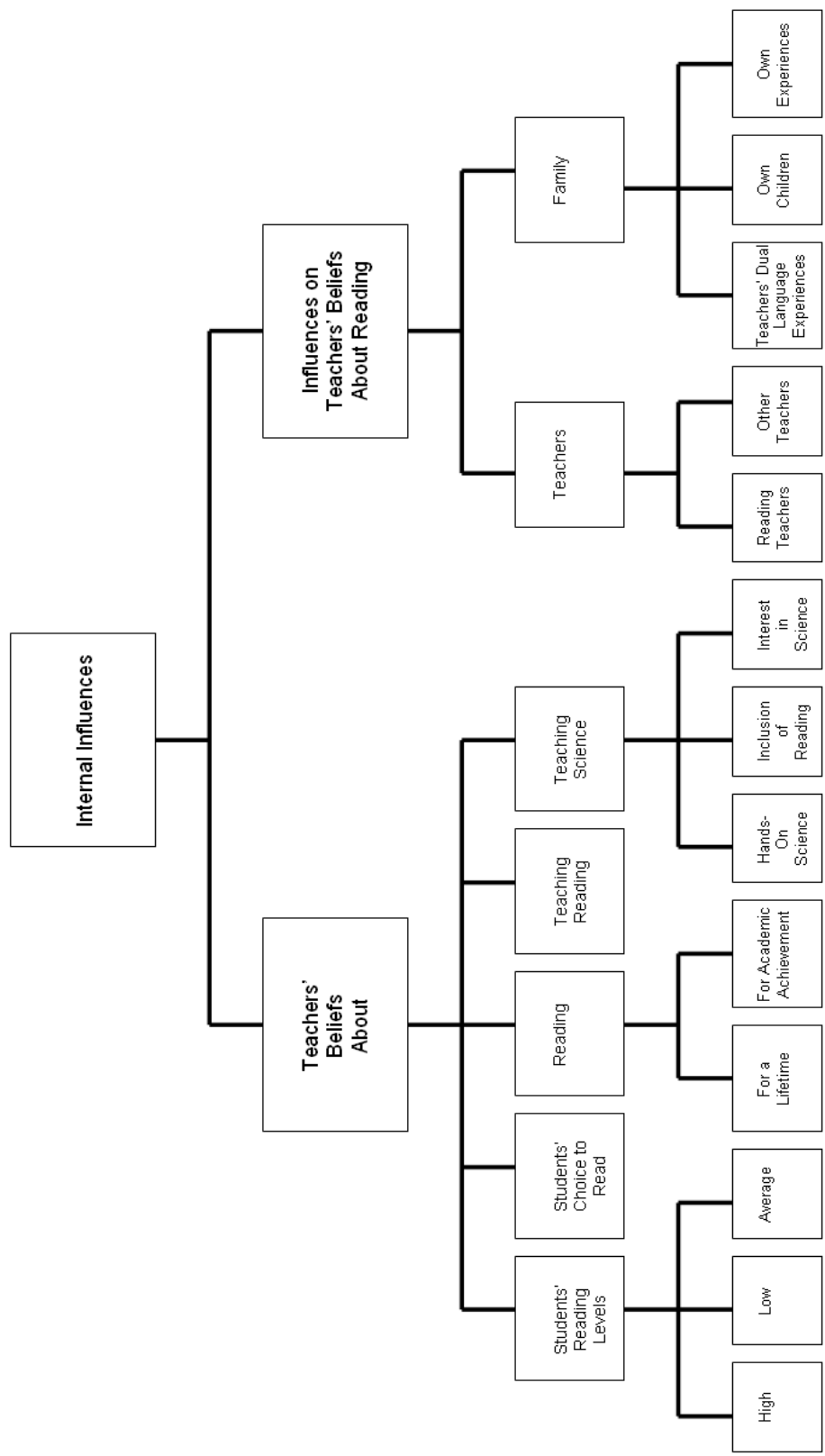


Figure 2. Internal influences affecting teachers' implementation of the Reading Strategies Handbook for Middle School Science Teachers.

Teachers' Beliefs

Although teachers were not explicitly asked about their beliefs, they mentioned their beliefs in relation to various interview questions. For example, teacher participants commented about their beliefs about their students' reading levels as they responded to the interview question related to their reasons for participating in the study. This section will include teachers remarks related to their beliefs about their students' reading levels, their beliefs about reading, teaching reading, and teaching science. Teachers' beliefs about their students' reading levels will be discussed first.

Teachers' Beliefs About Students' Reading Levels

When the interviewer asked teacher participants to describe any impact the *Reading Strategies Handbook* had on their students, teachers emphasized that the diversity of their students' reading levels was a determining factor in their choice of which reading strategies to implement. Teachers' comments generally clustered between the categories of high and low reading levels. The category of high reading level will be discussed first, followed by low reading level, and then the teachers' remarks related to average reading level. The section will conclude with teachers' comments about students' willingness to read.

High reading level. Six of the 11 teacher participants (55%) commented about the category of high level readers. When teacher participants mentioned readers with high reading levels, their comments generally referred to students in their Gifted and Talented (GT) or Honors classes. Two of these 6 teachers mentioned general observations they

made about their GT and Honor class students that differed from students in their other classes.

Kelly commented that she observed that her GT students, unlike her other students, always had a book with them—which she believed contributed to their success in school. Kelly stated, “Obviously, the GT children read and I think that’s one reason they do well in school. They are readers, first and foremost. They always have a book with them.”

Abigail also identified her Honors students as having stronger reading levels than her other students. She commented that of the 19 students in her Honors class, 17 were capable of reading and comprehending the textbook and only 2 students had difficulty comprehending the textbook. She remarked, “In my honors class, I have 19 kids in there and I can think of 2 who struggle to read—and that’s my honors class—and the rest of them [students in that Honors class] are okay.”

Four of the 6 teachers who commented about students with high reading levels mentioned students’ reading levels in the context of specific reading strategies. The teacher participants stated that often GT students’ high reading levels were obvious as those students successfully utilized reading skills introduced in several of the reading strategies in the *Handbook*. Evidence of this was validated during the researcher’s interview with Irene.

Irene spoke about her implementation of the reading strategy SQ4R with all of her classes. She remarked about the GT students’ ease of using the particular reading strategy. She stated, “The GT classes took to it [the reading strategy, SQ4R] like they had

always been doing it.” Irene later expressed her opinion that GT students already had gained the skills needed for reading and did not necessarily need to be exposed to the strategies included in the *Handbook*: “I think the GT students have adapted these things already or adopted, I should say, without even knowing what they were doing. They have picked up on the skills.”

Vanessa also commented about her Honors students’ high reading levels, describing her experience implementing the reading strategy Question Swap with her students. She compared the reading level of her Honors students to the reading level of her other students. She believed that strategy, Question Swap, was best suited for her Honors students because those students had not only mastered answering and writing recall questions, but inferential questions as well. She commented that students in her other classes were capable of recall questions, but had not acquired the skills necessary for inferential questions. For that reason, Vanessa chose to use this reading strategy with her Honors classes and decided not to use it with her other classes.

Question Swap, I would use it for a higher level like an honors group, more so because the quality of the questions that the kids come up with are better. For my other classes, they can write recall questions like the Honors students, but their [her other classes’] recall questions are limited to what is, where is, who is. However, when it comes to inferences, what do you think causes, the quality of the questions are better from the Honors class.

Paige commented similarly about her GT students, noting that her GT students demonstrated reading levels beyond the reading levels of her Learning Disabled (LD) and

Emotionally Disturbed (ED) students from her two heterogeneously grouped classes. She found implementation of the reading strategy SQ4R especially challenging in these classes, since students' reading levels were so diverse in those classes. In those classes of mixed reading abilities, Paige found that positioning students heterogeneously at each table allowed all students practice with the reading skills during the activity.

Two classes have about half GT. I don't have any classes [exclusive GT]. Those classes that have GT also have ED, and a few LD so it is kind of difficult, but I feel that this is the better activity for them [the GT kids] because they can do this. So generally, when doing an activity such as SQ4R, I assign at least one kid who is not GT at each table, so they [the GT students] can at least pull them [students reading at a lower level] along and so this is the one that I have done. When I have used this strategy [SQ4R], I have done it with those classes [the heterogeneously grouped] because they seem to be able to handle the higher level of thinking.

Candace's comments about her Honors students' reading level echoed the remarks of the four previously mentioned teacher participants. Candace stated that her Honors students were capable of doing Three Biggies, a reading strategy requiring the students to locate key words in a paragraph and determine a summarizing sentence for the paragraph. She clearly added that her other students had not acquired the skills to locate key words and summarize that her Honors students had successfully demonstrated with this reading strategy. She felt that her students in her other classes needed more

scaffolding, so she avoided using that strategy with them and selected a different strategy, such as Textbook Walk.

I've used Three Biggies, mostly with my Honors kids because they can get right into the section, the paragraph, and get the key word and get the wrap up for that one. The Honors kids, I have, are capable of doing that. The other kids [students not in her Honors classes], we have to do the Textbook Walk.

Unlike the already-mentioned teacher participants, Victoria did not specify who a good reader was in terms of belonging to a particular group. But she did comment about the benefit of being a good reader and the impact being a good reader had on student achievement, remarking that being a good reader enabled students to be more successful academically in terms of grades and the amount of content knowledge students acquired.

A good reader has an edge over these kids [less skilled readers]. The kid who knows how to read, does better on tests and quizzes because he is a better reader. He has more content knowledge because he or she is a better reader.

Teacher participants' comments on students with high reading levels predominantly focused on GT and Honors students. When teachers mentioned students' reading levels in conjunction with reading strategies, they remarked that GT students often did not need the reading strategy instruction since they had already acquired those reading skills themselves. Teacher participants' comments regarding students with low reading levels will be discussed next.

Low reading level. Five of the 11 teacher participants (45%) commented about students with low reading levels in their classes, particularly English Speakers of other

Languages (ESL) and LD students. As teachers commented about many ESL students' low reading levels, they acknowledged that language appeared to be a central problem. Additionally, they noted that ESL students often lacked background knowledge of science terms and concepts. Teachers' comments about LD students were mostly limited to low reading levels.

Pamela discussed that a large number of her students with low reading levels were ESL students. She added that these students often moved to other locations within the district, which made it difficult for them academically.

It's [our school has] a very transient population, so we get kids coming and going throughout the school year. Also, we have a very large ESL population so a lot of the children are B3s [students nearing completion of the district's English Speaker of Other Language program], so a lot of the kids just seem to be emergent readers or just low readers.

Pamela further explained that some of the reading strategies in the *Handbook* required students to use higher reading skills, such as making inferences, a skill beyond the capability of some of her students who struggled forming a sentence. She commented that a number of her students were still struggling with the mechanics of reading and writing.

Many of my students you saw, I even had to prompt them to make sure that [they] write a sentence. There were several students who said to me, "What is a sentence?" I have to prompt them. It has to have a subject. It has to have a verb. So, you know there are grammar reasons and why when they read a section in this

textbook there are things they don't understand because they simply don't understand the mechanics of reading and the mechanics of writing. To pick out a main point is sometimes something we might do after we have gone through and made sure that they understood what those specific sentences were telling them and how one sentence relates to another. So, I guess that was the idea that I was trying to get across. I can't go into a reader expecting at all the students will learn how to make an inference out of a simple declarative statement.

Vanessa admitted that this was the first year she had ESL students in her classes and commented that these students generally had low reading levels. Consequently, she was spending more time on vocabulary, explaining words; however, she felt that apart from language issues, there were a number of students who lacked interest in reading. These students could read, but chose not to read.

This is my first real experience with ESL kids and so I have taken more time asking "What so you think this word means?" . . . I do have a variety of reading abilities in the classroom. I just don't know what they are to tell you the truth I think it is the language that gets in the way of reading sometimes. The language of the ESL kids, but I also think there are some people who like to read and some people who don't and I'm not an expert.

Paige, like the previously mentioned teacher participants, commented about the large number of ESL students in her classes with low reading levels; however, she included her LD students. Paige attributed students' reading difficulties to their unfamiliarity with science terminology and concepts.

