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AN EXAMINATION OF THE EFFECT OF TEACHER READ-ALoud
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LEARNING IN SCIENCE

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By
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ON ADOLESCENT ATTITUDES AND LEARNING IN SCIENCE

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF
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ABSTRACT

Having been established as an important component of early literacy development, the use of teacher read-aloud as an instructional strategy has the potential to benefit adolescent students. The purpose of this study was to examine the effect teacher read-aloud had on adolescent learning in science and how the results varied according to individual reading ability.

The study was a counterbalanced design gathering both quantitative and qualitative data for analysis from two treatment procedures. Seventh and eighth grade students were given the reading portion of the SAT-9 to provide a national percentile ranking in reading. All students then participated in two consecutive units of study: one unit requiring students to read the science text silently and the second unit providing a teacher read-aloud of all text. The classroom procedures, assignments, and related activities were exactly the same for both treatments. Student learning was measured with pretest, posttest, and delayed posttest concept map scores on each unit of study.

A survey administered at the end of the study examined student attitudes toward the teacher read-aloud and served as the source for in-depth interviews concerning preference for or dislike of the teacher read-aloud strategy. An interview with the science teacher provided another outlook on the oral reading treatment.

A repeated measures analysis suggested both teacher read-aloud and silent reading were appropriate for student learning but results do not support either method as superior over the other. Multiple regression analyses were conducted on the posttest and delayed posttest scores as the dependent measured, had a significant relationship between treatment by reading ability interaction on one analysis. Regression equations

constructed for each level of the treatment indicated that as reading ability increases, students received more benefits from the teacher read-aloud procedure.

A correlation compared reading ability with attitude toward teacher read-aloud. Seventy-eight of the participants had a positive attitude toward the intervention, with no students reading below the 50th percentile showing disapproval. Interview responses supported these results since all below average readers favor the oral presentation. Overall themes from the interviews offered advantages and disadvantages of teacher read-aloud, suggestions for implementation, and a teacher's perspective on practical applications in science classes.

CHAPTER ONE

Introduction

Background and Statement of Problem

Over the past two decades, a great deal of attention has been focused on how children learn to read and ways instruction could facilitate maximum growth. While professional organizations and teachers have continually searched for higher quality instruction, recent public discussion has looked specifically at the beginning stages of reading. The National Reading Panel's research on teaching children to read became a basis for the "No Child Left Behind" act passed by the U.S. Congress in 2002. Concerned that only 32 percent of the nation's fourth graders perform at or above grade level in reading (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001), new legislation focused specifically on funding and instruction for successful reading through third grade. This concentration on reading fluency is critical for younger students, but unresolved reading difficulties remain an obstacle for learners far beyond fourth grade. Equally relevant for reading research and public attention would be the students who have moved beyond the first six grades and the important literacy learning necessary throughout adolescence.

Middle school years and the accompanying physical growth are often considered a transition time for many adolescents. After spending the majority of the school day in a classroom containing the same teacher, routines, and classmates, most middle schools require moving through a less personal environment of frequent class changes, several teachers, and a much larger peer group. Reading instruction, replaced by English grammar and literature, is no longer a separate daily subject but a required skill for all

curriculum areas. Coupled with unpredictable physical changes, adolescents are faced with multiple events that can impact their academic success.

A typical class of middle school students contains a mixture of reading abilities and motivations. The most recent NAEP statistics (Perie, Grigg, & Donahue, 2005) indicate 73 percent of eighth graders have reached a basic reading level, which is defined as having partial mastery of prerequisite knowledge and skills. Of that total 73 percent, 31 percent of that group are considered proficient or showing solid academic performance. A typical middle grade class has a wide spectrum of abilities and interests with average reading abilities becoming progressively higher each year (Worthy, Broadus, & Ivey, 2001; Manzo, Manzo, & Thomas, 2005). However, the ability range widens further as some students with reading difficulties could not progress the expected full year and others rapidly outpaced the norm. “A typical seventh-grade class may be expected to have reading levels ranging from the third to the tenth grade level” (Manzo et. al., p. 11). NAEP’s cumulative data indicate the achievement levels of adolescents have remained stagnant over the last two decades (Carnegie, 1995), ensuring diversity in reading levels will continue.

Considering continual fluency growth is fueled by motivation and attitude, changes in school structure can accelerate frustration level and desire to learn. McKenna, Kear, and Ellsworth’s 1995 survey found attitudes toward reading grow increasingly negative, particularly for those least able, as students move from first to sixth grade. Steven Dreher (2003), a secondary English teacher, observed reading problems for older students were extremely difficult to reverse because of repeated patterns of failure. Students with reading disabilities experienced ongoing learning problems throughout

their adolescent school years (McCray, Vaughn, & Neal, 2001). Upon reaching secondary levels, the everyday expectation is for students to independently comprehend complex reading material and new vocabulary. The teacher designs the majority of instruction in middle school and there is little differentiation to meet individual needs (Ivey & Broaddus, 2001). The Carnegie Corporation's 1995 research concluded adolescents between 10 and 14 are at a very crucial turning point, beginning the education behavior patterns that affect their future. The struggle to succeed with an inability to engage with the classroom focus is discouraging to any student. Over time this can lead to less interest in reading and little motivation to attempt participation.

Varied abilities and attitudes found in typical classrooms affect all subjects, not just language arts. Examining teaching practices is relevant and necessary when looking for different ways to actively involve all middle school students with literacy. Freeman and Person (1998) evaluated the difficulty of content area texts and found both science and social studies generally too difficult for the majority of students and offered inadequate access to provisions for different reading abilities. Current publications concerned about content area instruction argue since inclusion places all students in these classes, instructors need information about relevant reading strategies to fit content areas. It is particularly beneficial that literacy development can be done while teaching, not in addition to the content (Manzo, Manzo, & Thomas, 2005). Teachers who are aware of learners' unique needs can help offset some of the difficulties inherent in adolescence by actively adapting instructional techniques (Atwell, 1998). Even though educators realize the implications of reading difficulties and work to improve methodology, the search

remains relevant for additional approaches that foster unlimited involvement for all ability levels.

Research supports my experience as a middle school teacher. In each reading class of adolescents there was a wide variety of ability levels and motivations. Content area subjects contained an even broader spectrum of reading levels since all students, including those requiring Individual Education Plans (IEP), were part of the class. Efforts to involve everyone required multiple strategies for reading, responding, and thinking critically about the current topic. There is an especially strong lack of motivation for adolescents who are adjusting to the middle school environment and are struggling to be successful academically or socially. In literature and civics class, I began to periodically provide my reading of a text to students who were interested. Over time, I noticed not only requests for a teacher read-aloud in both classes, but also observed better attention to written text, in-depth discussions, and a higher level of involvement from students with lower reading ability.

Observations and a literature search for explanations did not satisfactorily resolve what the effect of teacher read-aloud is on student learning in a middle school content area classroom. Little is known about the value of teacher read-aloud with older students, particularly in content area classes. The questions then arise: What value does teacher read-aloud have for middle school instruction? Is teacher read-aloud a relevant practice in a content area classroom? Does individual reading ability impact the usefulness of teacher read-aloud for older students? The high volume of reading required for students above sixth grade coupled with the wide variation of reading abilities typically found in

classrooms suggests the strategy of teacher read-aloud for adolescents is a potentially valuable research topic.

Purpose of Study

This study proposes to examine teacher read-aloud of the textbook in seventh and eighth grade science classes. In the treatment groups, the science teacher will read orally to an entire class all the required text for one unit of study. In contrast, the control class will read the same required text silently for the entire unit. Both groups will participate in the same classroom discussions, activities, and assignments. Concept maps will be used to measure student learning with a pre-, post-, and delayed post-test over each unit. This will be a counterbalanced design. Students at each grade level will be presented two consecutive science units, one using the treatment method and the other using the control method. Intact classes will be assigned at random to begin with either the treatment or control. The science units at each grade level were selected to match in terms of similar text length, number of lessons, and related concepts.

An additional research component involves the impact of individual reading ability on teacher read-aloud as an instructional aid. National percentile scores in reading will be obtained for each student before the study begins. Students will be classified as high, average, or low readers to examine how reading achievement impacts learning with teacher read-aloud.

A final area of study will be the attitudes of students and teachers toward the teacher read-aloud intervention. All participants will complete a survey evaluating attitudes toward the teacher's oral reading and individual student interviews will provide

more in-depth responses. In addition, a teacher interview will be conducted to examine the value of teacher read-aloud from the instructor's perspective.

It can be reasoned that teacher read-aloud will be most likely to improve student learning for seventh and eighth graders classified as low ability readers. There are also potential advantages for some average and high readers because of text difficulty commonly found in the required science textbooks. Thus, it is expected that by measuring learning through concept maps, the individual mean scores obtained during the read-aloud unit would be significantly higher than during the silent reading unit, especially for students with lower reading achievement.

In addition, teacher read-aloud can allow students of all reading abilities to actively participate with the written science text and can positively impact student attitudes. The students with lower and average reading abilities are more likely to benefit from teacher read-aloud intervention and have positive attitudes toward the treatment. Students with high reading abilities are more likely to have indifferent or negative attitudes toward the intervention.

Research Questions

The research questions guiding this study are:

1. Does teacher read-aloud have an impact on student learning of science content?
2. How does the impact of teacher read-aloud vary when accounting for individual reading ability?

Importance of Study

This study will examine the use of teacher read-aloud in a regular science classroom as a reading strategy for involving students with varying reading abilities. Most studies in teacher read-aloud have looked at beginning reading and early literacy development. The value of adult modeling for beginning readers is well documented and considered one important component for reading success. There are very few studies on teacher read-aloud with older students, especially in specific content area subjects. Because of the wide variety of reading abilities typically found in middle school classrooms and the difficulty of content area textbooks, it is important to examine the value of an easily implemented strategy such as teacher read-aloud to help student learning.

Current research has briefly hinted that students who struggle with reading are more likely to benefit from teacher read-aloud. To date, no study has looked specifically at adolescent reading ability, teacher read-aloud, and the relationship between those two. This research will compare student learning with and without teacher read-aloud and examine which students are more likely to benefit and improve their attitudes toward reading of text. Instructor feedback can also provide personal insights and observations about the feasibility of teacher read-aloud in content area subjects. The perspectives of the teacher combined with student learning and attitude analysis can help lead to simple classroom changes that potentially benefit students up through high school.

Definition of Terms

Teacher read-aloud is the process of having a teacher read literature or any text to students. This can occur as a replacement for independent reading or as a foundation for independent reading by the student.

Although current definitions of adolescent readers place the beginning range at fourth grade, in this study adolescence describes the transitional stage of development between puberty and full adulthood. The typical age ranges from 13 years to 19 years old.

Content area subjects refer to a core of academic areas in education. The general topics include language arts, mathematics, science, social studies, foreign language, and the arts. Reading in a content area typically focuses on subjects outside of language arts instruction.

A concept map is a two-dimensional hierarchical diagram showing the relationship between concepts, or nodes, and the relationship with other related ideas. Concept maps are a tool for organizing and representing knowledge.

Counterbalanced design in research allows all participating groups to receive each research treatment in a different order. It is important to have the number of groups be equivalent to the number of treatments. Counterbalanced design is best suited for intact groups and permits the comparison of average performance of groups on each treatment (Gay & Airasian, 2003).

Middle school describes the grades found between elementary school and high school. Grades six through nine are commonly viewed as the intermediate grades and

middle schools can include any combination of these ages. Until recent years, teacher certification for these grades could include both elementary and secondary instructors.

Mixed methodology research involves the collection and analyzing of both quantitative and qualitative data in a single study.

Reading ability is defined in this particular research as a composite reading achievement score from comprehension and vocabulary on the Stanford Achievement Test, Ninth Edition. The terms reading ability and reading achievement are used interchangeably in this study.

Regression analysis allows a researcher to model the relationships in data and test for the effect of treatment. This is often done in a graphic form with the line of regression describing the relationship between two or more variables.

Repeated measures analyses examine the effect of treatment with two or more measures over time. Specific to this research, the repeated measure examines three assessments over one unit of study.

The following dissertation chapters will address all aspects of the research on teacher read-aloud. Chapter two will provide a review of literature on the theoretical perspectives toward teacher read-aloud and summarize current research. Chapter three will give a comprehensive description of the mixed methodology research design, including participants, setting, data collection instruments, procedures, and analysis. The fourth chapter presents all results on treatment and control group learning, student attitudes, student interviews, and teacher interview. The final chapter will offer an overall summary of the research and include discussion, conclusions, limitations, and recommendations for future research.

CHAPTER TWO

Review of Literature

Introduction

This review of literature examines the role of teacher read-aloud as one component contributing to student reading ability. Relevant theories, research, and current practices will be presented on oral modeling and its relationship to teacher read-aloud.

Theoretical Foundations of Teacher Read-aloud

A commonly accepted definition of the reading process states it is how humans make sense of written language, giving meaning to the print (Goodman, 2000; Ruddell & Unrau, 2000; Rumelhart, 2000; Smith, 2003). This general description applies to reading print with any age group, language, or genre. However, this broad interpretation of reading does not address the many complexities involved in the process of learning and successfully continuing to understand written texts. An elaborate combination of individual factors simultaneously work together and help any reader to comprehend print or ideas from another source. One known component is the modeling of oral language. Reading aloud to children has been considered an important part of literacy development for many years. *Becoming a Nation of Readers* (Anderson, Hiebert, Scott, & Wilkinson, 1985) claimed that reading aloud to children is the single most important component of early successful reading. Theory supports the oral reading of text for beginning reading and continued reading growth with older readers.

One perspective on reading acquisition addresses literacy learning by separating the most important processes into two primary components. The simple view of reading

was first proposed to identify abilities required for successful reading comprehension (Hoover & Gough, 1990). This theory contends reading ability is composed of two main factors: decoding and comprehension. While both skills are extremely complex, the simple view holds the complexities can be divided into two equal parts necessary for fluent reading ability; both decoding and comprehension are of equal importance (Juel, 1988; Juel, Griffith, & Gough, 1986). Although initial research was focused on beginning reading through fourth grade, current research (Floyd, Gregg, & Keith, 2004) has supported the simple view by finding significant effects for decoding and comprehension across age levels. From this viewpoint, reading comprehension will be poor under the following conditions: 1) students can comprehend the language but not decode the print, 2) students can flawlessly decode but not understand written or spoken language. While both conditions could limit fluent reading at any age, the primary focus of this research are adolescents who have the cognitive ability to understand the words and concepts presented in text but are limited by difficulties in decoding the words. The broad theoretical perspective toward reading supports the value of teacher read-aloud since it helps address decoding or comprehension difficulties for struggling readers.

The processing of information or written text requires fluent readers who can decode and understand text with ease. The LaBerge-Samuels 1974 model of information processing in reading addresses the same two components from another perspective. The reading process requires a dual operation of decoding and comprehension; as decoding becomes automatic more attention is focused on meaning (Samuels, 2000). This theory of automaticity suggests if decoding requires too much cognitive effort, it interferes with

the reader's comprehension. Again, the oral presentation of text eliminates the struggle to decode words and focus attention on content.