We have a population that is very low. They have very low reading scores. Then they'd know very little, especially when you give specific topics like that. Before we've done the lesson, they don't usually know very much. Is that terrible to say about my kids? A lot of our kids don't have a depth of background. Many are ESL kids, so they really have not been exposed to either the terminology or the concepts themselves . . . I have two classes that are a lot of LD, primarily LD and ED and a little bit of ESL. Those are the ones that have a difficult time with this [reading] . . . a lot of our ESL kids are out of the ESL program per se, but they are definitely lacking with the knowledge and language.

Paige made clear the severity of her problem with low level readers when the interviewer asked Paige whether she had recommendations to improve the *Handbook*. Paige responded asking if there were any reading strategies designed specifically for LD students or students reading at very low levels. She stated that a number of her students read at very low levels and were unable to use or benefit from some of the strategies suggested in the *Reading Strategies Handbook*. Paige spoke in a softer voice, almost hesitant to ask the question,

[A]re [there] any [strategies] for some of my lower readers or are these the same strategies for elementary school kids too or are there some specifically developed for LD kids? Some of my kids are reading in the first grade reading level and really struggle with it [the reading strategies from the *Handbook*]. They struggle so much with it that they couldn't even do some of these really easy ones. If there are any that would be specifically for those kids.

Candace's concern for her low reading level students was also evident as she responded to the interviewer's question regarding recommendations for improving the *Handbook*. Candace recommended that each school be assigned one strategy to use with all students and then each school would share with other schools in the district what they found for specific groups. The researcher noted the similarity of Candace's suggestion for the *Handbook* strategies to the reading initiative underway at her school that year.

The only suggestion I would have is taking the middle schools and assigning one strategy to each school and having them use that strategy and having them see how they kink it [adapt the strategy]. We can have an overview of how everyone is using one particular strategy in talking to several people who have used it . . . that way we can see what can work for LD students as well as ED students and without the teacher having to modify it, because I think the most important thing is when you come up with a *Handbook* [is] to help guide all learners, you want to help guide them all without having to modify.

Another teacher participant, Abigail, expressed concern for the large number of her students with low reading levels, including ESL and LD students. The context of Abigail's remarks was her three years' experience as a summer school teacher at a site away from her contracted location. She compared the reading levels of her students at her contracted site to the students at her summer school site. Abigail commented that she felt that low reading levels of many students at her contracted site were related to language issues, commenting that a number of her students' language limitations were caused by students never learning to read or write in their first language.

I've done summer school three years now at schools that didn't pull from Pine, [Abigail's contract location], and [have] seen the caliber of the student from here who goes on to summer school and the caliber of students from other places. I feel like our children are very low and they are very behind in their reading levels.

There are several kids we have who never learned to read and write in their native language and then they're trying to struggle through doing this in English.

Teacher participants' comments about low level readers focused on students' difficulties to apply the reading strategies from the *Handbook* to textbook passages and gain a clearer understanding of the passage. Teachers mentioned that textbook readings students were expected to apply reading strategies to were often too difficult for students with low reading abilities to read, or students lacked the background knowledge to understand them. The emphasis in this section was mostly on ESL and LD students. The next section focuses on remarks about teachers' beliefs about students with average reading level.

Average reading level. The researcher found it especially interesting that only 2 teacher participants (18%) mentioned students with average reading levels. Teachers' remarks about students with average reading levels focused on which students they thought benefited from the *Reading Strategies Handbook*.

On a questionnaire sent to teacher participants prior to their interview, teachers were asked why they volunteered for this study. Pamela's response defined the group she believed the *Handbook* was geared toward and explained her reasoning for this answer.

She stated that she felt the *Handbook* was suitable for students with average reading levels.

I like all the strategies and I thought they were the answer to helping our students increase their content reading comprehension. However, I'm having trouble finding the time to use them. Also, many of the strategies can only be used if the students have at least average reading skills. So many of my students do not.

A second teacher participant, Abigail, also mentioned students with average reading levels as she commented on who she felt the *Handbook* was useful for. Abigail, however, questioned whether students with average reading level can benefit from the reading strategies.

I would say it's helpful for the ones who can read and understand because they are able to focus on what's most important and retain as much as possible. I also think that it's helpful for those who are borderline because it points them in the right direction. It gives them more a sense of where they are going, but I think those who are below and even some of them who are on grade level, I don't know how much it is going to help them except I think it gives them more confidence when we go to a class discussion. It sounds familiar. They recognize words that way which is a start for them.

In summary, teacher participants' comments revealed that they believed that all students did not read at the same level in their classes and that this impacted their own use of the reading strategies. Teacher participants commented that decisions whether to implement a particular reading strategy were influenced by the diversity of the students'

reading levels since the textbook students were required to read was beyond the reading level of many of the students in the teacher participants' classrooms. Several teachers questioned whether students with average reading skills were capable of comprehending the textbook. The last section to be discussed is teachers' beliefs about students' choice to read.

Teachers' Beliefs About Students' Choice to Read

Approximately one-third of the 11 teacher participants commented about students in their classes who could read, but chose not to read. Teachers described classroom examples supporting that belief.

Kelly explained how she allowed students' time to read a passage in class prior to completing a reading strategy. She estimated that she allowed five minutes for her GT students to read the section, and she extended that time for her other classes. She explained that the extended time she provided for her other students to read the selections did not ensure that they had all read the passage. Kelly commented that typically one-fourth of her students in her other classes did not read the passage; however, it was not that they could not have read it, but rather that they don't like to read. She noted,

Not only did I give them longer time, yes I did do this with one of my lower classes. I would say probably 25 to 30% of the students in the class did not read it. They don't like to read, they resist it. So when you say "I'm giving you 10 minutes to read this," they are in "la-la land." They are not reading. It is obvious [They're not hiding it]. Whether it is they can't, they don't understand, they hate to read. That's a harsh word but it is true. They hate to write too.

Victoria made a general comment about her seventh-grade students' interest in reading their textbook: "seventh-grade students don't want to read their textbook."

Daniel's comments echoed those expressed by Victoria about students' lack of interest in reading their textbooks. He commented that some students read easy material such as comics, but will not read anything too technical.

Well, how do I say, they're not inclined to read? . . . They don't seem motivated.

There're some kids that are voracious readers. Some kids are really voracious readers of the really simple stuff, but if you sit them down with something relatively technical, they won't read it.

Summarizing teachers' beliefs about their students' reading levels, teachers focused their comments primarily in terms of high or low reading levels. They noted that often those students with high reading levels were their GT or Honors students, commenting that these students usually were successful with the strategies. In fact, several teachers expressed their opinion that GT and Honors did not need reading strategy instruction because they already had these skills. On the other hand, teachers who mentioned students with low reading levels commented that some strategies from the *Handbook* utilized reading skills that particular groups of their students had not yet acquired, or teachers felt the quality of the students' application of a strategy did not meet the teacher's expectation. In those situations, teachers elected to avoid those reading strategies and to stick to reading strategies they felt students could successfully use. Surprisingly, few teacher participants mentioned students with an average reading level, yet commented that the *Handbook's* reading strategies were more suitable for them.

Several teacher participants also discussed the issue of students' willingness to read, stating that some students' avoidance of reading was simply a personal choice. A dislike of informational text and lack of motivation were also stated by teachers as the reasons students chose not to read even though they could. The next section to be discussed is teachers' beliefs about reading.

Teachers' Beliefs About Reading

All 11 teacher participants (100%) explained their reason for volunteering to participate in the study in relation to their beliefs about reading. Approximately 50% of the teacher participants commented about the importance of reading beyond students' academic years, while the other half of the teachers focused their remarks about the importance of reading on students' academic achievement.

Reading for a lifetime. Two of the 5 teachers commenting about the importance of reading to students' future described reading as "key" to students' success. On an e-mailed questionnaire teacher participants completed prior to their interview, teachers were asked why they volunteered to participate in this study. Kelly wrote, "reading is key to improving student achievement in science and at-risk students need to be taught these strategies to succeed in reading." During the interview, Kelly added to that response, stating that reading was important beyond science, adding that she was willing to talk at length about that topic. She noted,

I still believe that [reading] it is not just to succeed in science. If they [students] are going to succeed in math, if they are going to succeed in anything they have to

improve their reading skills and I don't know how long your tape is, but I can talk for a long time about this.

Wanda's comments echoed what Kelly stated; however, Wanda called reading the most important skill students learn in school. As noted earlier, Wanda had many years experience as a middle school reading teacher prior to her present position as a middle school science teacher.

I think it's [reading is] key. If you don't know what words mean, it is awfully hard to communicate. It's hard to connect anything intellectually and cognitively. So you have to know what the words mean and you have to be able to read in order to function, not just academically. I think reading is the most important skill kids learn in school. That says it.

Paige also viewed reading as a requirement for life beyond a science class. Paige's response focused on reading's importance to students beyond the science classroom, commenting about its relevance to a changing world.

They [students] are going to have to read for the rest of their lives, depending on the kind of job they have. [They will need to] be able to read non-fiction to get some information from it. This is the age of information. They have to be able to figure out what is important and what is not important and what is true and what is false. If we can help them do that, it will help them completely in their future, but not just science content. It will help them learn how to read, period.

Victoria and Robert also labeled reading as a skill necessary for students' future success beyond their science classes. Victoria stated that reading was something to be

learned, not something you are born capable of doing. She related her own experience as a second language learner of English:

I think that it is a skill to be developed and we just haven't met that enough because reading is not something that you are born with. You have to grow up in that environment. I didn't grow up in a family where reading was emphasized, but I grew up in a school system where you had to read. You had to do a lot of work on your own. You had to read. You had to comprehend to come up with the answers and show that you could do better on your own not just because the teacher taught you that. Whatever I know is because I learned to educate myself by reading.

Robert mentioned reading as a very important life skill in the learning process. He explained, "Without it [reading], you [the teacher] can't get a lot of information into their [students'] brains. You can't just speak and expect the kids to get it all. You have to learn how to read. You can't do anything anymore if you can't read."

Teachers who commented about reading as a necessary life skill commented that without it, students could not do anything. One teacher mentioned that teachers can not tell students everything they need to know: Students must be able to read it. Remarks from teacher participants related to the importance of reading for academic achievement will be discussed next.

Reading for academic achievement. Six of the 11 teacher participants (55%), when asked why they volunteered for the study, directed their responses to reading for

academic achievement. Their view of reading was focused on academic success in their middle school science classrooms.

Daniel's view about reading's importance to academic success became evident when he discussed the amount of material he had to cover and the dilemma he faced trying to do that with students being unable to read or choosing not to read. He stated, "I believe that reading weaknesses are causing road blocks to learning." He later added, "We could get farther faster, if the kids could more successfully read the assignment, if they wanted to."

Vanessa remarked that her students struggled to comprehend informational text, especially the science textbook, and she believed that improving reading skills was a means to improve students' reading comprehension. Vanessa said, "I believe in reading and looking for ways to help me read for information to answer the question."

Candace commented about her concern for many of her students' low reading levels, mentioning that she had considered earning a reading specialist credential. She believed that would enable her to help her students improve their reading comprehension of the science material.

Actually, I had thought about becoming a reading specialist. I felt that in science, science itself can be challenging to students. I also found that working with the diverse population of students, oftentimes we try to teach them the concepts and in trying to teach the concepts we don't get them to understand and comprehend. The reading is important and I thought by having a reading background that would help them along to perhaps do well in science.

Irene commented about the importance for students to have strong reading skills, enabling them to have a foundation for understanding more difficult material. She commented,

If they [students] don't fully understand [what they are reading], how are they even going to understand more complex things in the encyclopedia or research material which is even higher level? It is going to lead to more problems if they don't master it now.

Abigail remarked about taking a Content Reading course prior to her teaching and commented about the value this information provided, since she was unfamiliar with reading instruction.

I think that having that [Content Reading] class before I started teaching showed me how important it was that the kids have reading skills. I learned that they are not going to get anything out of what you are trying to teach them if they don't understand what they are looking at. So I think that was probably a good start to wanting to implement the reading strategies.