From the beginning stages of literacy, readers decode written text to obtain meaning. Kenneth Goodman's (2000) model proposes that comprehension is a building process using a written text between the reader and the author. Multiple sensory factors help mediate the meaning process and teacher read-aloud could contribute to any of four cycles comprising the holistic process. The optical cycle occurs when the eye scans and fixates on the text to provide visual input. Readers selectively determine what is significant or must be ignored to interpret what is seen during the perceptual cycle. A third syntactic cycle forces the reader to address the structure and context of sentence patterns. The final cycle helps the reader understand semantic devices such as special style, terminology, or text formats from written language. Working rapidly in a cyclical process, the four cycles are sequentially repeated to understand text. Ruddell and Unrau (2000) also contend reading is a meaning making process, however the negotiation occurs between reader, teacher, and classroom context. Teacher read-aloud obviously can either fit as part of the teaching role or support the classroom context if it assists the reading process.

The search for text meaning continues as readers mature and move progressively through secondary grades. Louise Rosenblatt's transactional theory (2000) states that each "reading act is an event, or a transaction involving a particular reader and a particular pattern of signs, a text, and occurring at a particular time in a particular context. . . The meaning . . . comes into being during the transaction between reader and text" (p. 1063). Meaningful transaction with text contributes to student knowledge about the

world and application to personal life. Whether approached efferently for information or aesthetically for enjoyment, there is no transaction if a meaning is not acquired.

Rosenblatt believed responsibility falls on the teacher to connect students with texts and support developmental differences for gaining meaning. A teacher read-aloud is one mechanism for adolescents to relate to text, particularly if they are developmentally unable to do it alone.

A final perspective looks at the reader's attitude and its role in reading understanding. Repeated inability to obtain meaning can affect the attitude of the reader toward reading. A positive attitude leads to an intention to read, which then leads to the reading act itself (Mathewson, 2000). The combination of theories supports the idea that difficulties in decoding limit the focus on meaning. Recurring negative encounters with reading progress to lack of motivation and avoidance of written text, which is a typical symptom found with adolescent readers. Teacher read-aloud eliminates cognitive struggle and allows the listener to concentrate on meaning, which in turn affects reactions and comprehension during the reading task.

There is a common thread decreeing that all readers must decode the written signs and have the need to derive personal meanings from the text. This is important at any age but seems especially meaningful for students moving into adolescence. Young people who have the ability to encounter new ideas and think critically about their implications are frequently limited by their ability to comprehend the complex writings. Teacher read-aloud has the potential to decipher the code for every student, to foster more positive attitudes toward reading, and to allow active participation in a meaningful transaction with the written text.

Research on Teacher Read-aloud

Studies relevant to this research each contained a teacher or fluent adult reader reading aloud to students as an essential component. Many studies focused on preschool beginning literacy through second grade. Looking at older students, however, required a broader scope of relevant research that approached the topic from multiple perspectives.

Identification of key terms included initial descriptors of *reading*, *reading skills*, *reading motivation*, *reading programs*, and *intermediate reading programs*; these were too broad and nondescript. More specific terms such as *middle school reading aloud*, *secondary read aloud*, and *adolescent reading aloud* led to several articles on effective teacher classroom practices. The descriptor *read aloud* brought in many articles on peer reading, reading buddies, and reading between students. By far the most productive terminology proved to be *teacher read-aloud* or *adolescent teacher read-aloud*. This process produced several articles not only in high circulation reading journals and books, but also within the area of special education, teacher education, content area instruction, and multiple subject research journals.

Student Achievement

Early studies focused specifically on younger students aged four to second grade. One of these addressed 580 second-grade children in New York City (Cohen, 1968). Experimental classes contained a collection of 50 books on open shelves used for one daily read-aloud throughout a full school year; the control group continued with its usual routine but experienced occasional read-alouds. Experimental and control classes were located in separate schools to avoid any contamination of results. Different forms of the Metropolitan Achievement Test were administered as pre- and posttest evaluations. The

experimental group showed significant increases in vocabulary, word knowledge, and reading comprehension. The participants classified as socially disadvantaged or lower achieving showed the most significant increase and received the biggest benefit from teacher read-aloud. These findings suggested that teacher read-aloud could significantly contribute to early literacy development and confirms the relationship between oral language and reading.

Feitelson, Kita, and Goldstein (1986) investigated 139 disadvantaged first graders in Israel who were read series-format stories 20 minutes every day for six months. Control and experimental classes were in the same school setting, but control classes continued their usual instruction plans that contained reading and writing activities during the experimental classes read-aloud. Teachers in control classes did not increase their oral reading to students beyond their current read-aloud practices. All students were tested with Sharon and Eshel's 1979 test covering comprehension, technical reading, and a picture-story telling task. Pre- and posttest results were supplemented by classroom observations and interviews. Results indicated experimental groups had significantly better results on comprehension and language measures than students in control classes. The unexpected result was a high level of interest from participants in the series books that were read orally to experimental classes. Teachers reported children asked their parents to purchase these familiar books as gifts, and the children brought them to class for free reading time. Final interviews confirmed that 13 of 31 children in the experimental class had obtained the texts for independent reading at home. The teacher read-aloud helped provide growth in comprehension and language while increasing

motivation and interest level towards reading from students in experimental and control groups.

Similar results were obtained from two well-known experiments in New Zealand designed to measure the vocabulary growth for 7 and 8-year-old children (Elley, 1989). The first study involved a daily teacher read-aloud with 157 students from seven different schools and classes. After three readings of one text, participants showed an overall vocabulary gain of 15 percent. To build further on the initial research, the second study again examined vocabulary growth but added an additional component of teacher instruction. The classes who did not have any teacher explanation had a 15 percent gain in vocabulary knowledge; classes receiving reading with an explanation had a 40 percent improvement. Follow-up tests showed the vocabulary gains were the same for low and high-scoring children, and students had high retention of the new words. The results provided additional evidence that teacher read-aloud is a source of permanent vocabulary growth for the varied ability levels typically found in classrooms.

Another important study investigated four-year-old students in low socioeconomic day-care centers to examine the effect of one-to-one readings on children's comments and questions. Over a ten-week period, Morrow (1988) obtained results from two experimental groups and one control group. A first experimental group was read a different book each week while the second group heard repeated readings of three books. Researchers purchased a reputable reading readiness program that did not contain storybooks for the control group. Research results showed the experimental groups had a much higher number of questions and comments than control group participants. In repeated story readings, low-ability children provided more feedback and

discussion than middle- or high-ability children. High-ability students were most likely to question or actively participate when a different book was read in each session. The successful results obtained are consistent with other researchers (Cohen, 1968; Feitelsen, Kita, & Goldstein, 1986; Elley, 1989; Morrow, 1988) and are the most frequently cited data for teacher read-aloud as a fluency model with younger children.

Several other studies examined the influence of teacher read-aloud with younger children but did not find supporting conclusions. In one case, a small sample with one teacher and six first graders classified as high verbal, low verbal, or ESL were observed during a teacher read-aloud with literature dramatization for 16 weeks (Haag, 1998). While the read-aloud gave opportunity for collaborative talk, and all participants had an increase in verbal participation, it was not found effective without the dramatization activities that provided a wider array of participation opportunities. The results support using meaningful activities related to text and suggest that teacher read-aloud alone is not sufficient for maximum literacy growth.

Another study investigated if regular oral reading to second graders would have a positive effect on reading comprehension (Gatsakos, 2004). Using the reading scores from state-mandated tests, 75 participants were assessed as low, average, or high academic performance and randomly placed in three different classrooms. All participants were taught eight reading lessons designed to provide data in both control and experimental conditions. Four of the control lessons used only silent reading by students while the other four involved silent reading time and teacher read-aloud. Final data results showed no statistically significant difference in comprehension between the two types of reading instruction. The teacher read-aloud did not have any measurable

effect on comprehension for low, average, or high ability students. A factor that may have influenced the results is the small number of oral reading sessions by the instructor. Participants would have received a minimum of two oral reading lessons and no more than four teacher read-aloud sessions. Extending the focus of the research and additional insight into the related activities could influence final results.

Research on teacher read-aloud with older students has been less common. Bryant's 1982 research involved 280 seventh graders in experimental and control groups. The experimental groups were read books unrelated to subject area for 10 to 15 minutes every day for one semester. The control group continued with the established language arts curriculum and received no oral reading by the instructor. The comparison of pre- and posttests of the Iowa Silent Reading Tests and Estes Scale showed no significant difference in vocabulary, comprehension, or attitude for the experimental group. Bryant found that read-aloud to high ability students resulted in a negative effect on attitude while the greatest gains were only by low ability level students in the experimental group. Less obvious results included library records showed a much higher checkout rate of the teacher read-aloud books. Attitude and involvement of low ability students was higher and these students expressed appreciation to the author for the opportunity to hear good books. While results for teacher read-aloud were not significant, this study shows the potential of read-aloud as a meaningful strategy for students who struggle in content areas.

A listening to literature program was implemented in middle school English classes where teachers read classics aloud and discussed with adolescents for 10 to 15 minutes daily for six months (Herrold, Stanchfield, & Serabian, 1989). After the

pretest/posttest use of the Reaction Toward Reading Attitude Scale, a significant positive difference was found for the total population. The author concluded that the attitudes of adolescents, particularly boys, became more positive through teacher read-aloud and discussion activities. The results seem to imply there was potential value having an adult reading orally to an older population.

Meloy, Deville, and Frisbie (2002) examined the effects of a read-aloud accommodation on the Iowa Tests of Basic Skills for students with and without a learning disability in reading. Random assignment of 269 sixth through eighth grade students, of which 62 had identified learning disabilities, was made for the science portion of the test. Students in both groups achieved significantly higher test scores with the read-aloud accommodation. The authors had hypothesized that the learning disability group would score higher but did not anticipate improvement by the regular classroom students. While earlier research with older students indicated that struggling readers would most likely benefit from teacher read-aloud, these data expand the potential benefits to middle and higher level readers as well.

A final study examined the reading attitudes of high school students with 10 weeks of daily teacher read-aloud and sustained silent reading. Partridge (2004) administered a pretest/posttest of the Rhody Secondary Reading Attitude Assessment and interviewed participants. The results of the study found that some students showed marked improvement in reading attitude after the intervention while other participants showed no improvement. The author concluded that these particular methods might be more effective with basic level students.

Results from these studies show there is potential value in teacher read-aloud with adolescents, particularly those who are having more difficulty with reading texts independently. There are no conclusive results from these studies that confirm the value of this intervention for all ability levels in older grades.

Surveys of Teacher Practices

Another type of research concerned the teachers' perspectives and practices toward read-aloud in the classroom. Jacobs, Morrison, and Swinyard (2000) surveyed 1,874 elementary teachers across the nation to determine the frequency of reading aloud. They found significant relationships between grade level and time spent in reading activities; as the grade level increased teachers read aloud less frequently. Further, teachers of younger grades were more likely to read picture, informational, and student-selected books along with book sharing activities and recommendations to peers; teachers of older children were most likely to hear chapter books. Another survey by Lickteig and Russell (1993) compiled data from 183 elementary teachers from five districts in Nebraska. The results showed reading aloud was a highly valued practice among educators. Seventy one percent of the teachers read aloud daily for at least 20 minutes, although the frequency decreased as grade levels got higher. Most offered reasons for reading aloud were enjoyment, encouragement, and exposure to a variety of literature. Both of these studies found teachers view read-aloud as a worthwhile classroom activity, but frequency and variety decrease as students move to higher grades.

Albright and Ariail (2005) looked specifically at the read-aloud practices of middle school teachers from all content areas in one Texas school district. The responses from 141 middle school teachers showed that 85 percent read aloud to their classes either

once a day or three to four times a week. The types of texts most commonly read were chapter books or textbooks. The most common reason offered for read-aloud was to model aspects of fluency and make certain all students were exposed to information in the textbooks. The authors concluded teachers who read aloud could enhance their current practices and read-aloud could be implemented across the curriculum for aesthetic and efferent purposes. Results provide the same conclusions as other researchers (Jacobs, et al, 2000; Lickteig & Russell, 1993) that teachers value read-aloud as a worthwhile classroom strategy.

Motivation and Attitude

Several educators conducted research on the kinds of classroom activities that promote reading. Mendoza's 1985 survey of 520 children in kindergarten through sixth grade asked questions about teacher read-aloud, preferred group size, reading practices at home, book choice, and discussion formats. When asked if respondents liked adult read-aloud, results revealed that 94 percent of boys and 95 percent of girls up through grade three responded positively. In fourth through sixth grade, 74 percent of boys responded yes and girls were close with 73 percent affirmative. The author concluded that children throughout elementary school years enjoy teacher read-aloud and educators should capitalize on this activity. A yearlong study of reading motivation included questionnaires and random interviews from 330 third and fifth grade students with multiple reading proficiency levels (Palmer, Codling, & Gambrell, 1994). Responses revealed four significant motivators for students of all abilities and interest levels to read: prior experiences with books, social interactions about text, easy access, and choice. The most consistently mentioned component of motivation was prior experience with

books—particularly materials previously read to them by parents or teachers. The authors concluded the experiences could be closely linked to self-perceived competence because they successfully build reading experiences. The data show again the potential value of teacher read-aloud with students in varied age groups.

Ivey and Broaddus (2001) conducted a large-scale research project to determine motivation factors for middle school student reading. The authors administered a survey to 1,765 sixth grade students in 23 schools from two different regions of the United States. Two open-ended questions and a response checklist asked what made the students want to read and made their current class enjoyable, allowing multiple responses from each survey. Classification of data showed 63 percent of all students surveyed preferred free reading time while 62 percent chose the teacher reading out loud. The third most favored activity was reading plays and poetry out loud; this was selected or listed on 36 percent of responses. Overall results indicated teacher read-aloud and free reading time were the most favored activities for reading motivation and school enjoyment. Individual interviews were given with 31 additional students for more in-depth information. The interviews offered student perspectives on read-aloud as an aid to comprehension, learning a wide variety of materials, and a way to learn school subjects thoroughly. Similar to conclusions found by Palmer, Codling, and Gambrell (1994), Ivey and Broaddus (2001) also saw teacher read-aloud as a scaffold to understanding because the teacher could make the text more comprehensible or interesting for different reading levels. The use of a large sample and the strong preference for teacher read-aloud indicates an untapped resource for motivating many older students.

The viewpoints and reflections of college students on their reading experiences provided a similar perspective. Artley (1975) surveyed 100 junior and senior education majors to identify some successful characteristics and practices of reading teachers. While many students had little or no recollection of reading activities, the most frequently mentioned practice was the teacher reading to the class as the activity most remembered and enjoyed. Some students revealed the teacher's mention of a favorite book or text to read for enjoyment as motivating and showing the value of reading.

This final emphasis on student attitudes reveals much about personal motivation. A survey of 18,185 first through sixth graders was compiled from 38 states (McKenna, Kear, & Ellsworth, 1995). Using McKenna and Kear's Elementary Reading Attitude Survey, means were averaged for both recreational and academic reading attitude at each grade level. The data showed attitude toward reading grew increasingly negative in both home and school as students progressively moved through the first six grades. The mean drops between successive grade levels were significant at every level except between second and third grades. A second research question examined the relationship of attitude to reading ability and ethnicity. The negative trend is most rapid for the least able readers and is clearly related to ability. McKenna et al. suggested teaching techniques can improve reading attitudes through positive experiences in the classroom and indirectly affect negative beliefs about reading.