Pamela viewed reading as one of her responsibilities as a middle school teacher. She felt that her students needed these skills in preparation for high school, yet she was struggling with how to go about including them.

It also helps to tell you why I volunteered for this. I am a middle school science teacher. I am not a high school science teacher. I do think that it is my responsibility to teach students how to read a science textbook. It's a biggie. I don't want to send kids up to ninth-grade biology, open up that [science] book

and have no idea where to begin and so I do feel strongly that it is the responsibility of middle school teachers to teach that [how to read a science textbook].

In summary, some teachers mentioned the importance of reading in relation to students' academic success. They felt to be successful in school required students to be able to read.

Teacher participants' comments about the importance of reading were divided between those teachers believing reading was critical to students' future beyond the science classroom and those teachers who commented about reading's importance to students' success academically. Regardless of their perspective for defending the importance of reading, all teacher participants emphasized that reading played an important role in students' lives. Teacher beliefs about teaching reading will be discussed in the next section.

Teachers' Beliefs About Teaching Reading

Teacher participants were not directly asked about their beliefs about teaching reading, but one participant, Kelly, commented on this topic. Kelly stated that the science department at her middle school recognized the importance of reading. She mentioned that her school's science department did not need to hear what research said about a particular strategy. They just needed the strategies to be successful.

You don't have to sell us and that goes for the entire [science] department [at our school] on the importance of reading. We know it. Don't tell us what the research says. We don't care. We want to know; give us strategies, model strategies to do.

So we don't need to know why it's so wonderful. We need to know strategies to help us teach successfully. In essence, we'd like to be the best, so give us what works.

Some teacher participants commented on various reading strategies they used with their students prior to the introduction of the *Reading Strategy Handbook*. Several teachers spoke about their use of the Interactive Notebook. For example, Paige commented that she thought the Interactive Notebook helped students to process the information and enabled the teacher to evaluate students understanding of the material.

Well, they love to draw anyway, but I do Interactive Notebooks . . . We'll have done the notes. We'll have done the reading and then they have to interact on the left hand side of the book. Generally when they are doing that drawing in that notebook, it is always very helpful to see if they really have it or not. When they do the drawing they think they are just drawing while you are seeing how well they understand.

Three teacher participants explicitly commented that they were not reading teachers. It should be noted that these teachers did, however, comment on reading strategies they used prior to the *Handbook* strategies and their attempts to implement reading strategies from the *Handbook* with their students. Paige commented that her teacher education had been in science, not in reading. She felt that her students would benefit from her inclusion of reading strategy instruction in her classes and the *Handbook* was a tool to help her achieve that goal.

I am strictly a science teacher. I have only been trained in science. I'm not trained as a reading teacher. Having these reading strategies already organized for me to use when I am developing my lessons, when I am planning my lessons for the unit is terrific. As I said, I don't know how to teach reading and that is always a frustration to me because I know my kids could be so much more successful if they could do a better job reading . . .

Kelly also remarked that she was not a reading teacher, but she too believed that reading strategies could help her students improve their reading. Kelly commented that her students did not know how to read a textbook and she looked for strategies to help her with that task.

The textbook is extremely hard to read and they don't know how to read a textbook. Since [the textbook] is very difficult and they [her students] don't know how to read a textbook, I was looking for some help in how to teach reading because I am not a reading teacher. And so I looked through it [the *Handbook*] and I picked out strategies I thought I could use.

A third teacher, Robert, also commented about his ability to teach reading. He described his skills to teach reading as one of his weaknesses, although he mentioned that he had taken three reading courses during his master's degree program. Robert commented, "I'm not very good at teaching reading. I actually think that is one of my weaknesses as a teacher and it frustrates me."

Some teacher participants mentioned using various reading strategies with their students prior to implementing the *Handbook*. Three of those teachers even remarked that

they were not reading teachers. The next section is focused on teachers' beliefs about teaching science.

Teachers' Beliefs About Teaching Science

When the interviewer asked teacher participants what they thought were essential elements to teach in a middle school science program, teacher participants commented that the middle school science program must be hands-on; inclusion of reading was also mentioned, and developing an interest in science. Teachers' beliefs that a middle school science program must be hands-on will be discussed first.

Hands-on program. Teacher participants responded unanimously that the middle school science program must be hands-on, meaning students engaged in lab activities and these lab activities must form the foundation of the program.

For example, Paige stated that a hands-on science program was essential for middle school students. She cautioned that the purpose for the lab must be explicitly stated for students to understand "the science" behind the lab activity.

I strongly believe that it has to be hands-on, discovery-based curriculum for this age group in particular. It is the best way to learn. But we have to also help them focus in on what they were supposed to learn from the activity after they have done it.

Paige added that she believed that students needed to have an understanding about why they were doing this "fun" activity in science. As a product of the district's middle school science program herself, she remembered doing labs was fun; however, she

commented that she was not always sure of the relevance of the activity to what was going on in the classroom.

I even remember back to eighth grade in [the district] and I remember some of the labs we did. We'd play with cars and we'd go on with class and nobody ever really pulled it together as to why we were playing with these cars. So, yes it is fabulous to discover and to have them do the hands-on and make them come up with some of these ideas on their own, but then make sure they have the proper understanding when they are finished. I think there has to be definite direction in that regard.

Vanessa also shared her beliefs that middle school science must be a hands-on program, adding that she wanted her students to be interested in science. She felt that labs that surprised students helped to build their interest.

I do think that science must be hands-on. I do like the lessons that create the "Wow" in kids. I want them to learn the concepts but I want them to be interested in science. I want them to ask questions. "Why did this happen? Where do we go next? What happens if this happens?" That to me is more important in science. So I do love the program because it is so hands-on.

In support of including labs in the program, Kelly commented that students needed to be actively involved in science. She believed that labs allowed students to become engaged in science as a scientist does and not just read about the concept. Kelly stated, "I am still a firm believer that they have to do the lab, they can't just read about it."

All teacher participants commented that a middle school science program must be hands-on with students doing the labs. Teachers added, however, that the purpose for the lab must be clear so students gain an understanding of the science behind the lab as opposed to the lab just being fun. The next section will discuss teacher comments related to the inclusion of reading.

Inclusion of reading. Six of the 11 teacher participants (55%) mentioned reading as a necessary element in the middle school science program. As Robert mentioned, the need for a hands-on science program for middle school students, he added that students “should be able to write; they should be able to read.”

Vanessa also commented that she believed that reading should be included in the middle school science program. Since students were being tested they had to be able to read and comprehend the material; however, she reiterated her view that learning science came first.

We do need to spend more time when it comes to reading ability and the basics.

So that’s what we are being tested on, the basics. -being able to read, being able to do math, being able to understand. But my first priority is, you know, when kids do science that they are so interested and that they just want to keep learning about it.

Abigail felt that in addition to the labs which she thought were fun for students, students needed structure with reading activities. She commented that the middle school science program reflected features of elementary school such as reading and features of high school, such as doing labs since they were in the middle: “They’re still not kids who

can be left. It's got to be different than high school still and by incorporating more of the reading stuff it's more on the elementary level. So it is really right in the middle."

Wanda, the former reading teacher, also commented about the need for the inclusion of reading in the middle school science curriculum. She reiterated her belief that reading was the most important skill that students learn in school, stating that it should be incorporated in all subject areas.

I think it is important to incorporate literacy into every subject including science because as I said earlier I think reading is the most important skill any person has out of the academic arena.

Kelly echoed Wanda's comments regarding the importance of reading to the middle school science program. She remarked that she believed that the district's middle school science teachers were doing a good job of teaching the students science, although she thought they could do even better if students could read their textbooks: "I think we do a fine job in educating them in science, but if we want to do better they have to know how to read a textbook."

About 50% of the teacher participants mentioned that reading should be included in the middle school science program. Some teachers explained that reading should be included in all subjects; that it is "basic." The last section in this category to be discussed is interest in science.

Interest in science. Several teachers mentioned that they wanted students to develop an interest in science so they would want to learn science. Irene's remarks reflect those expressed by other teacher participants. Irene explained that she wanted students to

acquire a curiosity about science and desire to learn new things, such as exploring the world and why things happen. Irene said,

I think that's the seed that I want to plant that will grow so they can go on to interesting courses in high school and hopefully, careers in science. No matter how they look at it, every career involves science.

When teacher participants were asked what they believed were essential components of a middle school science program, they commented unanimously about a hands-on lab-centered science program for middle school science students. Many teacher participants discussed the need to include reading in the middle school science program. A third component some teachers identified as necessary in a middle school science program was developing an interest in science. They commented that interest in science was key for students' motivation to take science courses in high school and pursue careers in science.

Summarizing internal influences, teacher participants commented about their beliefs in relation to students' reading levels, reading, teaching reading, and teaching science. Their comments revealed that teachers believed that students with high reading levels usually had the skills necessary to comprehend the instructional materials; however, often students with low reading levels were unable to read and comprehend the district's instructional materials. Few teachers commented about their students with average reading levels, although those teacher participants who did comment remarked that the reading strategies were more suited for students with average reading levels.

All teachers remarked about the importance of reading, yet they were divided on how they discussed it. Some teachers viewed reading as an important life skill, while others concentrated on its importance in students' success in science. When teachers discussed what they felt was essential in a middle school science program, they commented that a hands-on program was suited for middle school students. About half of the teachers expressed their belief that reading was also essential to a middle school science program. Additionally, several teacher participants voiced their belief in the importance of students developing an interest in science. Influences on teachers beliefs about reading is the next internal factor that will be discussed.

Influences on Teachers' Beliefs About Reading

As teacher participants spoke about their teaching experiences, three sources that influenced their beliefs emerged: other teachers, family members, and teacher participants' own experiences. Each group will be discussed respectively, beginning with other teachers.

Other Teachers' Influence

Seven of the 11 teacher participants (64%) mentioned the influence a colleague had on their beliefs. More than half of the 7 teachers who credited colleagues as influencing their beliefs mentioned reading teachers they had previously worked with. Reading teachers will be discussed first, followed by other teachers.

Reading teachers. Four of these 7 teacher participants commented that reading teachers influenced their beliefs. Kelly mentioned the influence Rhonda, a past reading teacher at her school, had on her understanding of reading. Kelly credited Rhonda's

lesson, instructing students how to read a textbook, for piquing her interest in reading. As Kelly observed Rhonda's presentation each year, she realized that learning how to read a textbook could be taught, thus sparking her interest in reading. Kelly explained that previously she had not considered that students could be taught how to read a textbook:

Many years ago, we had a reading teacher who would come into the classroom and model previewing strategies at the very beginning of the year. She would come in and teach the children how to preview a chapter of the textbook, which was good because the children wouldn't realize that you could preview a chapter of a textbook and so that kind of piqued my interest that you can teach how to read a textbook.

It was also Rhonda's description of reading as a skill that led Kelly to gain a clearer understanding of the process of reading. Kelly admitted that previously she thought that you were either a reader or not a reader. Rhonda pointed out that skills can be learned through practice and she used some real life examples to make that point:

If you want to get good at anything, what do you do? If you want to get good at soccer, what do you do? If you want to get good at piano, what do you do? It's like anything, soccer or dance. But I never thought about that. I just thought you're a good reader or you're not.

Additionally, Kelly credited Rhonda with introducing her to a number of reading strategies. Kelly implemented some of those strategies with her students, including SQ3R, and questioning techniques such as Right There questions which she was presently using.

Kelly also mentioned Rhonda's successor, Ronald. Although he did not teach the students reading strategies, Kelly felt that he did impact students' thinking as well as her own, explaining that every test was a reading test:

He did try to emphasize that every test is a reading test whether it's math or it's science or whatever and the children don't stop to think that.

Kelly connected with that information, describing an incident during the SOL tests when a student asked her the meaning of a word. Kelly was certain the student knew the content, yet he was unable to answer the question because he was unfamiliar with a word used in the question. Kelly felt that validated what Ronald had told her about tests. Every test was also a reading test:

I had a child during the SOL tests that I monitored who was one of my better science students and he raised his hand and said to me, "Mrs. Donahue, what does valid mean? What does the word valid mean?" And I said to him, "I'm sorry, but I can not tell you what that means. I can't do it." I said, "You'll just have to read and try to figure it out." I knew he knew the answer to that question. He knew science, but he didn't know what the word valid meant. That was just a real clue to me that the test is a reading test more than a science test in many ways. It broke my heart because I knew he knew the answer, but he couldn't answer it because he couldn't read the question. Anyway, that's another thing that triggered my interest in teaching them how to read.

Irene reiterated experiences about Rhonda's lessons since she and Kelly were science teachers at the same school. Irene mentioned Rhonda's persuasive power on the

students, explaining Rhonda's description of strategy usage as a time-saving tool for comprehending a textbook. Irene described the lesson Rhonda presented for the students.

I remember she used to come out and she did a whole survey thing from an article that talked about bugs in an old library, at an Ivy League library, at an old university and how the bugs were eating away the papers. They liked to eat cellulose and she did this whole activity in one period and she sold it to them by saying that, "If I teach you these skills you'll spend a lot less time reading than if you didn't have the skills." Of course, who wouldn't buy that?

A third teacher participant, Abigail, also mentioned a reading teacher at her school who influenced her understanding of teaching reading. Abigail described Breanna's lesson about teaching students how to read the science textbook. From this lesson, Abigail created a generic form to help students comprehend the text.

She [Breanna] would come in at the beginning of the year and do a whole lesson with our kids on strategies for reading just our science textbook, and from that I developed a form sheet that was good for any section with a Before, During, and After and some questions they were answering as they'd read to get them thinking about what do they already know, what were the key words they were looking for, and afterwards what were the kinds of connections they were making. It was very generic, but it would apply to any reading assignment.

A fourth teacher participant, Paige, also mentioned a previous reading teacher at her school who assisted her with incorporating a science-related article in her instruction. Paige sought the reading teacher's expertise since she thought the article would be

challenging for her students to read, yet well connected to a unit she taught. Paige commented that the reading teacher helped her to see that although the article was difficult for many students to read, activities could be developed to make the article accessible for all the students.

A reading teacher a few years ago really helped me integrate a fabulous article I found about science in summer. It was about science-related things like eating ice cream on your taste buds, playing baseball and why it makes a crack in the bat. It was a pretty cool article, but it was pretty difficult material for my kids to read and understand, so the reading teacher helped me to come up with some fun activities to go along with the article.

Four teacher participants commented positively about a reading teacher's influence on their beliefs of reading and resource for their instruction. The next section will focus on teacher participants' comments about the influence other teachers had on them.

Other teachers. Two of the 11 teacher participants (18%) credited teacher colleagues with impacting their beliefs and enhancing their knowledge of reading. Candace mentioned an elementary colleague and friend, while Robert commented on what he learned from his father's experiences as a teacher.

Candace recognized that many of her students were reading at a low level and she was unsure how to help those students. Candace sought suggestions from a friend who taught in the elementary grades, believing that she could benefit from her friend's teaching experience with developing readers. Candace's friend suggested several reading

strategies for Candace to try with her low reading level students. Candace commented that she found the suggestions very beneficial for those students.

I have a dear friend that is elementary and I was telling her my kids are in the seventh grade but they are like in the third and fourth grade reading and so she said, “Why don’t you try this?” There were a couple of things she said I could use. She said if you do Read Alouds that will get them. That will grab them. The other ones were using cartoons to get them to read and infer and also making connections. It has worked out well to incorporate those. Now it makes a little more sense.

Robert also spoke about a teacher who influenced his teaching, his father. Robert explained that his father had advocated having students actively engaged in their learning, rather than listening to a teacher telling them information. Robert commented that he trusted his father’s advice, believing his father was speaking from his many years of teaching experience.

My father taught many, many years ago . . . He said, “Don’t give them information.” It was always, “Show me.” Don’t tell me, show me how you know that. And I think that is one of the things that you can get the kids to think with you, but then you let them show you how they understand some of it.

The researcher witnessed Robert’s application of this advice as students simultaneously viewed a brief science video and completed a cloze activity related to the video. The next topic that will be discussed is family’s influence on the teacher participants.

Family Members' Influence

Four of the 11 teacher participants (36%) mentioned their own family members as they discussed experiences with their students. Two of the teacher participants mentioned their experiences growing up in homes where English was not the primary language; two teachers commented on observations of their own children's reading experiences. These experiences will be mentioned respectively.

Teachers' dual language experiences. Irene discussed how witnessing her parents learning to read English influenced her beliefs about her students learning to read English. Irene described her experience with one ESL student in her class. She commented that this student repeatedly asked her what a word meant, rather than independently taking the dictionary that Irene had placed on the student's desk and looking the word up. Irene believed that this student should be able to use the dictionary for this task, since she had witnessed her parents' process learning to read English. Irene explained to the interviewer that although they could speak English, they were unable to read it. Irene commented positively about her parents' self-taught technique to read English. She described finding words underlined in *Newsweek* and learned later from her parents that these words were unfamiliar to them and they underlined them to remind them to look them up in a dictionary.

My parents used to get *Newsweek* and you know I thought that was my parents' magazine, not my magazine, and every time that I picked it up to look at an article it had a lot of underlining, red-lined words, and it was words my mom or my dad came across and underlined and because they speak Spanish as their first language

and they speak English [but] not like I do. They would run across a word, they'd look it up and underline it. And then I would read the article and see the words that they underlined and over time I could see this vocabulary expanding, expanding, and expanding and that is how you build it. I thought that was a really easy cool thing and I wish every student would pick up on that, but we're not there yet.

Victoria commented about her students' difficulty learning all the science terminology required for the curriculum. She mentioned a suggestion she made to her science department, developing a science hall word wall. She suggested that biweekly the science teachers should put a science word on each child's locker in the pod to promote student dialogue about the vocabulary words. Victoria's suggestion was prompted by memories of her sister's approach to learn over 1,000 roots in Latin Sanskrit.

I am reminded of my childhood here. My sister was taking Latin Sanskrit. It is a classical language and the root of all languages. As a college student, she had to memorize certain roots like they have in Latin and I said, "How are you going to learn these 1,000 roots?" She said, "I have a method." She made charts on poster board of the roots and then the words and she had them all over her room. When she came in from anywhere, she read one chart. She looked at it all of the time. She said, "You would not believe how much it has helped." She told me that by the time she was ready for the final exam, she didn't seem nervous anymore. "All those charts come in front of my eyes because I saw them all the time. They were

all around me because she was looking at them constantly.” So she was quizzing [herself], pondering [the roots] because they were all around her all the time.

Two teacher participants discussed their experiences learning English. One teacher’s comments are related to observing her parents rely on the dictionary to help them learn English. The other teacher described her sister’s technique to learn a vast number of language roots which she connected to observing her students’ learning science terminology. Both teachers commented how they became informed about learning to read English as they witnessed family members.

Own children. Daniel and Vanessa mentioned their own children when they talked about reading. When Vanessa stated that she was aware that her students’ reading levels were diverse, she was reminded of the diversity of her sons’ reading levels. She commented that one son read often and she attributed his success on the SAT test to his avid reading. The other son was not an avid reader and she viewed his reading skills as not at the level of her more avid reading son. Vanessa commented that some students were very skilled readers and some students had not gained those skills, reflecting on her observations of her sons:

I have been teaching 25 years and I just think you are always going to have kids who have different reading levels. I think reading is an issue because, well, some kids have the ability to read and comprehend what they are reading . . . everybody is different in their reading ability, but also it is their interest in reading as well. I’m talking as a parent of two sons. I have one son who is an avid reader and loves to read and it has helped him on his SATs, and I have a second son who

doesn't take the time to read and because he doesn't like to read. I don't think his reading level is anywhere near reading level of my son who likes to read . . . it's a matter of doing it and more practice and reading and then skills and being able to look for information as you are read.

Daniel commented about his students' reading abilities and remembered that he read to his own children. Daniel recognized that students needed to read and they needed to be motivated to want to read. Anxious to motivate his students, he even suggested creating a science video with a famous music figure teaching science and her lecture appearing as subtitles at the bottom of the screen for the students to read.

Well, I think back to my kids, I read to them. Nobody is reading to [my students] at home. They're at a disadvantage . . . If it was a video reading to them it might be better than nothing. If you could get somebody—have Brittany Spears make video tapes of reading and have the words at the bottom, her reading to you. Somebody that would keep their interest . . .

In summary, several teachers referred to their experiences as parents in relation to understanding their students' difficulties with reading or their lack of interest for reading to read. Teachers' own experience will be discussed next.

Teacher Participants' Own Experiences

Teacher participants also commented on how their own experiences have influenced their beliefs about reading. Several teachers tied their teaching experiences to influencing their beliefs about reading and their students.

For Victoria, English was a second language. At a very early age, Victoria expressed an interest in biology; however, biology was not taught in her native language. It was taught in English. Victoria made the decision to begin to learn English as a seventh grader so she could pursue her interest in biology. She attributed her success at learning English to her diligence and self-motivated efforts. She remembered her own experiences as a student and believed that her students should persevere to improve their reading skills:

English was a second language for me and I struggled as a seventh grader. I was learning my alphabet in seventh grade because I went to elementary school in my own language and suddenly I had to change to English because I wanted to take biology and sciences and it was not offered in our language. It was offered in English so I had to learn the language and I had to read to learn the language. If I didn't read, I wouldn't learn the language especially the scientific language.

Abigail commented that observing her students during her first year as a teacher contributed to her understanding of reading. Reflecting on her first year teaching experience, Abigail realized that her students needed help reading. Many of them were not able to read and comprehend what they had read.

I think it took me a while to realize that there are a lot of kids here that aren't getting it and something is going to have to change. I need to rework things so I can get it across to more of them. In the beginning, all I could think was that I have to fill the block and it has to be related to what we are learning. I don't want anyone to feel bored or think they have nothing to do. At first, I just kind of gave

them the assignments and the work to do. After you go through it a year, you can kind of sit back and analyze. I would jot down notes to myself in my plan book, such as this didn't work, this part worked, change it around for next year so I felt like the first year you needed to see what was going on to realize, OK, something more needs to be done here so that they're getting it.

Irene shared a personal incident that gave her insight about some students' attitudes toward reading. One summer her children wanted her to go to the movies with them and see the movie version of a book they had read in high school that year. Irene explained that she too wanted to read the book before seeing the movie, but did not. After seeing the movie, she picked up the book several times, but could not motivate herself to read, commenting that movie images of characters overshadowed her thoughts as she read. She explained that she—like her students—chose the easy route as a spectator rather than actively reading the book, visualizing and making inferences. Irene remarked that this incident helped her to see through her students' eyes.

I know my kids had to read *Cold Mountain* in high school and they thought it was a great book and when the movie came out we went to see the movie, of course. I tried to read the book afterwards and I could not get through it. It was one of these summer activities that I tried and attempted and then I stopped because I already had the mental picture of Nicole Kidman and this guy with her. Why was I going to bother reading the book at that point? So I think it is just easier to not read than to read and if they have a choice they are going to choose the easiest one . . . they don't have to imagine it or read into it with inferences . . .

Paige commented about witnessing her students implement the reading strategy SQ4R. She expressed her satisfaction with students' engagement as positive evidence for her inclusion of that strategy. She had commented earlier that she was a science teacher, not a reading teacher, and so she was willing to try the strategies. Paige commented that she often assigned reading; however, students had not done it or could not. She wanted to find some ways to help her students comprehend the material she gave them to read.

This [witnessing students' implement a reading strategy] has really helped me know that they are going to get the information in other ways. Also they are going to be readers for the rest of their lives. I think this [the reading strategies] gets them to really learn to be learners and read this kind of material [science textbooks] because it is harder to read and understand than other kinds of reading. Having strategies has really helped [the students and me]. It is more fun for me because I did not know a lot of these activities before. For me to introduce to them [the reading strategies] and watch them [the students], I get excited when they really get into it. As I walk around and listen to them talking about it [the reading strategy], it is fun for me.

Another teacher, Pamela, commented about the content reading course she took in graduate school. She explained that the required textbook, *Content Area Reading* by Vacca and Vacca, was discussed cover to cover. Pamela remarked that it was probably the best course she had ever taken and felt that all workshops she had attended since that course were in some way tied to that text.