Ivey's 1999 case studies of middle school readers support the complexity of literacy development for adolescent students. Ivey's in-depth interviews with a superior, average, and struggling reader showed reading attitude and performance are dependent on the instructional environments. Problem readers in middle school settings continually

struggle to master basic reading skills and fail to obtain meaning when reading. Average readers have difficulty with content area textbooks. Superior readers need interesting and varied text experiences along with access to less demanding materials. Schooling and instructional practices have the potential to influence all ability levels and attitudes either positively or negatively. These results confirm that reading difficulties remain a problem for many older students and there would be benefits from an environment that incorporates multiple strategies when gaining information from texts.

Teacher Action Research

Current teachers have implemented read-aloud practices in their classroom and provide examples of teacher action research. Teachers conducted research during the daily work of instruction, integrated naturally into the classroom environment. While less formal design and results than scientific based research, teacher action research provides an open inquiry into knowledge and thinking by the instructor and students.

Lettie Albright implemented teacher read-alouds of picture books in her middle school social studies class (2002). Her instructional model included three separate stages of planning, preparing and producing read-aloud sessions. Each classroom session involved the use of relevant literature with discussion starters, an appropriate routine and introduction, and actual read-aloud and related conversations with opportunities for efferent and aesthetic responses. Students who participated in the read-aloud earned statistically the same grades as those receiving regular instruction with conventional study guides and textbook questions. This research shows how read-aloud can be one method to effectively teach content area skills while promoting both efferent and aesthetic responses with a high level of engagement for students.

Susan Tingley informally chose “to try reading aloud to my eighth grade students just to see what would happen” (1986, p. 51). Tingley began each class with three to five minutes of read-aloud and found students made a special effort to be ready to listen, then quickly settled to the next activity. By year’s end, each of the classes had read several entire novels and students frequently suggested other books for the class read-aloud. Tingley concluded older students enjoyed teacher reading and the related opportunities for intellectual sharing with peers.

Turning to high school literature classes, Stephen Dreher (2003) taught an eleventh grade literature class with students reading anywhere from fourth grade to advanced college level. The typical class contained several students with unresolved reading difficulties. Teachers must work with comprehension problems that are very difficult to reverse while actively trying to involve these learners in classroom activities. Dreher structured the class time so students could choose to hear the teacher read text, join a group for shared reading aloud, or read independently. The students moved fluidly through all three reading groups and there was a noticeable difference in the task completion and participation of more class members. Students who would have struggled with reading difficulties were able to learn from complex ideas in literature when given the opportunity to discuss, analyze, and imagine texts through teacher read-aloud.

Many secondary teachers expressed concerns about finding time for teacher read-aloud. Richardson’s (1994) solution was the reading aloud of required short stories along with related texts to underscore the story’s relevance. The higher level of discussion in the class and quality written responses led to additional read-aloud units including picture

books and informational texts linked to the curriculum. Richardson's diary notes documented the 10th graders appeared interested because of increased attention span, oral and written positive comments, requests for specific authors, and repeated readings of previous read-alouds. She continued to use read-aloud throughout the semester and surveyed students about several activities at the conclusion of the class. When asked if teacher read-aloud was a helpful strategy, 53 percent chose "a lot" and 43 percent indicated "some." While there is considerable variance in the scope and formality of the previously mentioned studies, there remains continual reference to teacher read-aloud as a motivating and enjoyable classroom experience from both teachers and adolescent students.

Research Summary

In summary, research shows the value of read-aloud by parent, teacher, or any older fluent reader for young children's beginning literacy development. Read-aloud provides a model of fluent reading and helps listeners learn not only the conventions of language but also phonemic awareness, story elements, and vocabulary. Equally important, it provides a foundation to develop the affective aspects of literacy by developmentally building on the emotional connection to texts.

As students become more fluent readers, the read-aloud becomes less important in reading development. Research studies of older students indicate slower, less fluent readers receive the greatest benefits from teacher read-aloud. Oral reading of text removes the struggle to decode complex text and allows the listener to focus attention on meaning. Hearing the text orally is a great equalizer of the multiple reading abilities

found in a regular classroom because students of varied reading abilities can discuss, analyze, and participate with complex writings.

However, concluding data show that overuse of reading to students is possible with older, fluent readers. Successful implementations of read-aloud include an alternate activity for students wishing to move more rapidly than the oral reading speed. Read-aloud for “just reading’s sake” that is unrelated to classroom curriculum is enjoyable for many, but less effective as an instructional strategy. The knowledge of increasingly negative reading attitude for older students combined with teachers having the ability to improve student attitude leads to searching for a happy medium of teacher read-aloud to make the classroom more interesting to adolescents.

Middle school instructors were most likely to consider chapter books, textbooks, and current events as beneficial teacher read-aloud sources for adolescents. Student responses graded these sessions anything from negative to highly engaging, suggesting teacher implementation may affect student attitudes. Researchers observing classroom reading found model instruction would include quality literature, relevance to other topics, lively discussion, varied response and extension activities, teacher preparation/planning, and a fluent reading model (Fisher, Flood, Lapp, & Frey, 2004; Hoffman, Roser, & Battle, 1993). Success of the teacher research projects could be attributed to the enthusiasm and quality of the individual teachers implementing the strategy. Since this information was not provided in some studies, implementation and presentation factors may be part of the effectiveness with older students.

Related Research Methodology Literature

The critique of relevant literature leads to determining appropriate methodology for the current research. The study requires a thorough examination of concept maps to measure student learning and teacher read-aloud practices.

Concept Maps

The use of concept maps has become a more commonly used assessment in science and mathematics over the last 30 years. Novak introduced the idea of concept mapping in 1977 as another way for instructors to meaningfully evaluate what students learn (Rafferty & Flesher, 1993). The two main parts of concept maps are the actual mapping task and the evaluation/scoring process (McClure, Sonak, & Suen, 1999). The map drawing is a graphic representation consisting of circled nodes that refer to concepts and solid lines with linking words showing relationships between the nodes. The combination of two nodes and a labeled line is considered a complete proposition (McWhirter, 1998). According to Ruiz-Primo, Schultz, Li, and Shavelson (1998), the two primary types of concept maps require students to either fill in the map with an imposed structure or construct the map freely. Concept maps provide an alternative to traditional tests containing multiple-choice or true-false exams. The intent is to show meaningful relationships between new concepts and permit creativity in student responses (Novak, 1998). Research has found concept map assessment to be sound for assessing conceptual change (Markham, Mintzes, & Jones, 1994) with a learning outcome higher or equivalent to non-mapping evaluation techniques (Barenholz & Tamir, 1992).

For successful concept mapping evaluation, it is important for students to have experience with the construction process. The majority of students ranging from middle school to college age can learn to map in one to two learning sessions with little or no help from the teacher (Barenholz, & Tamir, 1992; Markham, et. al., 1994). Suggestions for quality concept maps and reliable scores include keeping the task simple, scoring with a student-constructed map compared to a master map, and limiting required concepts to approximately 15 for middle school students (Anderson, 1989; McClure, Sonak, & Suen, 1999).

Several scoring methods are available for concept map assessment. The simplest maps to grade were “fill-in-the-map” where some of the concepts and linking words have been left out; however, “construct-a-map” scores were found to be the most accurate reflection of subject knowledge (Ruiz-Primo, Schultz, Li, & Shavelson, 1998). Scoring rubrics varied from a 5-point scale for each proposition (Ruiz-Primo, et. al., 1998) to one point for each correct proposition (McWhirter, 1998). Based on the content of the science chapters and the age level of research participants, the simpler form of scoring one point for each correct proposition provided the model most appropriate for this research.

Teacher Read-aloud Practices

Current literature and research provides suggestions for high-quality oral reading experiences. Morrow’s (1988) study involving young children with adult read-aloud describes the experience as a social activity. Adult behaviors that affect the read-aloud include questioning, scaffolding discussion and responses, positive feedback, giving additional information, clarification or restating of information, personal responses, and

relating ideas to personal experiences. The adult feedback, modeling, and encouragement help make the read-aloud a more meaningful experience.

Hoffman, Roser, and Battle's (1993) survey of read-aloud practices in kindergarten through sixth grade classrooms involved multiple observations of successful read-aloud programs. Their observations combined with an examination of research that resulted in a "model" set of characteristics to improve the read-aloud experience.

Potential factors for quality read-aloud include a planned time and place, quality literature, connections to other texts, thought-provoking or lively discussions, smaller groups for reading or response, varied response options, and repeated reading of some selections. The authors acknowledge that all components are not essential during every reading session, but adaptations to the current practices will maximize the read-aloud experience. Another survey was built on the results of Hoffman, Roser, and Battle, but focused specifically on middle school instruction. Albright (2005) surveyed 141 teachers in one district and found 85 percent used teacher read-aloud in some form in their middle school classrooms. Albright offered an abbreviated list of suggestions more appropriate for adolescent learners. The four essential components include the teacher being familiar with text, slow fluent reading with expression, modeling personal questions and connections, and encouraging student responses and discussion.

To identify the typical procedures of teacher read-aloud, researchers examined the practices of 25 expert teachers to identify and analyze components essential for successful teacher read-aloud (Fisher, Flood, Lapp, & Frey, 2004). The seven observed practices of an effective interactive read-aloud include appropriate text, preview and practice by teacher, established purpose, fluent reading, animation and expression,

discussion, and independent reading and writing. The researcher then observed 120 additional teachers to determine how common these components were in other classes. The teachers were most likely to be animated, have discussions, use appropriate texts, and establish a purpose. There was very little consistency observed in modeling fluent reading, previewing and practicing the text, or connecting the reading to other activities. The authors concluded that a quality teacher read-aloud is an important tool for promoting literacy with students of varied ages. The data indicated there are excellent examples of teacher read-aloud available, but implementation of all the components is not typical. The authors concluded that teachers who use many of the effective practices were more likely to have success with older students.

There would be some variance on the appropriate practices of teacher read-aloud because of subject area requirements and the age of students. When determining the components of high-quality teacher read-aloud practices for older students, it seems essential that any oral reading should be previewed and practiced by the instructor. Any text read out loud needs to be delivered with expression, animation, appropriate volume, and at a speed slow enough to be easily understood. In addition, a successful read-aloud should include an established purpose, opportunities for discussion and explanation during the time the teacher is reading, and opportunities for independent or small group responses. These components of teacher read-aloud would be a required part of the current research study.

Chapter Summary

To provide additional information on teacher read-aloud, this study will build on previous research and focus on adolescent learning in a content area. Theory supports the

idea that reading is an intentional act to obtain meaning from written text at any age or ability level. Struggling readers faced with decoding complex writings are limited in their ability to understand and learn independently. While research shows adult modeling is critical for early literacy development, older students have received benefits from this strategy. Both students and teachers value teacher read-aloud but data from adolescents indicate the oral reading is most likely to help lower ability students.

The study of read-aloud requires appropriate evaluation and parameters for both the student listener and the adult model. When evaluating conceptual change with older students, concept maps have proven to be an effective tool for showing meaningful relationships. Concept map assessment should include adequate student preparation and evaluation methods appropriate for student ability level and topic complexity. In any teacher read-aloud, teachers implementing the sessions should establish a purpose with students, be familiar with the text, and model fluent oral reading. Other equally important components should be included if possible but may vary according to the class materials and overall objectives. The best practices of teacher read-aloud also involve meaningful discussion, connections to other texts, a variety of activities, and use of appropriate material for the age level and subject area.

CHAPTER 3

Research Design

As shown in the review of literature, teacher read-aloud is a very important component of early literacy learning. Read-aloud has provided a fluent model for children to learn conventions of language, story elements, vocabulary, and emotional connection to text. While older students do not have the same literacy needs as young children, research has shown adolescents enjoy teachers reading aloud in school and has been a helpful strategy for struggling readers. This study will examine the impact of teacher read-aloud with middle school students in content area classes.

Purpose of Study and Research Questions

The purpose of this study was to investigate if the previously described teacher read-aloud procedures are effective for adolescent comprehension of science texts. The research questions are as follows:

1. Does teacher read-aloud have an impact on student learning of science content?
2. How does the impact of teacher read-aloud vary when accounting for individual reading ability?

Method

Setting

The research site is a school district containing one school site located outside a large metropolitan city. The district is closely aligned with a large suburban district outside the city limits. Approximately 430 students ranging from pre-kindergarten through eighth grade comprise the entire population of the district. Twenty-nine of the

total student population qualify for free or reduced lunch and 364 are Caucasian. The sixth through eighth grades are in a separate section of the facility and change classes seven times during each day. In the seventh and eighth grade, students have multiple teachers each day in a departmentalized structure, but the smaller enrollment requires repeating reading, science, and math instructors for two consecutive years. Students with Individualized Education Plans (IEP) for math, reading, or language attend lab class with a different instructor than the regular classes. There are approximately 46 students in each seventh and eighth grade. Currently eighth graders are divided into three smaller classes and the seventh is split into two groups. The researcher's job assignment is the reading teacher of all seventh and eighth grade students without a reading IEP and she currently does not teach any content area classes.

Participants

All 80 participants in the study attended the same suburban school. Sixty-three of those providing results were Caucasian and six qualified for free or reduced-price lunch. The seventh grade data contained results from 34 students, none of which had an Individual Education Plan (IEP). A total of 46 students participated in 8th grade and six of these had an IEP. One experienced teacher taught all the science classes for both grades. Every seventh and eighth grader participated in the planned units and accompanying activities, but only data from students with signed parental consent and student assent forms were included in the data analysis.

Materials

Two consecutive science units from one of the state-mandated science texts provided the required text for reading. The eighth grade *Earth Science* (2005) units were minerals and rocks; the seventh grade *Life Science* (2005) units were cell processes and cell reproduction. The science teacher selected the areas of study because each of the chapters were equivalent in content, vocabulary, text length, and time requirements, as shown in Figure 1.

7th and 8th Science Units: 8 Total Weeks	
8 th Unit – Minerals 3 lessons, 17 pages of text	8 th Unit – Rocks 4 lessons, 19 pages of text
7 th Unit – Cell Processes 3 lessons, 18 pages of text	7 th Unit – Cell Reproduction 3 lessons, 17 pages of text

Figure 1. 7th and 8th Grade Science Units

Content area specialists verified the four units of study were age-appropriate and conceptually similar in the amount of material students were required to learn. All classroom information, written text, activities, and assessments were based on content from the school's adopted science series.

Instruments for data collection

Reading Ability

Seventh and eighth grade students completed the reading and vocabulary subtests of the Stanford Achievement Test, Ninth Edition, during the first two weeks of school. Results provided a national percentile ranking for each student in the separate subtests and a combined reading score. The total reading percentile score was used to identify

each student's reading achievement and later helped distinguish if higher or lower ability students received the greatest benefit from the treatment.