I think the best course that I have ever taken was when I was in graduate school, *Content Area Reading*. We essentially went through Vacca and Vacca's book chapter by chapter . . . We've had workshops since then, but everything I have learned since then is just a take-off of that [textbook].

Wanda commented about her many years of experience as a reading teacher.

Although Wanda did not cite a specific event, her experience as a reading teacher and resource teacher contributed to her comfort level implementing the reading strategies.

Wanda commented,

I used to teach reading . . . I taught sixth-, seventh-, and eighth-grade reading in a center setting. I was also a resource teacher in both elementary school and middle school and so of course reading and literacy were part of that.

Remembering her own experiences as a developing reader, Kelly revealed that she was a slow reader and had difficulty understanding what she read. After spending more time reading, she realized that her skills had improved. Kelly said that she was reminded of her own development as a reader when Rhonda, a previous reading teacher at her school, explained to Kelly's students that reading is a skill and practicing that skill results in improving it. Kelly remarked that she was so impressed by what Rhonda said that she tells that story to her students, commenting about the amount of reading she does in a weekend.

I was a late reader. I was not a reader. I was a slow reader and I didn't comprehend as well so it was laborious to read . . . The more I read the better I

got. This is true, so I tell kids that I read books in a weekend. I don't like to read difficult books, but the more I read, the better I got.

Teacher participants commented about their own reading experiences, including their own experiences learning to read and learning how to teach reading. Several teachers commented that they learned as they observed their students in the classroom.

In summary, teachers identified three sources for their beliefs about reading. They commented about other teachers' influence on their beliefs, including working with reading teachers. Teachers additionally mentioned witnessing family members' experiences learning to read English which they were reminded of as they observed some of their ESL students learning to read English. They also described some of their own experiences as teachers and learners that had influenced their beliefs about reading.

The final section of this chapter will focus on teacher responses to external and internal influences. This section will answer the study's final research question: How do teachers respond to the introduction of new curricular materials by a school district?

Teacher Responses to External and Internal Influences

This section describes techniques used by the subject teachers when their students were unable to comprehend the text, yet were required to learn the concepts and vocabulary set by the district's Science Program of Studies at their grade level. Teachers commented on the varied approaches they utilized to make the concepts and vocabulary available for those students. Four different approaches emerged from their comments. Teachers treated reading the instructional materials in the following manner for these

students: teacher demo, scaffolding reading, alternate texts, and paired reading. The categories will be discussed respectively beginning with the category of teacher demo.

Teacher “Demo”

Three of the 11 teachers (27%) mentioned that they recognized that some of their students were unable to comprehend the instructional materials, particularly the textbook. Teachers therefore did not require the low reading level students to read text to learn the concepts and vocabulary. Consequently, teachers used others techniques to present the material to the students. Two of the 4 teachers commented that they would “demo” the lab for the students, believing that the students with low reading levels would not be able to correctly complete the lab independently.

For example, Kelly commented that she would tell her low reading level students that they should read the lab directions, although she believed that they would not or could not read them. Kelly’s solution to this problem was to simply model the lab for the students, so they would be exposed to the required content information. Kelly, however, felt that her approach was probably not the best for the students since they did not actually do the lab and read the directions. She felt torn between “modeling” the lab for them or assigning them to read and complete the lab, knowing that it would most likely not be completed or it would be completed incorrectly. Kelly opted for the teacher demo because she knew that all students, regardless of their reading level, were responsible for the science content and that approach would at least expose the low reading level students to the vocabulary and concepts.

I think I do them a disservice sometimes when people ask me, “What’s one way that you differentiate between the higher and the lower kids?” For my lower level kids, I demo for them. I don’t require them to read it. My lower level kids I demonstrate for them. I say to them, “Be sure to read the directions,” but from experience I know they won’t do it or they can’t do it, so I model it.

Paige also shared a similar solution to her low reading level students’ difficulty comprehending the textbook. She explained that she did not view reading the required textbook a necessity for her to teach the science content and she believed that a “tell” method was the most suitable alternate method for her students to learn the science textbook and lab book content. Paige explained that she demonstrated labs for her low reading level students as opposed to the students attempting to do the labs, and she utilized a variety of activities such as drawing pictures or playing games to check their understanding of the concepts she “told” them.

A lot of the way I teach is not dependent on those textbooks. I’m doing lessons or I am doing demonstrations or letting them do activities or drawing pictures or playing games to make sure they are getting the material. They may have never really read, to be honest with you. They may have never read it, those really low kids, but if they did they may not have gotten a lot out of it, so I do other things to make sure they get the concepts.

Ralph approached low reading level students’ inability to read the required text yet another way. He would read the text to his students, stopping frequently to “break down” the text and discuss it with them. From photocopied pages of text, he would read

aloud to these students, cueing them on a main point by telling them when to use their highlighters. To verify their understanding, students would make flash cards for vocabulary words and frequently play games of bingo.

I would hand out [to the low reading level students] run-off copies of some of the longer text and start reading. When I would ask the students if they had their highlighter, they knew that was a signal that I was reading a main idea and they should underline it. Those are the guys who I will typically come back and review things with them. I wouldn't necessarily present everything written word or I'll try something on the board something or on the overhead. I would structure a lesson on students' writing. "Hey guys, here are some cards, let's write the term on the front side and the meaning on the back" and have them rattle them off to me and then we'll play bingo.

Some teachers felt strongly that they could not let students' low reading level prevent them from learning the required science content, and so chose to not require students to read the required text. The teachers presented the information through a "telling" method, even to the point of demonstrating the labs for students rather than students performing the labs. Two of the teacher participants said they utilized the "telling" method and one teacher read the text to students so they "heard" the text. Scaffolding reading will be the next section discussed.

Scaffolding Reading

Abigail utilized scaffolded reading, explaining that she required all of her students to attempt to read the text, knowing that her students with low reading levels would

probably not comprehend much of the text. Her purpose was when the class discussed the textbook, she hoped that those students with low reading levels may have recognized the terms or a heading from the text. She really viewed their attempt at reading the text as more of a scavenger hunt. Abigail commented that some of her students were reading at such low reading levels she did not feel that she could take the class time to modify the assignments just for them.

I let them try to read it. I let all of them try to read it and I hope even if they can't make it through all of what they are reading then when I give them some other type of assignment they can at least try to go in and try to find the right information to at least answer the questions. It is more of a scavenger hunt type format where they know what they are looking for. Can they find it? Do they know how to use the subtitles and the headings? I can't honestly say I go in and modify everything for them because there are some kids who are so far off you're just slowing everything down just for them. It's hard.

One teacher commented about requiring her students with low reading levels to attempt to read the text, in the hopes that they will pick up a term, vocabulary, or concept and gain something from the class discussion of the text material. She recognized, unfortunately, that this technique was probably not going to be suitable for her lowest reading level students, but she felt pressured to continue with the curriculum. Alternate text is the next section to be discussed.

Alternate Texts

Like the teachers mentioned in other parts of this section, the four teachers in this part recognized some of their students had low reading abilities and were unable to read the required text. Their approach to addressing this problem is what makes these teachers different. These four teacher participants used other reading material more suited to their low reading level students. Three of the four teachers commented that they were using “under the table” texts, older district textbook series that they felt more clearly explained the concepts and were written at lower reading level than the present approved district text.

David remarked that he used an older district text with his lower reading level students because he thought that not only was the text written at a lower reading level, the material was presented more clearly. David commented, “I go back to this text [holding the text in his hand] because it is more straight forward and I think a little bit lower level of reading.”

Candace also mentioned using another older text with some of her low reading level ESL students. She said that she would explain to the students that the older district text covered the same material as newer book, but the reading level was more suited for them at that time.

For some of my low reading level ESL kids I use that older one [textbook] because there are pictures and drawings to help them understand. I say it has the same information, but it is written easier to read.

Irene, another eighth-grade teacher, also stated that she used other reading material for her low reading level students and students who had been absent for an extended amount of time. The materials Irene mentioned could be duplicated and made into a packet covering a specific topic. They presented the concept at a low reading level and included questions reviewing the material discussed. Irene would have students work on these materials during an activity period or one-on-one after school.

We have materials that can be Xeroxed. The books are [written] in very simple language. [There is] a unit on acids. For example, what is an acid? It is a very simple book and it has little diagrams and little question-and-answer sections so we can run-off in a packet and hand that to them [the student]. I treat it through activity period or after school when they need one-on-one.

One of the four teachers who sought the use of other text was Wanda, a teacher at a Center for the Emotionally Disturbed in the district. Wanda commented that she purchased supplemental books that she believed were better suited for her low reading level students. She commented that she had to “squeeze” in time to use these supplemental books with required reading material.

The required text certainly doesn't hit the kids who are struggling to read so I have bought supplemental books. I'm required to use that [the main] textbook and I do. I use every page that we're supposed to use; in addition to that I have to find the time to squeeze in something that the kids can actually understand.

In summary, some of the teacher participants chose to use older district texts for students with low reading levels. Their decisions to use these alternate texts were based

on their belief that the older texts were written at a lower reading level and included more text features such as charts and pictures. The next section to be discussed is paired reading.

Paired Reading

Four of the 11 teachers (36%) commented on strategically pairing students to read aloud text. Their plan was to match a more skilled reader to a less skilled reader. Wanda commented, “I try to get them paired up reading out loud.” Her remark was echoed by Candace, commenting that her “students were like furniture.”

I move my kids around like I am moving furniture because certain concepts may be easier this time and may be next time not as easy, more challenging, so I would switch them to give them someone to help them out, reading with them, giving them clues, getting them to initiate questions about what they did not understand.

Vanessa also mentioned grouping her low reading level students with more capable readers. She mentioned that her school’s population was becoming more diverse and she felt that small grouping enabled her low reading level students’ exposure to the content with support from a more advanced student reader to comprehend the text.

Small group is my preference for these students [low reading level]. I use that with my seventh period, my large ESL class, because when it comes to reading, small group activities also help them with the final outcome of the reading. It helps them pull things in.

A fourth teacher, Pamela, commented that she too grouped her students, matching a student with a higher reading level to a student with a lower reading level to read text.

She however, did not assign text reading until students had learned the material. She noted, “I can’t use it as the first attempt to help kids reading. Often, no matter what strategy I use, reading has to be the very last thing I do to reinforce concepts that I have taught previously.”

Candace also read aloud to her low reading level students, directing her students to highlight bold printed words or definitions to emphasize their importance. She commented, “I read the lab out loud, we go over it, we try to identify key directions. We use a highlighter to underline the bold words, and the definitions to make sure they understand what they are going to do.”

In summary of teacher responses to external and internal influences, teachers commented about the techniques they chose when their students were unable to read the required text. Their comments revealed four different approaches: teacher demo, scaffolding reading, alternate texts, and paired reading. The teachers commented that without their choice of an alternate method for students who were unable to independently read the required materials, students would not have an opportunity to learn the required science concepts and vocabulary.

Summary of Chapter Five

The bulk of this chapter provides the answer to Part B of the first research question: What were the internal influences that influenced teachers’ implementation of the *Reading Strategies Handbook for Middle School Science Teachers*? Internal influences related to teachers’ implementation of the *Handbook’s* reading strategies included beliefs about reading instruction in science and who or what influenced those

beliefs. Teachers commented about the range of their students' reading levels. Some teachers remarked that students with high reading levels, usually their GT and Honors students, had already developed the reading skills included in the *Handbook*. Conversely, teachers felt that students with lower reading levels, including ESL and LD students, were generally not able to benefit from the reading strategies in the *Handbook* because they were connected to text passages that were too difficult for them to independently read. Few teachers commented about students with average reading levels, even though some said they felt the strategies in the *Reading Strategies Handbook* were most suited for this type of student.

Teachers' comments related to their beliefs about reading varied. Some teachers commented that reading was essential to students' success for a lifetime and other teachers viewed reading as important to students' academic success. Some teachers commented that they were not reading teachers, yet these teachers discussed implementing reading strategies prior to the *Handbook* and they had implemented several from the *Handbook* with their classes. When teachers commented about their beliefs about what they believed was essential in the middle school science curriculum, approximately half of the teachers commented that reading should be included in a middle school science curriculum.