Concept Maps

After reviewing current research on concept maps (McClure, SonAK, & Suen, 1999; McWhirter, 1998; Ruiz-Primo, Schultz, Li, & Shavelson, 1998), the science teacher and researcher developed a master concept map for each unit studied. The four master maps were reviewed and approved by two content area specialists teaching at a local university. Each reviewer independently examined the textbooks and proposed concept map assessments. Both specialists confirmed the units and accompanying assessments were conceptually accurate, equivalent in content, and appropriate for middle school curriculum. Concept maps for the four units are located in Appendix A. While other assessment methods were used during the science units, the only assessments included in this research were scores from the concept maps.

In order for students to become familiar with concept map development and scoring, several practice sessions were conducted in three classroom settings before the research project began. The reading classes moved through three sessions involving whole class, small group, and individual concept map development and scoring procedures. Additional practice sessions occurred in science and social studies with topics unrelated to the read-aloud research. After completing all practice sessions, each student constructed six concept maps over the course of the study: pretest over unit one, posttest over unit one, pretest for unit two, posttest for unit two, delayed posttest over unit one, and delayed posttest covering unit two. The researcher and science teacher scored 63 of the 480 maps. To determine interrater reliability for the scoring of these

instruments, the number of agreements was divided by the number of opportunities for agreement. The percentage of agreement for all four concept map tests was 83 percent. All differences were discussed and resolved initially between the two graders and as an ongoing process throughout the scoring. The science teacher and researcher divided the remaining 417 maps and scored them independently.

Attitude Surveys

At the conclusion of the two science units, students completed a self-administered attitude survey containing ten questions. The questionnaire was modeled after Anderson and Huang (1989) nine-question assessment to evaluate eighth grade students' reactions to concept maps. Since the 1989 survey was appropriate for adolescents and addressed attitudes towards a specific concept, the researcher designed the attitude survey used in this study in a similar format but addressed all statements to reading, the science units, and teacher read-aloud (Appendix B). To avoid neutrality, each statement had four response options varying from "strongly agree" to "strongly disagree" with point values ranging from one to four. The survey contained three positive and three negative statements about the teacher read-aloud intervention, one statement each about the science units studied, and two statements about personal reading attitude and ability. Student responses representing both negative and positive attitudes toward teacher read-aloud in each grade were selected for more in-depth interviews. A Cronbach's alpha test was performed, and an inter-item correlation score of .79 was obtained. Thus the survey was determined to be a reliable measure of attitude towards teacher read-aloud.

Student Interviews

Interviews were conducted with four seventh and four eighth grade students. Participants were selected who scored as higher or lower reading achievement and represented both perspectives of liking and disliking the teacher read-aloud. The questions specifically examined student perspectives toward read-aloud intervention for additional insights not available from surveys and concept maps (Appendix C).

Teacher Interview

A face-to-face interview with open-ended questions was conducted with the science teacher at the conclusion of the research project (Appendix D). Questions specifically examined the teacher's perspective toward read-aloud, observed benefits or difficulties for students, unanswered questions for future research, and any other recommendations or insights from the entire project.

Design

Since reading research in the last two decades has leaned towards a nonexperimental approach (Kamil, 2004), the inclusion of quantitative data analysis provides scientific, verifiable results relevant to the varied stakeholders involved in education. However, an equally valuable perspective is offered through an examination of the attitude of students and teachers toward teacher read-aloud. In order to include both numeric and textual information, the study was designed with a mixed methodology approach. Based on Creswell's (2003) mixed methodology descriptions, the sequential explanatory design shown below gave priority for the quantitative data to be gathered and analyzed first, then qualitative collection and analysis culminated with a final synthesis of

the study. A slight adaptation of this model was necessary since the delayed posttest occurred after the qualitative data collection. The original and modified versions are shown in the following diagram (Figure 2).

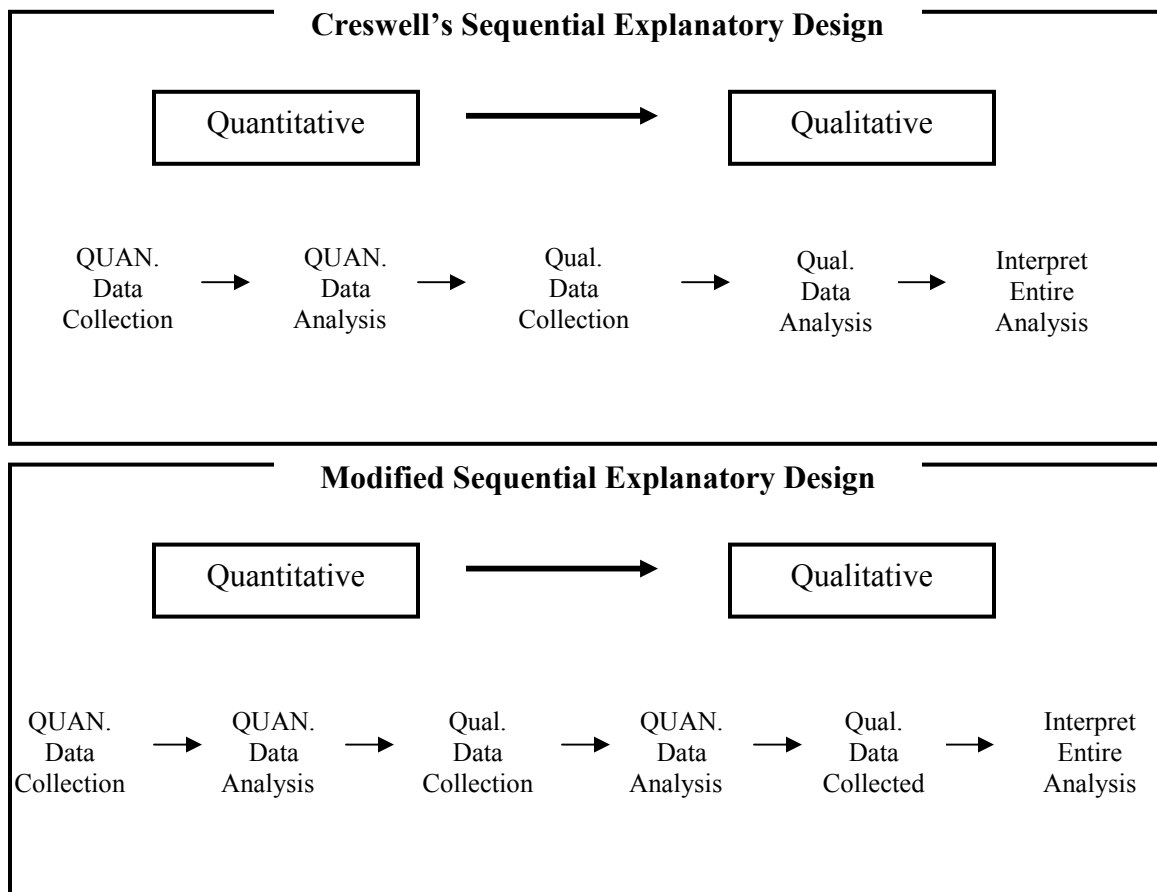


Figure 2. Mixed methodology designs

Quantitative Design

The quantitative part of the study was a quasi-experimental design since the school environment limited the use of randomly assigned participants. Gay and Airasian (2003) recommend a counterbalanced design when studying intact groups requiring more than one treatment. This allows the average performance of the groups on each treatment

to be calculated and compared. A counterbalanced design is structured so all groups receive both treatments but in a different order and so that content during each of the treatments will be different. Gay and Airasian's (2003) caution regarding a counterbalanced design is that one cannot teach the same geometric concepts using different treatments. In contrast, this study was well suited to a counterbalanced design because the content to be taught, although different, was judged by content experts to be similar in difficulty, length, and structure (e.g., presentation of content in the textbook). Participants were part of five self-contained classes of seventh and eighth grade science students taught by one instructor. In the randomly selected treatment classes, the science teacher orally read small sections of the lesson then stopped at predetermined points to take notes and discuss. Control classes read the same sections silently in five to ten minute segments, then stopped at the same predetermined points to take notes and discuss. Over the course of the research study, all students participated in control and treatment groups to counter-balance data collection and received the same content and instruction. Figure 3 illustrates the overall design of the study.

Teacher Read-aloud in Science: 7 - 8 weeks					
8th Unit -- Minerals 3 lessons 17 pages of text			8th Unit -- Rocks 4 lessons 19 pages of text		
8A (n = 17) Treatment Read-Aloud	8B (n = 16) Treatment Read-Aloud	8C (n = 13) Control Silent Reading	8A (n = 17) Control Silent Reading	8B (n = 16) Control Silent Reading	8C (n = 13) Treatment Read-Aloud
7th Unit – Cell Processes 3 lessons 18 pages of text			7th Unit – Cell Reproduction 3 lessons 17 pages of text		
7A (n = 19) Treatment Read-Aloud	7B (n = 15) Control Silent Reading		7A (n = 19) Control Silent Reading	7B (n = 15) Treatment Read-Aloud	

Figure 3. Design of study by group and treatment

Qualitative Design

Eight students were selected for individual interviews after completing the attitude survey. These individual case studies were bounded by reading achievement, attitude toward teacher read-aloud, grade, and gender (Merriam, 1998). The science teacher was also interviewed for another perspective on the value of a teacher read-aloud intervention. All interviews were conducted at the conclusion of the research study.

Procedures

The first phase of data collection began during the second full week of school in early September. All students were given the reading and vocabulary portions of the Stanford Achievement Test (SAT-9) in the regular reading class. This provided national percentile scores showing general reading achievement that were used in the final data analysis. During the same week the Institutional Review Board granted permission for

the involvement of human research subjects (refer to Appendix E). A copy of the approved student assent and parental consent letters appear in Appendix F. The school district and science teacher also agreed to participate in the research on teacher read-aloud (refer to Appendix G and H). The specific science units containing teacher read-aloud were scheduled to begin the first week of October.

The last three weeks of September were used for the final preparations needed to begin the research study. The researcher collected all student consent and parental assent forms in the reading classroom. While all students in both grades participated in the classroom activities, the only data included in the analyses for the study came from participants who chose to be involved through the signed consent and assent forms. No time during the research study was the science teacher given any knowledge of individual participants or SAT-9 reading scores.

During the same three-week time in September, teachers began a practice series for concept maps to familiarize all students with implementation and evaluation procedures in three different subject areas. The reading class was used for the initial experience and repeated exposure to concept map development. First, one reading class period was used to introduce and draw a concept map through group instruction. Two short sections of text were read orally; concept map and connecting nodes were suggested, discussed, and illustrated. A second session one week later used a different text to individually develop concept maps. Responses were evaluated by individual peers, small groups, and then analyzed as a class to develop a master map. A third reading class assigned students to independently read text and develop a concept map

from three specific prompts to be evaluated and assigned a score. After the third session, students appeared comfortable and familiar with concept maps as an evaluation tool.

Two other subject areas provided additional experience with concept map development after the first two sessions in reading. Examples from the reading concept maps were shared with participating instructors. The teachers used these as models for the lessons to develop science and social studies concept maps. All seventh and eighth grade students developed and evaluated concept maps in their science and social studies classes before or during the first week of the research study. Each student had a minimum of five class experiences in three different subjects with three separate instructors by the first week of the research study in the science classroom.

Two consecutive science units from the state-mandated Glencoe science text provided the required text for reading. The eighth grade *Earth Science* (2005) units were minerals and rocks; the seventh grade *Life Science* (2005) units were cell processes and cell reproduction. Each of the chapters were equivalent in content, vocabulary, text length, and time requirements. The science teacher and researcher developed concept map criterion and scoring templates; two content area specialists teaching at a local university assessed the master maps and determined they were conceptually sound, equivalent without content repetition, and appropriate for the grade levels and textbooks being used.

The research study began the first week of October. Before any reference to the unit or text, students were asked to draw a concept map over the upcoming topic to help show their background knowledge. As recommended by Gay and Airasian (2003) for counterbalancing, the science teacher began the first units with each grade after randomly

assigning classes as teacher read-aloud or silent reading. All classroom procedures, assignments, activities, time frame, and assessments throughout both units were exactly the same except for how the science text was read. The science teacher orally read small sections of the lesson to the treatment classes, stopping at predetermined points to take notes and discuss. The control classes read the same sections silently in five to ten minute segments, then stopped at the same predetermined points to take notes and discuss. The only differences in classroom procedures were from individual class needs and variance in the discussion responses. Each class unit contained some combination of note taking, vocabulary development, small group lab experiments, concept maps, and weekly quizzes over content. At the conclusion of the first unit, students were again given the same concept map prompt as a posttest. The initial section of study was concluded during the first week of November.

The second unit began the second week of November. The five classes traded their previous teacher read-aloud or silent format to allow for all participants to be part of both the control and treatment groups. The second unit began with a pretest concept map over the upcoming section and then progressed through the chapter in a similar format and structure as unit one. A final posttest was given to all the class groups during the last school week of December before the holiday break. When school resumed in January the science teacher returned to regular classroom curriculum and procedures.

Over the course of the study, the researcher observed two entire class sessions using teacher read-aloud. The first occurred with eighth graders during the minerals unit and the second was conducted with seventh graders studying cell reproduction. Three additional unannounced visits occurred randomly to compare silent and read-aloud

practices of the same lesson. Researcher observation confirmed the read-aloud practices followed the guidelines of the research study and represented high quality oral reading practices.

After the teacher read-aloud units were completed, all data were collected during other classes or breaks during the formal school time. The delayed posttest for unit one was given in reading class during the first week of January, allowing a minimum of four weeks since the completion of the first unit's posttest. The reading teacher administered the second delayed posttest for unit two during the last week of January, which also provided the same four-week wait time. Student participants each completed a total of six concept maps over the entire research study.

All seventh and eighth grade students completed the attitude survey in the middle of January. Based on responses, students were categorized as either liking or disliking teacher read-aloud in the science classroom. Students were selected for individual interviews that equally represented both seventh and eighth grade participants, positive and negative responses to teacher read-aloud, male or female, and high or low ability in reading.

Interviews were conducted in a secluded school setting and audiotaped for later transcription. All eight students were individually invited to participate and each one readily agreed to provide their perspective on the research. Every session began with a brief explanation about the purpose for the interview and students were encouraged to speak and replay a short conversation to make them more comfortable with the interview format. Participants were then asked the scripted questions in Appendix C. Any short or

unclear responses were prompted for additional explanations, examples, or rephrased for better understanding.

The teacher interview was conducted one week after the study units concluded. The interview questions in Appendix D provided the primary focus of the interview, with some expansions for additional explanations or clarifications to thoroughly understand the teacher's perspective on classroom read-aloud. This interview, like all student participants, was audiotaped and transcribed after all individual interviews were completed.

Data Analysis

The mixed methodology of this research study required analysis of both quantitative and qualitative data. All participants were assigned an identification number and names were removed from any data to maintain anonymity. Following Creswell's design, the quantitative analysis was the first area to be examined.

Quantitative Analysis

Three statistical analyses with SPSS were performed using the results from student concept maps, reading scores, and attitude surveys. The first analysis was a 2 x 3 repeated measures ANOVA with two levels of treatment (silent reading and teacher read-aloud) and three levels of testing (pretest, posttest, delayed posttest). Wilk's Lambda was the F test selected, and the probability level was set at .05. Second, a regression analysis was performed in which treatment, reading ability, and the interaction of treatment and ability were regressed on the individual posttest and delayed posttest concept maps (Figure 4). The third and final analysis was a correlation between student reading ability and student attitude towards teacher read-aloud.

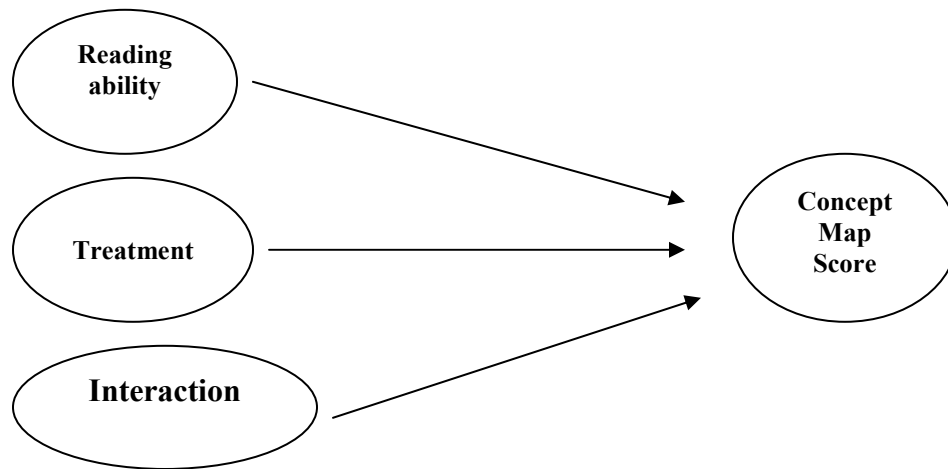


Figure 4. Multiple regression model

Data Transformation.

Quantitative results required the transformation of some data results prior to SPSS analysis. Each of the four concept maps had a different total number of correct responses so it was necessary to standardize the raw scores for comparison across the different units of study. According to Weinberg and Abramowitz (2002), a monotonic linear transformation retains the order of the data points and the relative distance between points in a distribution, as well as the shape of the original distribution, distance, and distribution of all data points. Since the shapes of distributions on concept map scores were not similar, translation rather than z-scores was selected as the appropriate transformation so that the relative meaning of an individual raw score within each distribution remained the same across all distributions. With this particular translation of scores a constant was added to every data value in the distribution prior to analysis, as shown in Table 1.

Table 1

Linear Transformation of Unit Scores

Grade	Unit	Total	Constant	Translation
8 th	Minerals	25		
8 th	Rocks	14	+11	25
7 th	Cell Processes	21	+4	25
7 th	Cell Reproduction	18	+7	25

This particular transformation resulted in all four concept maps being on the same metric for comparison (Weinberg & Abramowitz, 2002).

The attitude survey was used in order to explore the students' reactions to teacher read-aloud. The survey contained six items that specifically addressed the research intervention. Three of the questions framed teacher read-aloud in a positive manner so any agreement would infer a more positive view. The other three questions described teacher read-aloud as a negative strategy so that agreement would indicate some dissatisfaction. Using a Likert-type rating scale, the following numerical values were assigned to each response: 1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree. Weinberg and Abramowitz (2002) suggest the use of reflection as a linear transformation when changing scores that were low on the original scale to become high on a new scale. This process reversed the direction of scoring and shows negative attitude responses as a mirror image of the original score. After performing the linear transformation on the three negative statements, each student had a numerical total on

attitude questions. Scores ranged from six to twenty-four, with numbers below fifteen indicating a more favorite attitude toward teacher read-aloud and higher than fifteen showing greater dissatisfaction. Cronbach's alpha indicated .79 correlation showing internal consistency among the individual items evaluating student attitude toward teacher read-aloud.

Repeated Measures Analysis of Counterbalanced Design.

A repeated measures analysis allowed the examination of all the concept map scores of both the treatment and control groups. The seventh grade classes were equally divided into two equivalent groups that were randomly assigned by the school administration into two classes; however, concept map scores from the eighth grade participants required special consideration since classroom assignment was three separate groups. This meant a much larger proportion of eighth grade students, specifically two out of three complete classes, were receiving either the treatment or silent reading intervention during each unit. A counterbalanced design requires the number of groups be equal to the number of treatments (Gay and Airasian, 2003). Because of this, one intact class of eighth graders (Class 8B, c.f. Figure 3) was eliminated from this part of the analysis based on the random assignment of read-aloud or silent reading at the beginning of the study. Although only two eighth classes were needed for the counterbalanced design, the researcher decided a Hawthorne effect was less likely if all eighth grade sections received the two treatments.

According to Gay and Airasian (2003), the effectiveness of the treatments can be determined by calculating and comparing the average performance of each group on each treatment. A 2 x 3 repeated measure analysis of variance with simple contrasts was

performed for each grade. Figure 5 below depicts how each analysis was set up, with shaded areas representing teacher read-aloud treatment. Based on Gay and Airasian's explanation of a counterbalanced design, means for eighth grade teacher read-aloud and silent reading scores across the minerals and rocks concept maps were computed for the pretest, posttest, and delayed posttest conditions. The 2 x 3 analysis was then computed with treatment (two levels) and testing time (three levels) using the SPSS general linear model repeated measures ANOVA. A similar process was used for the seventh grade 2 x 3 repeated measures analysis of variance with simple contrasts.

Grade	Minerals				Rocks			
8 th A	T1	Pre	Post	Delay Pst	T2	Pre	Post	Delay Pst
8 th C	T2	Pre	Post	Delay Pst	T1	Pre	Post	Delay Pst
	Cell Structure				Cell Reproduction			
7 th A	T1	Pre	Post	Delay Pst	T2	Pre	Post	Delay Pst
7 th B	T2	Pre	Post	Delay Pst	T1	Pre	Post	Delay Pst

Figure 5. Counterbalanced read-aloud treatment and implementation

Regression.

Regression was used to test the interaction of treatment and reading ability. Because the cells for a factorial design with treatment (two levels) and reading ability (two levels) were not balanced, a regression analysis was an appropriate method to examine the treatment effects. All seventh and eighth grade groups receiving the read-aloud intervention were collapsed into one group. This combination provided four separate regressions in which treatment, reading ability, and the interaction of treatment and reading ability were regressed on the concept maps for mineral and cell structure combined and rocks and cell reproduction combined at the posttest and delayed posttest times. The four multiple regression models are as follows:

1. Posttest concept map (minerals/cell structures) = reading ability + treatment + reading ability X treatment
2. Delayed posttest concept (minerals/cell structures) = reading ability + treatment + reading ability x treatment
3. Posttest concept map (rocks/cell reproduction) = reading ability + treatment + reading ability X treatment
4. Delayed posttest concept map (rocks/cell reproduction) = reading ability + treatment + reading X treatment

The regressions were performed using SPSS linear regressions based on procedures recommended in Weinberg and Abramowitz (2002). Because treatment was a dichotomous variable with a value of zero or one, the reading ability variable was centered to have a mean of zero. According to Weinberg and Abramowitz (2002) centering the mean of reading ability to zero put the variable on a scale that resulted in a meaningful quantity for interpretation purposes. The centering was accomplished through the linear transformation process of translation by subtracting the mean of reading ability from each student's reading ability score. The interaction of reading ability and treatment was computed using the SPSS compute command to form the product of the values of the reading ability transformed variable and the treatment variable (Weinberg & Abramowitz, 2002).

Correlation.

An important component of the research was comparing individual reading ability with their attitude toward teacher read-aloud. A SPSS correlation analyzed the degree of

relationship between these two variables for all research participants. A scatterplot was developed to describe the relationship.

Qualitative Analysis

The science instructor's overall perspective on the research project was the first component of qualitative analysis. This interview was conducted during the first week after all intervention and testing phases were complete. The teacher understood the two guiding research questions throughout the study and participated with scoring and evaluation of student learning. The interview was transcribed and any researcher observations were noted on the transcription. After rereading and grouping comments by similarity, the transcription was color-coded by groups and showed three general themes. This initial analysis was temporarily suspended for later comparison with student interview results.

Student selection for interviews was based on grade, gender, reading ability, and attitude toward teacher read-aloud. Students were assigned a pseudonym and transcription occurred after all interviews were complete. Based on Merriam's (1998) procedures for case studies, analysis began by taking notes to look for potential themes in the first interview conducted. Next, a separate list of themes was compiled for the second interview. These two lists were compared and a shorter group of categories began to emerge. This master list was used to initially analyze the remaining six interviews. Any additional categories were added and four mutually exclusive categories were established and named.

Interview transcripts were then color coded by the four broad topics and three subcategories that directly related to the research questions. An additional document

combined all student statements compiled by categories to propose general trends or themes. The last analysis compared the four student categories with the three teacher themes. This provided an overall holistic description and analysis of both student and teacher perspectives toward teacher read-aloud.

CHAPTER 4

Results

The purpose of this study was to examine the effect of teacher read-aloud with adolescents in a science classroom. Because of the varied reading abilities typically found in adolescent classrooms, it was hypothesized that teacher read-aloud would be an appropriate strategy to aid in student learning. The research questions for the study were:

1. Does teacher read-aloud have an impact on student learning of science content?
2. How does the impact of teacher read-aloud vary when accounting for individual reading ability?

The chapter has been organized to answer each question using both quantitative and qualitative results.

Teacher Read-aloud and Student Learning

Quantitative Results

The first statistical model used to examine the impact teacher read-aloud had on student learning was a 2 x 3 repeated measures analysis of variance with simple contrasts. The dependent variable was concept map scores administered at three points in time. The treatment variable was either teacher read-aloud or silent reading of text. This was a fully-crossed, counterbalanced design. Each participant received all possible levels of instruction (teacher read-aloud and silent reading) across all testing times (pretest, posttest, and delayed posttest). Separate analyses were performed at each grade level. Means and standard deviations found are reported in Table 2.

Table 2

Group Means and Standard Deviations for Counterbalanced Concept Maps

Treatment	Pretest Means	SD	Posttest Means	SD	Delayed Post Means	SD
7 th Teacher Read-aloud	5.35	1.50	23.32	3.33	12.24	5.92
7 th Silent Reading	5.82	1.71	23.29	2.69	11.15	7.08
8 th Teacher Read-aloud	5.93	5.13	24.17	1.68	13.80	6.34
8 th Silent Reading	7.33	4.70	24.03	1.50	14.63	6.92

Note: A one-way ANOVA on the pretest means showed no significant difference between 7th grade pretest means or between 8th grade pretest means.

A comparison of the means showed that all four groups had similar gains from the pretests to the posttests. The four groups also demonstrated a similar decline and average for the delayed posttests. The 7th grade teacher read-aloud group's mean (12.24) was higher than the silent reading group (11.15), however this was not significant. This was contrasted by the 8th grade silent reading group's mean (14.63) being higher than the teacher read-aloud mean (13.80), although again the difference was not significant.

The 2 x 3 repeated measures analysis of variance examined the effect of treatment, test, and the interaction of treatment and testing time. Mauchly's Test was not significant indicating sphericity was acceptable. As shown in Table 3, these results indicated a significant main effect for seventh grade tests ($F(2, 66) = 357.267, p = .000$) and eighth grade tests ($F(2, 58) = 1071.115, p = .000$) over time. This suggests that both teacher read-aloud and silent reading of texts are equally effective methods for student learning in this specific sample. There was no significant difference on the treatment at

either grade level, and the treatment by test interaction was not significant at either grade. Neither treatment was favored based on the results of the repeated measures analysis.

Post hoc analysis used a simple contrast to determine where the differences were across time. At each grade level and for each treatment, there was a significant difference ($p = .000$) between the pretest and posttest, posttest and delayed posttest, and pretest and delayed posttest. For both grade levels regardless of treatment, the pattern indicated students achieved the highest learning levels on the posttest and declined in overall retention on the delayed posttests. As one would expect, students maintained a portion of the earlier learning on the delayed posttest assessment.

Table 3

Treatment, Test, and Interaction Analysis of Variance for 7th and 8th grades

7th Grade

Source	df	SS	MS	F	Sig.
Treatment	1	2.373	2.373	.081	.778
Error	33	968.627	29.352		
Test	2	11021.324	5510.662	357.267	.000
Error	66	1018.010	15.424		
Interaction	2	21.539	10.770	.809	.450
Error	66	878.461	13.310		

8th Grade

Source	df	SS	MS	F	Sig.
Treatment	1	22.050	22.050	.310	.582
Error	29	2062.783	71.130		
Test	2	9205.433	4602.717	1071.115	.000
Error	58	249.233	4.297		
Interaction	2	18.033	9.017	.338	.715
Error	58	1548.633	26.701		

Qualitative Results

In order to understand some of the attitudes these students have toward teacher read-aloud, eight students were interviewed who represented some viewpoints of all 80 participants. Students were considered for interviews if their reading score was below the 40th percentile or above the 60th percentile. Seventeen of the eighty participants could be classified as neutral or disliking teacher read-aloud; this represented 22 percent of the total population in the research. To maintain an equivalent percentage in interviews, two participants were chosen who disliked teacher read-aloud and the other six showed a favorable attitude toward the intervention. Final selections for interviews were based on equal number of boys and girls, seventh and eighth graders, and high or low reading ability. Any students asked for an individual interview had signed consent and assent forms specifically giving permission for audiotaped documentation. Table 4 shows the pseudonyms and descriptions for each participant.

Table 4

Interview Participants

<i>Name</i>	<i>Grade</i>	<i>Gender</i>	<i>Reading Ability</i>	<i>Read-aloud Attitude</i>
Nicole	7 th	Female	High	Like
CJ	7 th	Male	High	Dislike
Kathryn	7 th	Female	Low	Like
Kyle	7 th	Male	Low	Like
Chris	8 th	Male	High	Like
Laurie	8 th	Female	High	Dislike
Jackie	8 th	Female	Low	Like
Wayne	8 th	Male	Low	Like

The following brief profiles were developed from what students said and did during the interview session, their responses on the attitude survey, and my additional observations during the research process.

Nicole was a highly motivated 7th grader who openly liked school and reading. Nicole represented the perspective of one with high reading ability who enthusiastically liked teacher read-aloud. She described herself as always being an advanced reader and typically chose reading as a favorite entertaining activity. Nicole offered two reasons for liking teacher read-aloud in almost any classroom situation. First, she realized she was a very fast reader and often skipped over important details. She did not mind having read the text independently and hearing it again from the teacher because she felt it improved her grades in science. Second, Nicole felt the teacher read-aloud helped in her difficult subject areas. She was confident her grades had improved, liked knowing how to pronounce new vocabulary words, and felt the oral presentation was very helpful. She also acknowledged she was able to tune out the teacher's voice if she wanted to move faster in the reading material, so a read-aloud did not distract from her concentration.

C.J., another high reading ability seventh grader, offered a completely opposite perspective on teacher read-aloud. C.J., like Nicole, described himself as a very good reader and said he read "a lot, anytime I can." He had just completed book 38 in a series of 52 and said he was "hooked" on them and planned to read every one. However, C.J. was very critical of teacher read-aloud and felt it limited his comprehension. The teacher's pace was much slower than C.J. could read and it slowed him down because he would rather read by himself. He also became frustrated when he moved ahead of the teacher and the class would be "reading something totally different and just mess me up."