Teachers credited various individuals as influences and sources of their reading beliefs, mentioning other teachers, including reading teachers both present and past, family members, and their own experiences. These influences were evident in the way teachers implemented the reading strategies with their students.

Research question two—How did teachers respond to the introduction of new curricular materials by a school district?—is answered in the final section of Chapter Five, entitled “Teacher Responses to External and Internal Influences.” Teachers in this study discussed four types of techniques they utilized when working with students of varying reading levels who they felt could not benefit from the reading strategies because they were unable to read the text. The techniques teachers chose were influenced by their concern for students to learn the science content regardless of their reading level.

Some teachers chose to demonstrate the lab as students watched and teachers “told” them the content information that was stated in the text. This teacher “demo” technique eliminated any requirement for students to read the text material.

Scaffolded reading was another approach mentioned when students were unable to read the text. The teacher would require students to try and read the text because she believed that this would benefit them later. She described this process as a “scavenger hunt,” thinking students may recognize some of the terms when she conducted her follow-up explanation of the content material.

A third approach some teachers chose was the use of alternate texts. Older versions of district approved texts were “pulled out,” since some teachers believed that the reading level of the older texts was lower and textbook layout was more suitable for their students.

A final approach identified by some of the teachers was paired reading, matching a more proficient reader with a less proficient reader. Some teachers believed this technique would enable both students access to the text. Teachers’ description of the

various techniques they “really” chose for students whose reading levels were too low to comprehend the district’s science text revealed that teachers were not deterred from finding ways that they believed could help students’ learn the science vocabulary and concepts required by the district.

6. Conclusions

This was a study of content teachers' responses to a request from their district that they implement content reading strategies in their content classrooms. My purpose was to explore middle school science teachers' implementation of the *Reading Strategies Handbook for Middle School Science Teachers* developed by a small committee of district science and reading teachers. I was additionally interested in the external and internal influences that influenced teachers' implementation of the *Handbook* in their classrooms. This chapter compares the study's findings to earlier research and discusses recommendations for practice and implications for research and policy.

As noted in Chapter Four, the study found that teachers had varying beliefs and practices in relation to using reading strategies in science instruction. Multiple influences affected the teachers' implementation of the reading strategies, including the following: (a) "one size fits all" curriculum (including a discussion of textbook issues), (b) curricular demands, (c) time, (d) professional development, and (e) teacher's personal background.

"One Size Fits All" Curriculum

This study found that the teacher participants did not feel that the district's middle school science materials met the needs of all of their students. Teachers' comments focused on the "one size fits all" curriculum, textbook issues, and students' experience with expository text.

“One Size Fits All”

Teachers stated that the district’s middle school science materials included district-developed lab manuals for each unit and a grade-level textbook to be used as a resource, issued to each student. They expressed dissatisfaction with this practice, commenting that the text was not suitable for the diverse students in their science classrooms.

These findings mirror research described in Chapter Two. School districts often purchase the same content-area textbook for all students (Allington, 2002). Sturtevant (2003) commented that, “It is important to realize that a curriculum that supports learning and literacy cannot be a rigid, one-size-fits-all program” (p. 1). In addition, Bauman and Duffy (1997) noted that a “one size fits all approach” may be suitable for tracking students; however, it is not suitable for academic achievement of all students. According to Pikulski (1991), one classroom can represent reading levels ranging from early elementary level to high school level. Expecting all students to read and comprehend the same text ignores the range of reading abilities represented in a typical classroom.

Textbook Issues

The “one size fits all” curriculum issue is related to a textbook issue. Teachers in this study stated that students’ reading abilities varied, sometimes very dramatically, in a classroom. Teacher participants explained that despite a class’s varied reading abilities, students were issued the same grade level middle school science textbook to read and comprehend. Teacher participants described this practice as problematic for several reasons. Some teachers explained that the district’s textbook was written at a higher level

than many of their students could comprehend. Secondly, some teachers expressed their disapproval of some textbook features such as busy page layout, small print size, and uneven concept development, labeling them as obstacles for some of their students.

Teachers explained that often their students with high reading levels could comprehend the textbook; however, students with low and some average reading levels often could not. Some teachers commented that the textbook's difficult readability and textbook features previously mentioned prevented students from comprehending the text; consequently, students' difficulty to comprehend the textbook impacted teachers' decisions whether or not to implement the *Handbook's* reading strategies. Some teachers revealed that in order to "cover the content" with all students they resorted to various techniques that they believed would meet that goal: teacher demonstration, scaffolded reading, alternate texts, and paired reading.

Textbooks are often too difficult for struggling readers and even some average readers to read (Ivey, 1998), since as mentioned earlier, they are sometimes written two years above the grade level of the students expected to learn from them (Chall & Conrad, 1991; Budiansky, 2001). When textbook readability exceeds students' reading levels, those textbooks offer little value to students (Ivey & Fisher, 2005). This situation creates a dilemma for classroom content teachers since they often have students in their classes who do not read at grade level—let alone two years above it. Students cannot become better readers by reading books that are too difficult for them (Fisher & Ivey 2005).

In addition to readability, researchers cite various textbooks features that can be troublesome for students. Publishers sometimes attempt to imitate hypertext; however,

researchers have noticed that some texts become “more hyper than text” (Daniels & Zemelman, 2004, p. 42), causing confusion for the reader. Additionally, textbook writers for middle school texts often use complicated syntax along with an emphasis on inferential thinking and prior knowledge which may be unfamiliar to many middle school students. The result is that even students who have experienced success in reading may begin to struggle in middle school content classes (Allington, 2002).

As Fisher and Ivey (2005) noted, “Many teachers find that the dry and difficult exposition of typical textbooks actually gets in the way of learning and teaching” (p. 5). The result is some teachers circumvent textbook reading. Some teachers describe this practice as “teaching around the text” (Schoenbach, Braunger, Greenleaf, & Litman, 2003) which prevents students from receiving “the support they need to develop as more sophisticated and independent readers and learners” (p. 136).

Secondary teachers need to be sensitive to their students’ range of reading levels when addressing specific content or concepts since students can not learn much from texts if they do not know “a substantial percentage of the words from the text” (Ivey & Fisher, 2005, p. 5). No reading strategies are of value to the students if they can not comprehend the text the reading strategies are applied to. In fact, according to Ivey and Fisher, “the worst thing we can do is to assign difficult text” (p. 7). They add, that “the text needs to be easy enough to read so that students can focus on the information rather than get tangled up in figuring out the hard words, poorly-explained concepts, or badly-written text” (p. 3).

Students' Expository Text Experience

Another finding of this study was identifying a gap between middle school students' knowledge of expository text and the expectations of some middle school teachers regarding students' readiness to comprehend science textbooks. Some teacher participants were frustrated by students' inability to comprehend the sanctioned textbook, yet recognized that the district had withheld introducing any science textbook until students entered middle school.

Researchers stated that by the end of fourth grade, many students have typically learned to read from narrative text and the emphasis begins to shift toward reading to learn from expository text found in textbooks (Blanton et al., 2007). Unfortunately, many students have not received adequate instruction for comprehending expository text (Duke, 2000). Difficulties with expository texts are not limited to at-risk students, but may include students who read at grade level (Readence, Bean, et al., 1998). This dilemma is often referred to as "the fourth grade slump," which sometimes begins a decline in students' performance and progress in reading (Mullis, Campbell, & Farstrup, 1993). Consequently, this academic decline for some students is perpetuated through middle and high school (Blanton et al.; Taylor et al., 2007).

Curricular Demands

This study also found that curricular demands impacted teachers' decisions whether to implement reading strategies. Claims of "too much curriculum to cover" and preparation for mandated high-stakes tests were factors that influenced teachers' implementation decisions.

Amount of Curriculum

Some teacher participants expressed feeling torn between the district's curriculum expectations and implementing the district's *Reading Strategies Handbook*. Findings of this study revealed that teachers felt pressured to cover the required curriculum; at the same time, they recognized that many of their students could not read the textbook to learn the required concepts. Some teachers even commented that some of their students who were unable to comprehend the science textbook could benefit from reading strategy implementation; however, feeling pulled between covering content and implementing reading strategies caused teachers to make choices. Teachers had to prioritize their classroom instruction; consequently, for many teachers, reading strategy implementation was dependent on the amount of time left after the content was "covered."

Many content teachers genuinely value the role reading plays in learning, but they fail to foster that role in their classrooms (O'Brien & Stewart, 1992). Some research suggests that when administrators impose such pressure on teachers to cover content, the result may be teachers' feelings of guilt and anger (Sturtevant, 1996). Consequently, for many teachers the pressure to cover curriculum takes precedence over reading skills (Silverman, 2006).

State Mandated High-Stakes Tests

The study also revealed that high-stakes testing compounded pressures that teachers faced when trying to implement reading strategies. Teachers commented that they were forced to make decisions whether to spend time preparing students for the standardized tests or implementing a reading strategy in their classroom.

Similarly, researchers reveal that attention to accountability by policy makers and school administrators has influenced teachers decisions. Researchers commented that state mandated tests may present obstacles to changing classroom practices (Davis, 2001). Reports from various states indicated that outside tests such as state-mandated tests can have a strong impact on instruction and may interfere with classroom instruction that included thoughtful reading (White, Sturtevant, & Dunlap, 2003).

Research has also been conducted on the amount of time teachers reported spending on practice to familiarize students with content or item format for state tests. A survey of 236 elementary teachers in North Carolina revealed that more than 70% of the reporting teachers noted that students were spending more time practicing for tests than in the past. Additionally, 80% of the reporting teachers responded that students spent more than 20% of their instructional time practicing for state tests and more than 28% reported students spending more than 60% of their instructional time practicing for tests (McColskey & McNunn, 2000).

Time

Another finding that emerged from the data was teacher participants' concern about time. Teachers discussed time as it related to instructional and non-instructional obligations.

Instructional Obligations

Even when teachers viewed a reading strategy as worthwhile, if they thought the reading strategy required too much time to implement it was questionable whether they would try it. Some teachers stated they could only implement reading strategies that were

“quick”—requiring 10 - 15 minutes to complete. Yet other teachers described their concerns about being behind the district’s projected timeline and feeling too pressured to “add anything.” In fact, no teacher participants mentioned that they were ahead of the planned district schedule; they only expressed concerns about falling further behind. Their decisions whether to use reading strategies from the *Handbook* or not were largely influenced by their perception of the amount of time they could afford to implement a strategy.

This finding is supported by earlier studies. Time constraints can cause a tremendous amount of pressure on teachers to cover content in a particular amount of time before moving to the next unit (Vacca & Vacca, 2001). Although numerous research studies have advocated that explicit reading strategy instruction can lead to improved reading comprehension for students (Fielding & Pearson, 1994; Laine et al., 1998), Yore and Denning (1989) reported that only 25% of science teachers used techniques designed to improve students’ reading because they lacked the time or skills to help students with low reading levels. According to a participant in Barry’s (2002) survey, when asked about barriers to implementing reading strategies, a participant commented that “the barrier to using any technique is time, time to plan, prepare, etc. It is often easier and less demanding to just lecture when you get so bogged down” (p. 140).

Non-Instructional Obligations

Additionally, teachers identified non-instructional obligations as obstacles to their implementation of the *Reading Strategies Handbook*. Teachers commented that non-instructional obligations demanded their time, often consuming some of their

instructional time that could have been used for reading strategy implementation. Noted infringements on teachers' time included teachers conducting observations, completing paperwork for school initiatives, and learning a new computer grading system.

This finding is supported by earlier research. For example, Laine et al.'s (1998) study, described in Chapter Two, revealed that various non-instructional obligations can reduce instructional time and impact teachers' instructional decisions. Furthermore, Davis (2001) noted that "lack of time for teacher planning and collaboration, difficult work conditions, and state testing mandates can stymie educators' learning and their efforts to make changes in their instructional approaches"(p. 8).