C.J. felt the only way he could enjoy and learn from teacher read-aloud would be to not see the text and only listen.

Kathryn described herself as “not the best reader but I’m sure not the worst.” While her seventh grade reading scores for this research placed her as one with lower ability, Kathryn said she liked to read as long as it wasn’t a really hard book. Kathryn liked the teacher read-aloud because she felt it made things easier to remember and knew she sometimes skipped over important facts. Kathryn also liked the teacher reading small amounts of text then stopping to discuss or explain. She felt a read-aloud could be overused and commented that teachers sometimes “go too slow and it makes people kind of go into a daze; I’ve seen a lot of people do that.” Kathryn’s overall attitude, however, was strongly in support of teacher read-aloud, especially if students who disliked the strategy could go at their own speed.

Kyle was the last seventh grader interviewed and his interview provided perspectives from one with a lower reading ability. Kyle described his reading ability as “a little bit good.” He realized he was capable of understanding written text, but was also very aware that he had difficulty pronouncing words since it required frequent stops to figure out words. Kyle also mentioned he had to read any text several times because he didn’t usually remember what he just read. The read-aloud in science was very helpful because the vocabulary words were “long and hard to pronounce and would take me a long time; I would hold up the class a little bit.” Kyle felt the teacher reading was faster, easier to understand, and basically simplified everything for him. As our discussion moved to other subjects and classes, Kyle was unable to think of any situation where he wouldn’t prefer to have the teacher reading out loud.

The first eighth grade interview involved Chris, another very motivated student who was a high-ability reader. Chris enthusiastically described his reading strengths and stated he prefers challenging books with new vocabulary words. Chris was one of several good readers who favored the teacher read-aloud in any subject. He felt it helped him learn how to pronounce new words, improved his comprehension, and liked “reading and hearing it at the same time, it just helps me remember it better.” Like some other students, Chris felt the teacher’s reading of text and follow-up discussion helped point out details he might have missed. The only potential drawback Chris mentioned for a read-aloud strategy would be his own inability to keep up with the class, specifically falling behind in listening and processing information. He described this situation as “the worst thing because it would be difficult to catch up if they’re reading on something else and I’m trying to catch up on my own.” Since Chris was a very high-achieving student, his concern shows the importance he places on performing successfully in a classroom.

Laurie, another high reading-ability eighth grader, offered perspectives very similar to C.J. from seventh grade. Laurie acknowledged she was a good reader, enjoyed reading as entertainment, and was capable of working with challenging texts. She stated emphatically that teacher read-aloud “doesn’t help at all. I’m a kind of person who doesn’t pay attention very well unless I’m the one doing it; I think I do better when I’m reading.” Laurie laughingly admitted she would try and stay with the teacher, but tended to read at her own pace and block out the teacher’s voice. Since the speed of teacher read-aloud was much slower than her individual reading speed, Laurie suggested students should have an option to go ahead on their own if they chose.

Jackie's personal description of her reading struggles matched her lower reading scores. She realized she was slower than other students and required multiple readings to independently understand any book. Jackie was confident that she could figure out any new word but needed time to process the information. Jackie very enthusiastically supported teacher read-aloud since she "could comprehend it [better], because after the reading Mr. B would back it up with an example." She felt she did not have to reread the text because it was easier for her to understand. Jackie's personal reading included listening to books on tape because it was easier and more enjoyable. The only difficulty with teacher read-aloud was her inability to tune out the teacher's voice because "if there's something going on, I have to listen."

The last interview was with Wayne, a quiet eighth grade boy who struggled with reading. Wayne was pleased to participate in a conversation, but very reserved in his responses. He did not find reading an enjoyable activity under any circumstance. Figuring words out was always difficult "cause a lot of times the words are confusing and I get the words mixed up and sometimes I don't even know what the words are." Wayne liked teacher read-aloud because it "got the message across clearer, it seems like it is more detailed when he [teacher] reads it." He felt hearing the text made it easier to complete any assignment on his own. When asked if he could think of any drawbacks to teacher read-aloud or possible time limits, he quickly shook his head no and added, "You could do it as long as you feel like you want to, or as long as you need to." Wayne would never choose to read the material on his own if he had an option.

Student Perspectives

To summarize how teacher read-aloud affects student learning, there were three recurring themes from the interviews showing a value for this strategy. First, teacher read-aloud can help when students are learning new or challenging vocabulary words. Students felt they learned new words more easily and were assisted by hearing the pronunciations. It also was helpful for lower ability readers to have all the text read to them. Two students commented specifically on feeling relieved they were not holding up the class to figure out all the words and found they could understand a subject more easily. A second advantage was the accompanying discussions and explanations. Students liked hearing small amounts of text, having the teacher stop for questions or explanations, and giving an example if appropriate. A third supporting idea was the opportunity to get details. Two high ability students mentioned this as an advantage because their fast reading rate sometimes caused them to miss important information. Other slower readers felt when they were given the oral reading scaffold, they were more likely to understand, remember the concept, and retain more specific information. The simple statement, “I just like it” was expressed at some point during the interviews with all six students favoring teacher read-aloud.

One very specific theme addressed the way that teacher read-aloud did not improve student learning. Both high ability students disliking the intervention offered the exact same reason for their dissatisfaction with this research: their reading speed was much faster than the rate of oral reading. It was very frustrating to them to be held back and they strongly preferred being able to go ahead at their usual pace. It was described as both distracting and frustrating; Laurie felt she lost ownership of her learning and did not

do as well. Both students acknowledged they were capable of tuning out the teacher's voice, but felt obligated to follow along in case they were required to actively participate.

Teacher Perspective

The interview with Mr. B, the science teacher participating in the research project, addressed the subject of student learning from an instructional viewpoint. Mr. B admitted he felt more control when reading to the students because he could make certain the students were attending to the text. The silent reading treatment left him feeling uncertain about the level of student comprehension as they moved through a lesson. As one who had not previously used teacher read-aloud, Mr. B felt there was good attention from the students when he read, a high level of participation from students of all ability levels, and the reading provided a good way to introduce difficult vocabulary and concepts. Even before the testing sessions were completed, anecdotal notes showed Mr. B had predicted teacher read-aloud would not make a big difference in actual student learning. His primary support for the strategy was being able to provide the extra help for students who had difficulty reading or trouble attending to complex texts.

Mr. B's experience with the read-aloud treatment included his own observations of factors that improved the quality of the classroom reading sessions. One important awareness he discovered was building up his ability to read aloud comfortably over several class sessions during one day. Mr. B compared the process to the readjustment of full day teaching every August stating, "You know how we have to work back up to having teaching endurance every single year? I think a teacher would have to get into practice first so their voice would last." He went on to say he could tell his voice got

stronger as the study progressed and the oral reading was not especially tiring after the first two weeks.

Mr. B felt other factors were important for a teacher to consider when reading aloud to adolescents. Most important was the teacher's own attitude and preparation toward the practice. He felt his enthusiasm, buy-in of the strategy, and familiarity with text were all very essential for student success. He found it might be best "to pick out selected things . . . cause if you don't like the chapter it might not be worth it." Mr. B believed he had a big responsibility to be prepared and positive, and those two components increased his comfort level with the read-aloud sessions.

A second factor addressed realistic implementation of teacher read-aloud. The students responded most favorably to shorter sections of text combined with regular stops for questions and discussion. Mr. B's perspective reflected the need for novelty and stressed "you wouldn't want to use teacher read-aloud every day; it just won't be special to them." He felt the change in class structure was appealing to middle school students. Mr. B elaborated on this idea saying, "I know there were kids that enjoyed it more than us just doing the same old thing. Cause this age thrives on variety too much. They see video stuff all the time, they hear things, they get things visually; I think anything we can do to change it up enhances what we can get across." His only suggestion for future sessions to help student learning would be "to bring students up into a circle" to allow for comfort and closer proximity during the reading. Overall, Mr. B concluded the involvement and participation of students supported his belief in the value of teacher read-aloud.

Teacher Read-aloud and Individual Reading Ability

Quantitative Results

Multiple regression analysis was used to investigate the impact of teacher read-aloud when accounting for individual reading ability. Posttest and delayed posttest scores of all participants were the dependent variables for regression models using reading ability, treatment, and the interaction of reading ability and treatment as the independent variables. Four multiple regression analyses were computed. The four models were as follows:

1. Reading ability + treatment + reading ability X treatment regressed on the dependent variable of posttest concept map (minerals/cell structures)
2. Reading ability + treatment + reading ability X treatment regressed on the dependent variable of delayed posttest concept map (minerals/cell structures)
3. Reading ability + treatment + reading ability X treatment regressed on the dependent variable of posttest concept map (rocks/cell reproduction)
4. Reading ability + treatment + reading ability X treatment regressed on the dependent variable of delayed posttest concept map (rocks/cell reproduction)

Tables 5-8 summarize each model.

Table 5

Regression—Model One

Model One

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.325	.106	.071	2.616

ANOVA

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	61.618	3	20.539	3.000	.036
Residual	520.270	76	6.846		
Total	581.888	79			

Coefficients

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	23.320	.505		46.138	.000
Treatment	.449	.623	.079	.719	.474
Read Abil.	.000	.022	.003	.017	.986
Product	.044	.027	.318	1.657	.102

Table 6

Regression—Model Two

Model Two

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.485	.235	.205	4.40494

ANOVA

Model 2	Sum of Squares	df	Mean Square	F	Sig.
Regression	453.283	3	151.094	7.787	.000
Residual	1474.667	76	19.404		
Total	1927.950	79			

Coefficients

Model 2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7.102	.851		8.346	.000
Treatment	1.803	1.050	.175	1.718	.090
Read Abil.	-.036	.037	-.176	-.981	.330
Product	.149	.045	.590	3.325	.001

Table 7

Regression—Model Three

Model Three

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.163	.027	-.012	2.38728

ANOVA

Model 3	Sum of Squares	df	Mean Square	F	Sig.
Regression	11.857	3	3.952	.693	.559
Residual	433.131	76	5.699		
Total	444.987	79			

Coefficients

Model 3	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	23.331	.461		50.591	.000
Treatment	.440	.569	.089	.774	.442
Read Abil.	.013	.020	.131	.647	.519
Product	.003	.024	.022	.112	.911

Table 8

Regression—Model Four

Model Four

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
4	.154	.024	-.015	5.31205

ANOVA

Model 4	Sum of Squares	df	Mean Square	F	Sig.
Regression	51.926	3	17.309	.613	.608
Residual	2144.562	76	28.218		
Total	2196.488	79			

Coefficients

Model 4	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	16.523	1.026		16.102	.000
Treatment	1.205	1.266	.110	.952	.344
Read Abil.	-.035	.045	-.158	-.781	.437
Product	.042	.054	.154	.767	.446

Because the purpose of this analysis was to examine the relationship between reading ability and the treatment (teacher read-aloud or silent reading), statistics of importance were a significant F for the overall model in the ANOVA table, and a significant b-weight for the ability by treatment interaction variable (referred to as Product) in the coefficients table. Model 2 met these criteria. This model explained 23.5

percent of the variance in the scores on the delayed posttest scores for minerals/cell structures as shown in Figure 6, and had a significant b-weight of .149.

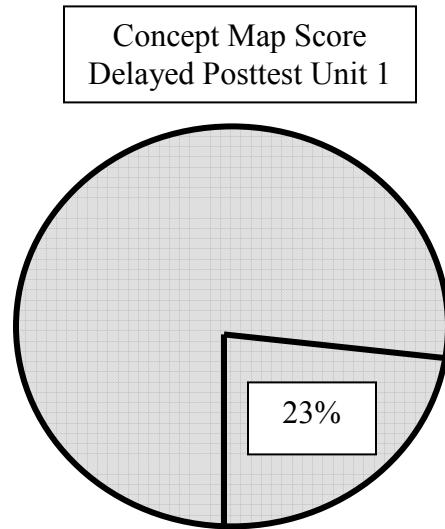


Figure 6. Percent of variance accounted for by reading ability, treatment, and interaction of reading ability and treatment

In order to assess the importance of the interaction variable in the equation, hierarchical analyses were conducted using blocks. A regression analysis was run using the main effect variables as the first block, i.e., treatment and reading ability. Subsequently a second block, interaction of treatment and reading ability, was entered into the model. The results are reported in Table 9 below. This hierarchical analysis indicates that the interaction of treatment and reading ability explains 11 percent of the variance in delayed posttest scores for minerals/cell structures over and above the percentage of variance explained by the main effect variables.

Table 9

Hierarchical Regression Analysis

Model 1 – Treatment and Reading Ability

Model 2 – Interaction of Treatment and Reading Ability

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df 1	df 2	Sig. F Change
1	.352	.124	.101	4.6837	.124	5.442	2	77	.006
2	.485	.235	.205	4.4049	.111	11.055	1	76	.001

Procedures outlined in Weinberg and Abramowitz (2002) were followed to interpret the meaning of the significant interaction. The relationship between reading ability scores and delayed posttest scores is not constant for silent reading and teacher read-aloud; rather it varied as a function of the treatment. Because the relationship is different for silent reading and teacher read-aloud in the population, two separate regression equations, one for each treatment were created using the b-weights for each variable, including the constant, in the regression model. The steps in the creation of these separate regression equations appear below.

To find the regression equation for silent reading, “Treatment = zero” was substituted into the following equation, and then by employing algebraic processes the equation was reduced to its simplest form.

$$\begin{aligned} \text{Delayed posttest for minerals/cell structures} = & -.036(\text{reading ability}) + \\ & 1.803(\text{treatment, which is zero}) + .149(\text{interaction, reading ability X treatment which} \\ & \text{again is zero}) + 7.102 \end{aligned}$$

$$\text{Delayed posttest for minerals/cell structures} = -.036(\text{reading ability}) + 0 + 0 + 7.102$$

$$\text{Delayed posttest for minerals/cell structures} = -.036(\text{reading ability}) + 7.102$$

The exact process was used to find the regression equation for teacher read-aloud, but with treatment equal to one substituted into the equation.

$$\begin{aligned} \text{Delayed posttest for minerals/cell structures} = & -.036(\text{reading ability}) + \\ & 1.803(\text{treatment, which is one}) + .149(\text{interaction, reading ability X treatment which} \\ & \text{again is one}) + 7.102 \end{aligned}$$

$$\begin{aligned} \text{Delayed posttest for minerals/cell structures} = & -.036(\text{reading ability}) + 1.083 + \\ & .149(\text{reading ability X } 1) + 7.102 \end{aligned}$$

$$\text{Delayed posttest for minerals/cell structures} = -.036(\text{reading ability}) + .149(\text{reading ability}) + 1.083 + 7.102$$

$$\text{Delayed posttest for minerals/cell structures} = (-.036 + .149)(\text{reading ability}) + 8.185$$

$$\text{Delayed posttest for minerals/cell structures} = (.113)(\text{reading ability}) + 8.185$$

For silent reading every one percentile point increase in reading ability is associated with a .036 decrease in delayed posttest, whereas for teacher read-aloud every one percentile point increase in reading ability is associated with a .113 increase in delayed posttest. The statistical significance of the interaction term tells us that these two slopes are significantly different, and suggests that as reading ability increases, students gain more from the teacher read-aloud procedure. The interaction is plotted in Figure 7 below. This figure was constructed using a composite of two scatterplots of delayed posttest for minerals/cell structures by reading ability.

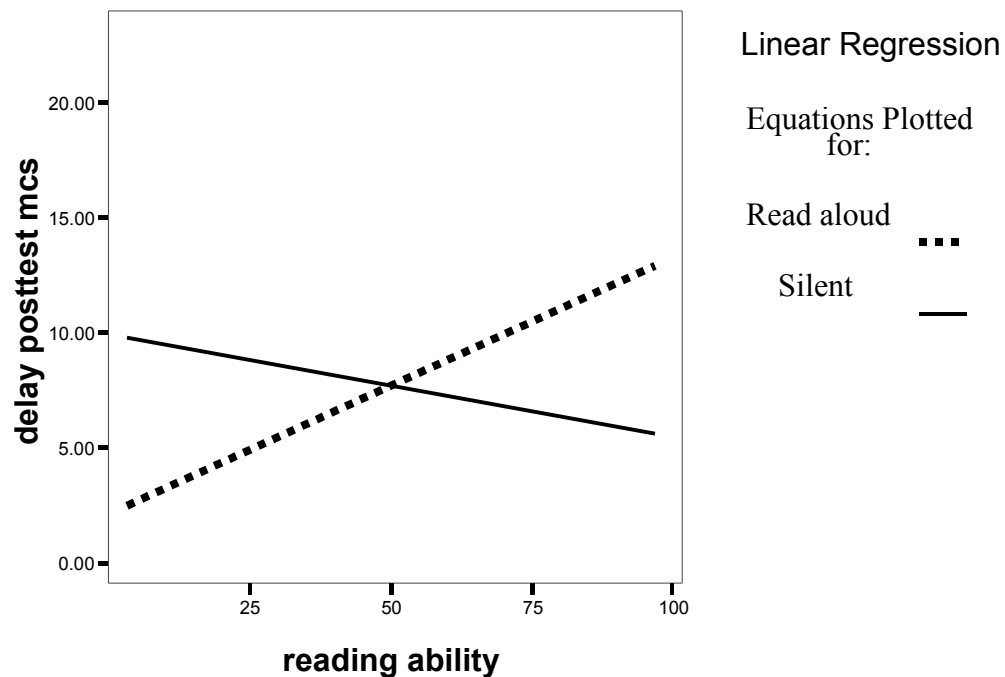


Figure 7. Linear regression equations plotted for the interaction of reading ability and delayed posttest scores on minerals/cell structures for teacher read-aloud and silent treatments

In order to examine the relationship between ability and attitude, a correlation between the reading ability scores and the attitude survey scores was obtained. In addition, a scatterplot was created to illustrate the relationship between reading ability and attitude towards teacher read-aloud, and this scatterplot was used to triangulate with data from the student interviews. Although the correlation of .263 is significant, it is also weak; however the shape of the distribution as illustrated in the scatterplot reveals interesting information about the relationship between these two variables. Reading ability is plotted on the Y-axis; attitude towards teacher read-aloud is plotted along the X-axis with lower attitude scores indicating liking teacher read-aloud and higher scores

indicating dislike of teacher read-aloud. This scatterplot appears in Figure 8 below. With 15 as a middle score reflecting neutrality, the majority of participants fell within the category of liking some aspect of teacher read-aloud. Note that the lower, right quadrant is empty of cases. This illustrates that none of the students with reading scores below the 50th percentile had a dislike of the oral reading treatment.

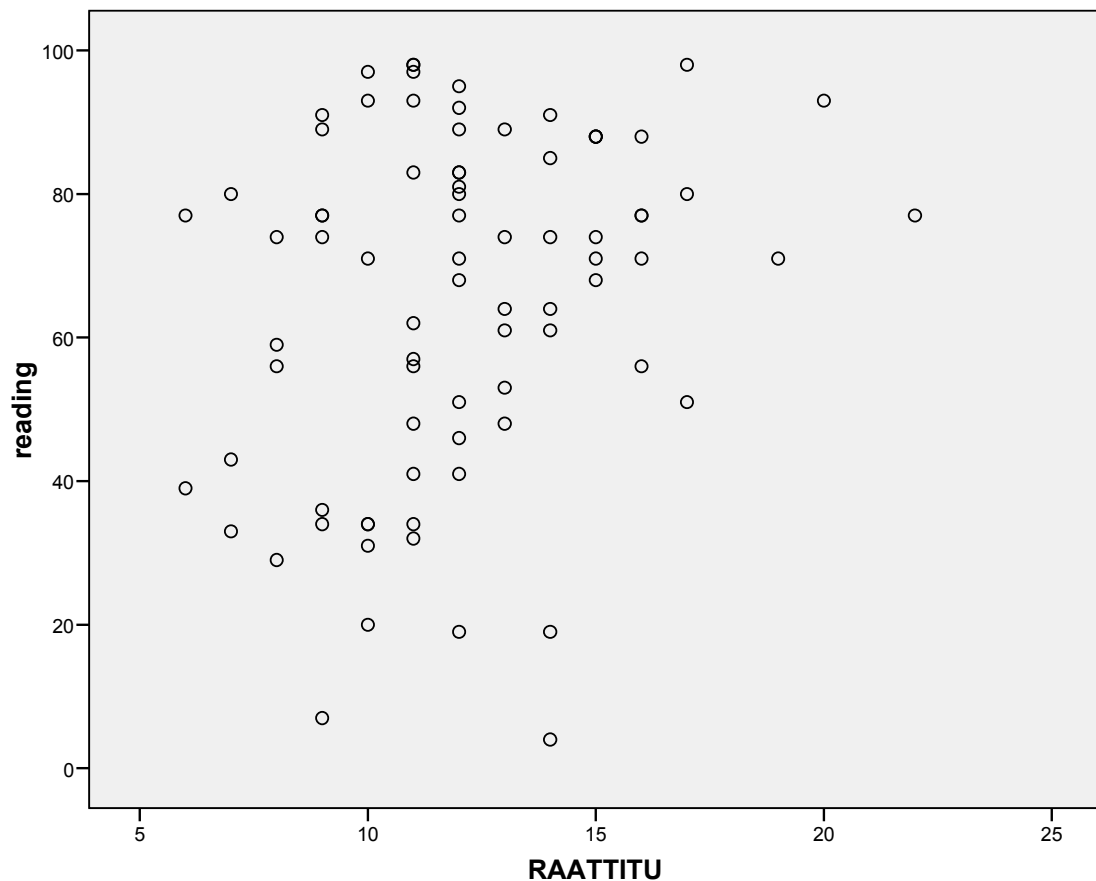


Figure 8. Scatterplot of correlation between reading ability and attitude toward teacher read-aloud

Qualitative Results

Student Perspectives

The students participating in interviews were all very aware of their individual strengths and weaknesses. Without exception, the student's own perspective accurately reflected the researcher's classroom observations. The four lower ability readers felt the teacher read-aloud was an important help in school success, particularly when learning new material. The reasons varied some over the four interviews, but all felt it led to better understanding and recall. Kyle commented on the value of hearing and seeing the text simultaneously. Wayne believed it was easier to find answers for assignments after he heard it read aloud and added that he felt he made better grades. Both Wayne and Kyle said reading independently was much slower and they were likely to miss something important. Jackie and Kathryn both liked the opportunity to stop, ask questions, and discuss; the text and accompanying talk provided a repetition that helped them understand.

There were no students with lower reading ability who ranked as having an overall negative attitude toward teacher read-aloud. When asked for ways to improve the strategy, they suggested a good reading rate, strong voice, and not overusing the method. Kathryn and Jackie also wanted the teacher to realize that some people might rather read at their own speed. Both girls liked the freedom of having the help if they needed it, but not being forced to if they didn't. Wayne and Kyle, who both faced the biggest challenges as readers, felt the teacher reading was always a helpful choice for them.

The higher ability students who liked the read-aloud offered the same reason for favoring the strategy. With a fast reading speed, Chris and Nicole felt they skipped

details and the read-aloud helped them pick up on things they missed reading independently. Nicole specifically said her grades improved during the read-aloud treatment. Chris didn't mention grades, but felt he just did better because it was "an extra little help." He knew he could do it on his own, but preferred having Mr. B read aloud. Chris, like Kyle, said he remembered more when he was hearing and seeing text at the same time.

While all four higher ability readers acknowledged their individual reading speed was much faster than the teacher's oral reading rate, their response to the difference fit into two categories. As mentioned earlier, C.J. and Laurie both strongly disliked being held to a slower pace and felt it limited their learning. In contrast, both Chris and Nicole felt the slower pace helped them attend to details and gain a better understanding of the text. The higher ability readers were more varied in their opinion of teacher read-aloud and could not be described as having one unified perspective toward the intervention.

The advanced reader's suggestions for successful teacher read-aloud were similar to ones from the less fluent readers. The four students collectively mentioned expression and volume as important. Laurie was the only one who realized the teacher might have trouble with the vocabulary and laughingly acknowledged, "If words were mispronounced, I wouldn't really care because I probably wouldn't know how to pronounce them myself." She went on to say it was helpful for teachers to read directions aloud and could name specific times when that had been beneficial. C.J. suggested he would do best with teacher read-aloud if he couldn't see the text. He was more likely to listen in that situation; being given his own copy of any book was "irresistible" to avoid reading on his own. Both Nicole and Laurie affirm the earlier

observation of flexibility for individual preferences. They liked having an opportunity to move away from the oral reading and work on their own if they felt it best, especially if read-aloud was a frequently used practice. All four of these students were capable of tuning out the teacher's voice if they chose or were given the opportunity.

Teacher Perspective

As previously mentioned, Mr. B felt all the students were involved with the teacher read-aloud and the accompanying discussions. He was unable to pick out any high or low ability students who seemed disengaged or unwilling to participate. This perspective was confirmed when we shared student interview results and he was completely unaware of C.J. and Laurie's frustrations or the other six students support of teacher read-aloud. Mr. B believed this school's climate was one highly motivated by good grades and recognized the students were often reluctant to go against an authority figure and jeopardize their standing with the teacher.

Mr. B's 30+ years as a classroom teacher helped guide his methods when implementing teacher read-aloud. His choice to read small portions of text "was a hangover of what had worked for me before." Two classroom observations confirmed he was a fluent, confident reader and each of his read-aloud sessions included short sections of text with note taking, discussion, and a brief accompanying activity. His awareness of the adolescent need for variety and novelty addressed the wide variety of learning styles and abilities typically found in his science classes. When asked if the research project was worth the trouble, he responded, "Absolutely! If nothing else for showing me one more tool that I could put in my arsenal of teaching that you can actually point to." The

responses suggest an appropriately implemented teacher read-aloud is one way of addressing individual differences within a larger classroom environment.

Summary of Results

The examination of teacher read-aloud on adolescent learning addressed the two areas of student knowledge acquisition in science and the impact of individual reading ability. The two grade level comparisons had similar results on the pretest, posttest, and delayed posttest measures. Repeated measures analyses showed both silent reading and teacher read-aloud as equally effective methods for adolescent learning. Interviews with both high and lower ability students indicated teacher read-aloud can be valuable in acquisition of new vocabulary, accompanying meaningful discussions, and opportunities to discern important details. Teacher read-aloud frustrated some higher ability readers because it required a much slower reading rate and did not improve learning. The teacher interview supported the strategy and offered suggestions for improved read-aloud sessions.

The second research question looked at teacher read-aloud and its impact on students with high or low reading ability. Regression analyses showed the read-aloud treatment was the most beneficial for high ability readers. A correlation comparing student reading ability and their attitude toward teacher read-aloud although weak was significant. Seventy-eight percent of participants had a favorable attitude toward the oral reading intervention. A scatterplot of the correlation indicated no students below the 50th percentile disliked the teacher read-aloud procedures. Individual interviews with lower ability students confirmed this teaching strategy as helpful for their learning. High ability students were equally split on the value of teacher read-aloud. All students and teacher

interviews agreed that a teacher read-aloud could be helpful in some middle school classrooms when implemented as a high-quality read-aloud flexible to student needs.

CHAPTER 5

Summary

The purpose of this study was to examine the effect of teacher read-aloud on adolescent learning in a science class. The science teacher provided oral reading of all required science text to all seventh and eighth grade students during one complete unit of study. An exploration of student learning along with student and teacher attitudes toward the strategy helped determine the impact of this reading strategy for middle school learners.

Method

Participants

This study focused on seventh and eighth grade students at one suburban school site outside a large metropolitan city. All 80 participants were part of the science classes taught by one instructor over a ten-week instructional period. Sixty-three of those providing results were Caucasian, six qualified for free or reduced lunch, and six had an Individual Education Plan. Looking specifically at numbers by grade level, the study contained 46 eighth grade participants and 34 seventh graders. All students participated in the planned units and activities, but only data from students with signed parental consent and student assent forms were used in the final analysis.

Materials

Two consecutive science units for each grade were selected from the state-selected science texts. All of the chapters were equivalent in content, vocabulary, text length, and time requirements. The classroom information, written text, activities, and

assessments were based on the content from the science textbook and the instructor's curriculum goals.

Measurement Instruments

The reading portion of the Stanford Achievement Test, Ninth Edition was administered to all students early in the school year. The total reading score was based on the combined reading and vocabulary subtests. This provided a national percentile ranking for each student before the research study began.

A concept map was developed for each of the two units in seventh and eighth grades. Students were given the topic prompts and categories for every concept map test. Group testing included a pre-test at the beginning of the unit, a post-test at the unit's conclusion, and a delayed post-test one month later. This process was repeated for both units of study. The concept map tests measured short-term and long-term learning over the course of the research study. Interrater reliability was determined for this instrument by measuring the proportion of agreements with opportunities for agreements. After converting that figure to a percentage scale, there was an 83 percent agreement between the two raters.

After completing both science units, all students completed a ten-question attitude survey with four response options varying from "strongly agree" to strongly disagree." A reading attitude score was based on the six questions concerning the teacher read-aloud by transforming the scores from three negative statements to correspond with scores from three positive statements.

Face-to-face interviews using open-ended questions were conducted with eight different students. All interviews were transcribed, coded, and categorized to fit into one

of four major topics showing support of teacher read-aloud, a dislike of teacher read-aloud, student reading strategies, or suggestions for quality read-aloud.

An interview was also conducted with the science teacher at the conclusion of the research project. The interview was transcribed, coded, and categorized into three major topics: value of teacher read-aloud, suggestions for research and implementation, research observations.

Design

This study was a mixed methodology study including both quantitative and qualitative data collection and analyses. Using five self-contained classes of seventh and eighth grade science students, a counterbalanced design allowed all groups to receive both treatments of teacher read-aloud and silent reading over two consecutive units of study. During the first unit, the read-aloud treatment consisted of the science teacher orally reading small sections of the lesson and stopping at predetermined points to take notes and discuss. The silent reading classes read the same sections silently and then stopped for the same notes and discussion. Treatment and control group assignments were switched for the second unit, allowing all students to receive both treatments while receiving the same content and instruction. Concept map scores were used to measure the students' learning over the course of both units of study.