Professional Development

An additional finding of this study was the lack of professional development available to support teachers' implementation of the *Reading Strategies Handbook*. Teachers reported various forms of support to implement the *Handbook*. For example, some teachers explained that their only support was the initial training provided at the in-service when the *Handbook* was introduced to the district's middle school science teachers at the beginning of the school year. A few other teachers described isolated instances where they were assisted by a colleague from another department at their school. Support available at school science departments for teachers was also inconsistent. For example, at one school, a science department colleague led several reading strategy training sessions for the department's teachers; however, this practice was the exception. The most common support available for the teachers was a science department chairperson's verbal reminders to use the *Handbook*.

These findings illustrate a mismatch with earlier research presented in Chapter Two. Many researchers have indicated that sustained professional development is necessary to promote the implementation of an innovation and a necessary component for educational change to occur (e.g. Guskey, 2003). Sparks (2000) noted that educational improvements almost never occur without professional development. Others explain that teachers need, “The support of school and system leaders who can help them get the knowledge, skills, and resources they need, and find innovative, effective solutions for the students who are at risk” (Guothro et al., 2003, p. 33). As stated in *Goals 2000*, “Professional development serves as the bridge between where perspective and experienced educators are now and where they will need to be to meet the new challenges of guiding all students in achieving to higher standards of learning and development.”

As discussed in Chapter Two, professional development can take many forms. Researchers have identified more than two dozen models of professional development; six of the more popular models were discussed earlier. No “one size fits all” model of professional development exists, although a number of characteristics of high quality teacher professional development have been identified from the evaluation of prominent lists (Guskey, 2003).

Research has identified that when professional development is teacher-driven it becomes more meaningful to teachers since they have had a voice in its content and process (King & Newman, 2000). As described in Chapter Three in the section titled History of the *Handbook*, the *Handbook* was developed from district teachers’ concern for their students’ difficulties to comprehend their science textbooks; however, despite

the inclusion of “how-to” directions and student worksheets, teachers’ implementation of the *Handbook* varied. It should be noted that since this is a very large district, most of the science teachers involved had no involvement in initial discussions of the need for a *Handbook*.

A number of studies indicate that professional development must be on-going rather than episodic, and include follow-up and support. According to Guskey (1998), follow-up and support are vital to the success of an innovation and often are the most neglected aspects of staff development. A study conducted by Joyce, Wolf, and Calhoun (1993) found that despite extensive training, K-12 teachers only adopted 10% of the practices learned in professional development, unless the training was followed by coaching or action research. More than 25 years ago, Sparks (1983) noted that a one-shot presentation, even if it lasts two to three days, does not allow enough time for teachers to make changes.

According to Guskey (1998), “Successful staff development rests not so much on the initial training, but in what happens afterward. It is the follow-up, the support, and the on-going, professionally-embedded assistance that make the real difference” (p. 7). When teachers begin using new practices, they often have questions or concerns which need prompt attention. Failing to address these concerns in a timely manner can result in teachers reverting back to the tried-and-true practices. The amount of follow-up that is necessary depends on the size of the change. The greater the change, the more frequent and lengthy the follow-up needs to be (Guskey, 1998).

As Morawski (1995) stated, teachers need to feel that they are supported in their efforts to improve student literacy skills. Without that support, teachers are reluctant to integrate literacy instruction. Changing perceptions of reading must occur on two levels: instructional, and theoretical and curricular. According to Bintz (1997), “Solving reading problems is not just a matter of teachers using more informed instructional techniques; it also involves a commitment by teachers to interrogate assumptions about learning and conceptions of curriculum that underpin different methods of reading instruction” (p. 23). Bintz added that,

Teachers must see their instructional strategies as expressions of their personal values about how people learn in general, and learn to read in particular, and to reflect on the extent to which these values reflect advances in learning and reading theory. (p. 23)

One unexpected and positive finding of this study was that the district’s middle school science teachers had common grade-level planning time at their schools. In most cases teachers indicated that this time was utilized for curriculum-related issues such as discussing materials necessary for upcoming laboratory activities or the curricular timeline. Teachers clearly stated that reading was not a priority item of discussion during those common planning times. Comments from teachers in Chapter Four repeatedly stated that reading strategy discussions were not agenda items of the day.

The district’s decision to schedule common planning time for science grade-level departments is consistent with research recommendations. Built-in time for collaboration is essential to implement new practices in the classroom. Researchers often consider time

“the most significant barrier to implementing an effective collaborative schedule” (Henry, 2005 p. 32). Allocating time within the school day for grade level teacher common time provides a potential opportunity for teachers to discuss reading strategies pre- and post-implementation in the classroom. As Taylor, Pearson, Peterson, and Rodriguez (2005) noted, common planning time can help “schools and programs develop site-based learning communities where professional development is intertwined with the school community, balanced at times with the cross-fertilization of new ideas from outside the school” (p. 54).

As revealed in Chapter Four, teacher participants’ comments revealed their interest in collaborating with colleagues at their school site and other schools in the district. Some teachers expressed interest in wanting to share samples of students’ work to review, or an opportunity to collaborate with colleagues about the success and challenges of implementing the reading strategies. Several teachers even sought clarification about a strategy from the researcher, commenting that they wished that there could be time for one-to-one training.

In a study about collaboration conducted in Louisiana’s public schools, teachers described that a lack of time and numerous district-initiated programs were considerable barriers to collaboration (Leonard & Leonard, 2003). With so much attention today on school reform, districts often require teachers’ attention on too many educational initiatives and do not provide teachers with adequate time to accomplish these tasks (Henry, 2005).

Teachers need time to collaborate. According to King & Newman (2000), “Teacher learning is most likely when teachers collaborate with professional peers, both within and outside of their schools, and when they gain further expertise through access to external researchers and program developers” (p. 576.) As Birman, Desimone, Garet, et al. (2000) noted,

Professional development activities that include the collective participation—that is, the participation of teachers at the same department, subject or grade—are more likely to afford opportunities for active learning and are more likely to be coherent with teachers’ other expertise. (p. 30)

Teacher’s Personal Background

This study revealed that teachers’ backgrounds were varied and those variations influenced their beliefs and attitudes toward implementation of the *Handbook*, as noted in the Teacher Background Table (Table 1). As noted earlier by Readence et al. (1998) in discussion of Cone’s (1992, 1994) teacher inquiry studies, “Beliefs shape practice and practice shapes beliefs” (p. 143). Reviewing the number of reading strategies, teachers with various backgrounds indicated that they had implemented maybe one window to their level of understanding of the reading strategies and attitude toward implementation of the *Handbook*.

Teacher participants’ implementation of the reading strategies appeared to fall into three groups. Group One included one participant, Wanda, who until several years earlier had been a reading teacher. This participant worked independently to implement the reading strategies and at the time of the interview had implemented six of the seven

reading strategies. She explained that there was only one strategy was she unable to figure out without any assistance. Following a discussion with the researcher to clarify the strategy, she said that she would try it.

Group two comprised the majority of the participants. These teacher participants indicated that they had implemented two to three reading strategies at the time of their interview. Looking at the Teacher Background Table (Table 1), it is obvious that their backgrounds were diverse. No one common factor could account for their level of implementation of the *Handbook*. What was apparent was that multiple reasons impacted their decisions to implement the reading strategies.

The third group included one participant who had not implemented any of the reading strategies prior to the observation. The teacher stated that there were no reminders to implement the *Handbook* nor offers for assistance to implement the *Handbook* from her school's science department.

Understanding why and to what degree teachers decided to implement the reading strategies is a complex issue. Richardson (1996) identified several sources for teachers' beliefs, including personal experiences, experiences with schooling and instruction, and formal knowledge of subjects and pedagogical knowledge. These internal influences combined with external influences resulted in teachers' decisions whether to implement or nor implement the *Reading Strategies Handbook*.

Summary of Chapter Six

This study sought to understand the choices 11 teachers in a large school district made to implement a *Reading Strategies Handbook* created to support middle school

science teachers' implementation of reading strategies in their content classes. An e-mailed information sheet to each participant, a classroom observation, and an interview with each teacher participant provided the data for this study.

Some teachers suggested that students' difficulty in comprehending their science text may have been due to a lack of experience with expository text. Teachers attributed their decisions whether or not to implement the *Handbook* to various influences, commenting that the district's reading materials were too limiting and were inaccessible for some of their students. Teachers described the district's sanctioned science textbook for each grade level as written above the reading level that many of their students could comprehend, and identified textbook features that also contributed to students' difficulty understanding the text. Concerns about the bloated curriculum and preparation for high-stakes tests were also voiced by the teachers.

Time was also described as a barrier to teacher's implementation of the *Handbook* due to instructional and non-instructional demands. Teachers felt pressured to cover the required curriculum.

Furthermore, professional development for teachers' implementation of the *Handbook* was minimal. Teachers were, for the most part, "on their own." The district had established common planning time for grade-level teachers, however, the time was often consumed by topics other than discussions related to implementing the *Handbook*.

This *Reading Strategies Handbook for Middle School Science Teachers* innovation was an ambitious effort initiated by the Middle School Science Coordinator of a large school district in response to comments from some district teachers' that some of

their students had difficulty comprehending their science text. This admission led to the development of the *Handbook*. At the *Handbook's* introduction during the district's beginning-of-the-year in-service day, some teachers voiced positive feedback for the development of a tool for them. However, months later this study's teacher participants described varying levels of implementation of the *Handbook*. Teachers could list multiple reasons why they had or had not implemented more strategies.

Without a professional plan in place to assist them individually or as a group to work through introducing new materials, teachers were left to muddle through on their own. During an interview the researcher conducted with the Middle School Science Coordinator, the coordinator estimated that 60-70% of the district's teachers had not implemented any reading strategies at mid-year. What were the chances that the number would decrease, resulting in an increased implementation of the strategies, if things remain status quo?

Implementing new practices requires examination of teachers' beliefs and consideration for teachers to change. As Cuban (1993) noted, "The knowledge, beliefs, and attitudes that teachers have . . . shape what they choose to do in their classrooms and explain the core of instructional practices that have endured over time" (p. 256).

Implications for Research

This study clearly draws attention to the need for further professional development studies. The project developed around a *Reading Strategies Handbook* created by a committee of middle school science and reading teachers; however, the intended audience of science content-area teachers received minimal support to

implement that *Handbook* in their classes. Middle school professional development often is not a standard component of the middle school culture (Flowers & Mertens, 2003). Research studies are needed to further understand why professional development is a missing component in many middle schools and how professional development can be woven into teachers' daily schedules.

This small study of 11 teachers adds to the body of literature on professional development; however, more research is necessary that explores teachers' beliefs and attitudes related to implementing new practices over time. More research is necessary to gain a deeper understanding of change. According to Fullan (1991), "People do not learn or accomplish complex changes by being told or shown what to do. Deeper meaning and solid change must be born over time" (p. 73). It is critical for teacher educators to adequately reflect on their practice for deeper meanings and beliefs, understanding how beliefs interact with practice in various instructional contexts.

A number of studies have been conducted claiming success in teacher implementation of literacy instruction in content area classes (e.g. Fisher, 2001; Taylor et al, 2005). These studies just touch the surface of what is needed to bring about change in professional development. Content literacy in secondary school content classrooms is a very complicated issue, but an area where further study is required in order to help content teachers gain theoretical and practical understanding of the impact it has on student success.

Implications for Policy

In recent years attention has turned toward adolescent literacy with middle school students' low test scores gaining national attention. Reading researchers have repeatedly stated that explicit reading strategy instruction can improve students' comprehension. As evidenced in this study, creating the *Reading Strategies Handbook* for a district of approximately 300 middle school science teachers was a huge undertaking. Ideally, these teachers would have received substantial professional development. However, districts often lack the funds needed for such an endeavor or the resources to propel innovations. Making state and federal governments cognizant of the statistics related to students' low reading levels raises the awareness about the situation. The Striving Readers program mentioned in Chapter One has the potential to begin to address this issue. Although over 100 grants were submitted when the project was started, only 8 grants were funded, reflecting a sizable need for professional development directed toward teachers of adolescents (Alliance for Excellent Education, 2007). Policy makers also need to direct their attention toward increased funding for professional development earmarked for content literacy.

An additional implication for policy evident from this study is recognizing teachers' professional judgment and allowing them a stronger voice in decisions that directly impact their classroom instruction. For example, including teachers in the decision making to select reading materials acknowledges teachers' professional knowledge based on their day-to-day interactions with their students.

This study demonstrated that teachers will seek means to provide effective materials for their students, evidenced by some teachers' choice to use alternate texts that are, in their estimation, more appropriately leveled for their students. Policy makers need to trust teachers' professional opinion and allow teachers more voice.

Lastly, much research has been written about pre-service and in-service teachers' knowledge of content reading, yet teachers have been slow to implement literacy in their content-area classrooms. Maryland has led the way by requiring content teachers to take two content reading courses rather than the previous requirement of one. Is that the answer, or is that more of the same old? According to Pajares (1992), teachers' beliefs are established long before they enter the classroom to teach. It is important to look at teacher training classes and begin to have pre-service teachers reflecting and journaling to try to bring their beliefs to the surface. Additionally, methods textbook publishers need to write textbooks that integrate literacy into the content information presented in them. Reading is a means to support the content; as stated earlier, if you cannot read, you cannot learn much.

Recommendations for Practice

This study supports the need to implement an integrated plan of professional development. District implementation as the sole design is removed from the school's local cultures and cannot generalize about implementation models at the school level. It is not my intent to minimize the role that the district needs to play in professional development, particularly for this program in a large school district. As research suggests, the district can offer training—but the follow-up needs to take place at the school sites.

Districts need to be responsible for allocating funds to schools for the long-term effort that is needed to implement new practices and orchestrate intra-school opportunities for teacher collaboration. If teachers are to implement new practice they need time to collaborate. Someone needs to oversee that this occurs.

A relatively new model of professional development is one led by a literacy coach (Sturtevant, 2003) who would serve as a liaison between the district, school administrators, and teachers. A literacy coach can work with teachers who are reluctant to announce at a department meeting that they have not implemented any reading strategy instruction because they do not know where to begin. I strongly feel that this model can be a step toward department-wide implementation of the *Reading Strategies Handbook*, not by simply adding to the bureaucracy, but as a non-intimidating resource for content teachers to begin examining their beliefs about teaching and learning in relation to instruction in both their content and reading.

Conclusions

This study revealed that without texts that students could read and comprehend, teachers felt constrained in their use of strategies in the *Reading Strategies Handbook for Middle School Science Teachers*. Some of the study's teacher participants commented about an increasing number of students with low reading levels in their classes, which elevates the need for appropriately leveled texts. Adherence to "a one size fits all" curriculum maintains the status quo. Teachers described non-*Handbook* instructional techniques for students with low reading levels that will continue to serve as their instructional tools. Not only will the *Handbook* strategies remain out of reach for some

students, but students will be denied opportunities to improve their comprehension of text. In fact, efforts to improve students' comprehension of text through integration of the *Handbook's* reading strategies in content classes will likely be defeated by administration's inattention to providing appropriately leveled materials.

In addition, implementing new materials requires time. As teachers in the study indicated, time to implement the *Handbook's* reading strategies comes out of time designated for instruction, already stretched to cover the required curriculum. In this project, no allocation of time for teachers to implement the *Handbook* was made, nor were any modifications or consolidations of labs made to integrate the new materials. Some teachers expressed concern for "too much to teach." Not surprisingly, when teachers needed to make choices between covering science content and integrating reading strategies, science instruction was the priority.

Implementing new materials requires insight into the impact the new materials may have on the curriculum. Teacher participants in this study revealed multiple influences related to their decisions whether or not to implement the *Handbook's* reading strategies. Schools and districts must also consider how the new materials will impact teachers' practices. In this study, the *Handbook's* reading strategies were intended to be a means for teachers to support students' improved reading comprehension of science text. Consequently, a common ground between the required science content and the required inclusion of new materials, in this case the *Reading Strategies Handbook*, needs to be addressed.

When businesses develop new products, failure to advertise those new products has an impact on sales. Similarly, development of new materials for the classroom requires support for teachers who will implement those materials. Failure to provide support to teachers through professional development can mean failure for an innovation. This study's findings could help decision makers realize that placing new materials in teachers' hands and requiring their implementation does not necessarily ensure that result. Districts must be cognizant of what impacts teacher change, including external and internal influences on teachers' beliefs. As stated earlier, professional development bridges the gap between where teachers are presently and where they want to be. Failure to provide that bridge can doom an initiative and leave teachers disenchanted with the innovation, despite teachers' acknowledgement of the need for the new materials or innovation.

Professional development's significance cannot be overemphasized. This study can serve as an example to other districts' implementation of new instructional materials. Professional development is a necessity to effectively implement new materials, whether that training is commercially or district developed. If a district is willing to purchase new instructional materials, funding to support those who will implement the materials must be available. Not providing ongoing, structured professional development can lead to an innovation's failure and wasted school resources. At these financially difficult times, what school district can afford to waste funds?

In closing, the subject district's efforts to address the century-old dilemma of students' textbook comprehension problems are commendable. Developing the *Reading*

Strategies Handbook for Middle School Science Teachers clearly reflects the district's innovative educators at all levels; however, new materials presented in isolation will not automatically result in effective change. Implementing new materials requires attention to the myriad impacts the new materials may have on existing curriculum: Factors such as appropriation of teachers' time, volume of course content, appropriate reading materials, and a professional development component to support teachers' implementation efforts must be considered. Professional development supports "a work in progress" effort. Ultimately, the district's efforts could become a model for other districts seeking to effectively implement new instructional materials.

Appendix A: Prospective Interviewees

Looking for interviewees!

I am conducting a study to gain feedback from teachers implementing the *Middle School Science Reading Strategies Handbook*. No teachers who participated in the pilot of this project last year, please. It is important to gather information from a wide range of middle school science teachers in the school district. If you are willing to participate in a one-hour interview and are interested in participating in a research project, please complete this short form and turn it in at the end of this session. **All information will be confidential.** Thank you for your time.

Judy Weingartner

Your name _____

Work Location _____

Grade level taught _____

Telephone number where you can be reached (preferably not a school #)

Appendix B: Middle School Science Teachers In-Service Session Survey for
Implementation of the *Middle School Science Reading Strategies Handbook*

Please take a few minutes at the end of this session to complete this survey, developed to support the implementation of the *Reading Strategies Handbook*. It is an anonymous survey.

Who are your students? Circle all choices that apply.

7th graders 8th graders

Regular ed. Special ed. ESOL Honors GT Other _____

How many years have you taught middle school science in [this district]? _____

1. As a group, to what degree do your students experience problems in comprehending required science texts and materials?
* This question only applies to returning [district] teachers.
1 (not at all) 2 (occasionally) 3 (sometimes) 4 (often) 5 (always)
2. Prior to today's session, how would you have rated your comfort level regarding the implementation of reading strategies in your classroom?
1 (very uncomfortable) 2 (somewhat uncomfortable) 3 (average) 4 (fairly comfortable) 5 (very comfortable)
3. Based on today's in-service session for the *Reading Strategies Handbook*, how do you perceive the *Reading Strategies Handbook* as a tool for teachers?
1 (not helpful) 2 (possibly) 3 (somewhat) 4 (potential) 5 (a definite help)
4. Did you find that today's in-service session provided clarity for you to implement the reading strategies?
1 (not helpful) 2 (slightly) 3 (somewhat) 4 (usually) 5 (great help)
5. What did you view as positive points of the in-service session?

6. Do you have any reservations/concerns with implementing the reading strategies presented in this *Handbook* in your content class? If so, please describe.

Appendix C. E-mail Sent to Prospective Interviewees of the
Reading Strategies Handbook for Middle School Science Teachers

Dear _____,

When you attended the *Reading Strategies Handbook* session during the In-Service Day on September 1, 2004, you completed a sheet volunteering to participate in a research study focused on teachers' perceptions of the handbook.

As you may recall, I am a middle school reading specialist and also a former science teacher. I am currently working on a Ph.D. at Pleasantville University. My dissertation research relates to teachers' implementation of the *Reading Strategies Handbook* through the teachers' eyes. At this point in time, I have completed the Pleasantville University and Riverton Public Schools requirements to conduct the study, so I am now ready to begin talking with volunteers who may be interested in participating.

The purpose of this message is to thank you for volunteering and to request that you complete the enclosed questionnaire related to your views about the *Reading Strategies Handbook*. All of your answers will be kept strictly confidential. I also want to emphasize that while I will also be conducting interviews as part of this study, completion of the questionnaire does not obligate you to participate in the interviews. I will be using the questionnaire to gain information that will help me select the interview participants. As you might imagine, it is important for the teachers interviewed to represent a range of schools, grade levels, and opinions. Thus only a subgroup of those completing the questionnaires will be asked to interview.

Please let me know if you have any questions or concerns about this survey or any other aspects of the study. I would appreciate if you could complete the following survey questions and e-mail your responses to me by _____. I reiterate, your comments on this e-mail are confidential as is all correspondence in this study. Your participation in this study will help provide an understanding of science teachers' perceptions of reading strategies and the *Reading Strategies Handbook*.

Questionnaire

How would you rate your implementation of the *Handbook* in your classroom to date?

1 _____ 5 _____ 10
Hasn't gotten off the ground one or two (explain) Have tried Off to a great start

Please explain your rating.

Please answer the following questions as specifically as possible. If you have not begun to implement the strategies, please respond - Not yet.

1. If you have begun to implement the strategies, describe one thing (if any) that you like about the *Handbook*.
2. If you have begun to implement the strategies, describe one thing (if any) that you dislike about the *Handbook*, or concerns you may have.
3. Is there anyone or anything that is helping you implement the *Handbook*? If so, please describe.
4. What do you see as some things that may hold you back from implementing the *Handbook*?
5. Why did you volunteer for this study?
6. Including this year, how many years have you taught? _____ How many of those years have you taught middle school science? _____
7. What courses related to reading or writing (including content-area reading and writing) and/or in-service training have you had? Please note when this occurred, if possible.

I thank you for completing this survey.

Judy Weingartner

Appendix D: Research and Interview Questions

How do teachers respond to the introduction of new curricular materials by a school district?

- Describe what you like about the *Handbook*.
- What don't you like about it? Explain.
- What is helping you implement the *Handbook* in your classroom?
- What do you see that may hold you back from implementing the *Handbook* in your classroom?
- What revisions would you suggest for the *Handbook*?
- How do teachers' beliefs of literacy and attitudes toward the *Handbook* influence their implementation of it?
- How do you believe middle school science should be taught?
- Describe any changes you have made to the way you are teaching your classes as a result of the *Handbook*.
- Do you think that is possible?
- How do you view your job as teacher, as a science teacher?
- What literacy courses or in-service training have you had?
- From a teachers' perspective, what effect has the implementation of the *Handbook* had on students?
- Describe any impact you have observed that the reading strategies you have used are having on students. Probe for academic, social, motivational - both positive and negative.
- What behaviors do you think demonstrate students' engagement and learning when using the reading strategies in your science classroom?

Appendix E. Middle School Science Specialist Interview Questions

1. Having read the history of the *Reading Strategies Handbook*, have I captured it accurately?
2. What changes or additions do you think I need to add?
3. What is your philosophy of teaching science?
4. How do you think your classroom experience informs the choices and decisions you make as a Middle School Science Specialist?

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Curriculum Vitae

Judith A. Weingartner earned her Bachelor of Science from Central Connecticut State University in 1973 in Elementary Education with a concentration in Reading. Her teaching career began with various teaching assignments in the primary and upper elementary grades. In 1981, Judith became involved in Literacy Volunteers of America in New Hampshire. She continued to pursue her interest in adult literacy when she accepted a position as a GED/ABE instructor in New Jersey from 1983-1991.

Moving to Virginia in 1991, she returned to public school education as a middle school science teacher for a Northern Virginia school district. Judith earned her Master's Degree of Science in Curriculum/Instruction with a Reading Specialization at Virginia Polytechnic Institute State University in 2001. Upon completion of her master's degree, she accepted a position as a Reading Specialist in a Northern Virginia middle school.

Judith entered a doctoral program in 2001 at George Mason University. Upon moving to California in 2005, she was hired at Chaffey College as a full-time reading instructor.