Procedures

Using the state-selected science texts for seventh and eighth grade, the science teacher and researcher (a reading teacher in the school) selected two consecutive units for each grade that were equivalent in content, vocabulary, text length, and time requirements. After independently developing a concept map for each unit of study, both

teachers compared and developed one master concept map-scoring template for evaluating student learning in each of the four chapters. An assessment by two content area specialists determined the maps were conceptually sound, equivalent without content repetition, and appropriate for the grade levels and textbooks being used.

Preparation for students participating in the research began during the first week of September. All seventh and eighth grade students were given the reading and vocabulary portions of the Stanford Achievement Test (SAT-9) during their regular reading class. Then the students began a series of ongoing practice sessions with concept maps in three different subject areas (reading, social studies, and science) involving three different teachers. This was designed to familiarize all students with the development, implementation, and evaluation of concept maps. Parental consent and student assent forms (refer to Appendix F) were distributed and collected prior to the first week of October. Even though all students participated in the research study activities, only data from students with signed consent and assent forms were included in the data analyses. The study contained a total of eighty students, with eighth grade contributing 46 to the total number and seventh grade containing 34 participants.

After completing the required curriculum for September, both grades began the study during the first week of October. Before any reference to the unit or text, students were asked to draw a concept map over the upcoming topic to demonstrate their background knowledge and this provided a pretest score. After randomly assigning the classes as treatment or control, the science teacher simultaneously began the first units over cell structure in seventh and minerals in eighth grades. All classroom procedures, assignments, activities, time frame, and assessments throughout both units were exactly

the same except for the method of reading text. The science teacher orally read small portions of a lesson to the treatment classes and stopped at predetermined places for notes and discussion. The control classes read the same sections silently in five to ten minute sections, then continued with the same notes and discussion session. At the conclusion of unit one, students were given the same concept map prompt for their posttest. This initial section of the study was completed during the first week of November.

Unit two began during the second week of November. The five classes traded treatment groups to allow all the participants to be part of both teacher read-aloud and silent reading. After completing a pretest concept map over the upcoming section on cell reproduction in seventh and rocks in eighth grades, students progressed through the chapter in a similar format and structure as the earlier unit. A final posttest was given to every class during the last school week in December before the holiday break.

In January, the science teacher returned to his regular classroom curriculum and procedures while final data collection was completed. The first delayed posttest was administered outside of science class during the first week of January. The second delayed posttest over unit two was completed the last week of January. This allowed a minimum of four weeks wait time for each unit. After all students completed their attitude surveys in mid-January, eight students were selected for individual interviews. Selection for interview was bounded by grade, gender, attitude, and reading ability. The science teacher also participated in an interview during January. Scripted interview questions for both students and teacher can be found in Appendix C and D. All interviews were audiotaped and transcribed by the researcher the first week of February.

Results and Discussion

Quantitative

A 2 x 3 repeated measures analyses of variance was used to examine the impact of teacher read-aloud on student learning. Concept map scores were obtained at three points in time. Analyses examined the effect of treatment (teacher read-aloud or silent reading), test, and the interaction of the two variables. Results indicated a significant main effect for seventh grade tests ($F(2, 66) = 357.267, p = .000$) and eighth grade tests ($F(2, 58) = 1071.115, p = .000$) over time. Combined results from group means and repeated measures analyses suggest students showed an overall learning growth over the course of two units. The means for the two treatment groups had similar patterns of gain from pretest to posttest and decline from posttest to delayed posttest, but not to the level of the pretest means. Simple contrast indicated the differences from pretest to posttest, posttest to delayed posttest, and pretest to delayed posttest were significantly different at each grade level. Both teacher read-aloud and silent reading were appropriate for student learning, but mean differences between the treatments do not support either teacher read-aloud or silent reading method as superior over the other. There was no significant difference between the two treatment groups at either grade level, and the treatment by test interaction was not significant for seventh or eighth graders. Thus, both teacher read-aloud and silent reading approaches are acceptable methods for student learning in science.

In order to examine the impact of the two treatments when accounting for individual reading ability, four multiple regression analyses were conducted and analyzed using the posttest or delayed posttest scores for both the silent and read-aloud treatment

groups as the dependent variable, and student reading ability scores, treatment, and the interaction of treatment and reading ability as independent variables. One of the four models showed a significant interaction between treatment and reading ability. This specific model examined the concept map delayed posttest scores for students studying rocks in eighth grade and cell reproduction in seventh. Specifically, this analysis showed a significant interaction between treatment and reading ability.

Post hoc analyses were used to further examine the relationship between ability and treatment. Two separate regression equations were computed for each treatment in order to interpret the interaction effect. Results from this analysis showed that as reading ability increases, students gain more from the teacher read-aloud procedure. This does not support the earlier expectation that teacher read-aloud was most likely to help lower ability students. The read-aloud treatment seems to favor high ability readers when their learning is measured through concept map assessments.

Looking back to literature and theory, the simple view of reading (Juel, Griffith, & Gough, 1986) contends reading is composed of decoding and comprehension. Students who have mastered both components are more likely to have success with any reading support. Students with a lower reading ability could still be limited by their difficulties with decoding when reading independently and be less likely to make similar improvements. The research results also support Meloy, Deville, and Frisbie's (2003) research showing higher achievement for students with and without a disability when provided a read-aloud accommodation on the Iowa Tests of Basic Skills. The read-aloud accommodation intended to aid struggling readers can also help the achievement of higher ability students.

Two intervening issues could have affected the quantitative results in this study. First, there is a sizeable difference in the number of high ability and lower ability participants in the study. Fifty-nine of the eighty participants could be classified as reading above the 50th percentile. This large percentage of high ability students is not typical of the general population or a normal distribution. In addition, any outlier or unusual score from a low ability reader has a strong effect on that group's mean scores. The distribution of this particular school's population is strongly skewed toward high ability students and does not give equivalent representation to students falling below the 50th percentile in reading ability.

Also of interest were the higher average scores for both the higher and lower ability groups on their delayed posttests scores from the second unit. A second intervening issue occurred during the time between the first and second delay posttests given in January. Since the researcher and the science teacher (Mr. B) shared the grading of the concept maps, as scores were compiled Mr. B was very surprised by the overall lack of retention on the delayed post-test scores for the first unit. The research design process and Institutional Review Board guidelines had determined the delayed posttest be administered outside of the science class by the researcher to limit any potential stress on the adolescent participants. As a result, the students felt no pressure to complete the concept map to any specific standard. Mr. B asked several students why their responses were so brief and limited; the students replied it was not for a grade and they didn't think it really mattered. Mr. B chose to review the first unit of study with each grade and spent additional time with students learning the content because he was concerned about their long-term learning. When the time came to take the second delayed posttest at the end of

January, the student response was completely different from unit one. Several students commented that even though it wasn't for a grade, they realized Mr. B was aware of their scores and they did not want to do unit two again. This unplanned instructional session could have motivated the students to try harder on the unit two delayed posttests since students realized their performance was monitored.

Because of the structure of a counterbalanced design, higher scores on the second unit of study balanced out lower scores on the first unit. To illustrate, in the eighth grade the scores for minerals in the first unit of study were combined with the scores for rocks in the second unit. The students did much better on the delayed posttest over rocks due to history in the form of Mr. B's extrinsic motivation. Therefore, the higher scores during the rocks unit brought up the lower scores of the minerals unit. A similar phenomenon occurred in the seventh grade data. Had the history not occurred, this repeated measures analysis might have provided a different result.

This idea is supported somewhat by the regression model for reading ability, treatment, and the interaction of treatment and ability as predictors for the delayed posttest scores during the first unit of study. This regression resulted in 23.5 percent of the R-square being explained, and the model was significant. It is likely that this model reflects the long-term learning over four weeks without the intervention of the history previously described. However, there was no measure for motivation built into this study to determine if any variance could be explained in that way. Based on the two points discussed above, the history and the significant regression model, additional pairs of repeated measures analyses were conducted for exploratory purposes. Four separate 2 (treatment) x 3 (testing time) repeated measures ANOVAs were conducted as follows:

- Unit one seventh grade data
- Unit one eighth grade data
- Unit two seventh grade data
- Unit two eighth grade data

If history were a factor in the outcome of the study, one might predict that treatment and the time by treatment interaction would be significant for unit one. This was the case for the seventh grade data set ($F(2,66) = 357.267, p = .000$) and the seventh grade results (mean for delayed posttest read-aloud = 12.24, mean for delayed posttest silent reading = 11.15) favored the read-aloud procedure. Although this was purely exploratory, it does point to a need for more investigation into the validity of this instructional method.

A final quantitative analysis involved the comparison of reading ability and the student attitudes toward teacher read-aloud. Using the attitude score ranging from six to twenty-five, a lower score indicated a favorable attitude toward the teacher reading and a higher score showed a dislike of the treatment. A correlation between the attitude score and student reading ability showed a significant positive relationship ($r = .263, p < .05$) between these two measures. A scatterplot displayed the distribution of scores for this correlation.

Scrutiny of the scatterplot indicated two interesting ideas concerning reading ability and teacher read-aloud. First, when the scatterplot was examined by quadrants, the lower, right quarter showing low reading ability and dislike for teacher read-aloud remained empty. This indicated there were no students reading below the 50th percentile from this population who disliked the teacher reading aloud in class. A second observation required visually dividing the graph along the X-axis into two equal parts.

This showed the majority of students of all reading abilities favored teacher read-aloud as an instructional aid. Even including the six midpoint scores as part of the negative total, those 17 of the 80 total participants comprised 22 percent of the population. Viewed another way, this research found 78 percent of the adolescent participants had a favorable attitude toward teacher read-aloud.

Qualitative

The primary source of qualitative data analyses came from the interviews with eight students and the science teacher. After the transcription process was completed, the first interview was used to list potential themes relevant to all students. A separate set of themes was compiled when reviewing the second student transcription. These two lists were combined and provided the basic categories to analyze the other student responses. Final evaluations found four broad topics and three subcategories that directly addressed the two research questions. A similar analysis was conducted with the teacher interview and results were combined with student responses.

The first major theme listed described the value of teacher read-aloud for students. The students found oral reading of text was helpful in three areas: learning new vocabulary, reading text with an accompanying discussion/explanation, and an opportunity to gather important details. The teacher's perspective found the read-aloud treatment worthwhile because it offered a good way to present difficult concepts and the students appeared to have a high level of attention and participation.

A second theme focused on disadvantages of teacher read-aloud. The only complaint came from two of the high reading ability students. The teacher read-aloud rate was much slower than their independent reading speed and this difference was very

frustrating and distracting. The perspectives of these two students were so remarkably similar that it is likely they represent a common frustration of advanced readers forced to endure a group recitation that would easily be completed independently. Support from the teacher was found in his awareness that adolescents thrive on variety and the likelihood of problems if teacher read-aloud was used too often. While it is important to help students with difficult text, it is equally valuable to avoid restricting fluent readers from independent learning.

A third theme offered suggestions to improve the quality of teacher read-aloud in middle school classrooms. The students and teacher both valued the teacher having expression, good reading rate, and a voice easily understood and heard. The teacher mentioned the importance of preparation and enthusiasm for the subject. While students failed to mention this specific instructor quality, it is unlikely any listeners would benefit from mispronunciations, broken reading, and boredom from the teacher. These suggestions from research participants support the current findings on high-quality, model read-aloud characteristics appropriate for any content area (Hoffman, Roser, & Battle, 1993; Fisher, Flood, Lapp, & Frey, 2004; Albright, 2005).

A subcategory developed under the theme covering suggestions for quality teacher read-aloud. It was first addressed when Mr. B mentioned the importance of variety and an awareness of multiple learning styles in every classroom. Several students suggested implementing teacher read-aloud with some flexibility, allowing students the option of going ahead independently if they chose. This practice would provide the assistance for students who need it, but not restrict those who were comfortable on their own. Dreher's (2003) high school literature classes found success with this type of

flexible format by allowing students to choose independent, group, or teacher read-aloud of text. This adaptable kind of practice would provide students with some needed assistance while fostering the autonomy of adolescent learners.

A final theme from interviews was focused on student awareness of their individual abilities. Each of the interview participants was very realistic and willing to talk about their own strengths and weaknesses. They were all able to articulate some type of strategy for resolving difficulties when reading. While responses were as different as the individual personalities, the students had each identified a way to focus their attention on a difficult text and use some type of aid (dictionary, picture, concept map, peer) to give the text meaning. When given the opportunity to explain meaningful learning, the voices of students are extremely insightful and informative for an attentive instructor who wants these individuals to succeed.

Conclusions

Adolescents come to school with a wide variety of abilities, interests, and learning needs. After promoting to the faster-paced environment of middle and high school classrooms, students who have difficulty with reading are at a serious disadvantage in many subject areas. Sometimes the general assumption is that grade and class placement approximate a student's ability to complete the required tasks—if they've made it this far, they should be able to work on their own. Realizing NAEP (Perie, Griff, & Donahue, 2005) research found 73 percent of eighth graders have reached a basic reading level or partial mastery, it is important to recognize there are an additional 27 percent of students below the minimum level who will struggle with grade level texts. Most secondary teachers realize there are students with reading difficulties but often do not have the time

or experience to address these difficulties. Educators working with adolescents need a heightened awareness of this discrepancy in student abilities, knowledge to help students succeed, and opportunities to participate in the ongoing search for ways to engage and motivate middle and high school learners with reading. The purpose of this research was to determine if teacher read-aloud would benefit adolescents in science and how individual reading ability and attitude factored into their success. Some results of this research offer support for the use of teacher read-aloud as an instructional aid for student learning.

There was not an advantage in learning for low ability readers in this particular study using teacher read-aloud. Previous research did not find significant results using teacher read-aloud for lower ability readers (Bryant, 1982) but speculated the use of this strategy could be motivating and helpful for adolescents (Herrold, Stanchfield, & Serabian, 1989; Patridge, 2004; Ivey & Broaddus, 2001; Albright, 2002; Dreher, 2003; Richardson, 1994). In addition, the findings are similar to earlier research by Stanovich (1986) suggesting a reciprocal relationship, or Matthew effect, resulting in higher reading growth for those with greater skill. This research supports previous findings, but adds some additional insights to the current knowledge base.

First, the teacher read-aloud has less potential benefit for low reading ability students; however it would merit use even if it did not always provide a significant measurable result over silent reading. Lower ability students reported benefits from teacher read-aloud and those particular students may be enough reason to warrant occasional classroom use of teacher read-aloud.

Second, one regression analysis showed a positive treatment by ability interaction with an advantage of teacher read-aloud for high ability students. Teachers concerned about student learning could justify using teacher read-aloud as one strategy to help all students in class and have the possibility to see some benefits for the high ability students. It appears that a teacher read-aloud would be most beneficial with difficult texts containing challenging vocabulary. A carefully planned teacher read-aloud could maximize the learning environment and provide a scaffold for students facing challenging concepts in secondary classrooms.

Finally, there is a strong indication that many students enjoy and benefit from teacher read-aloud. The initial motivation for this study came from research by Ivey and Broadus (2001) showing teacher read-aloud as a favorite activity for 63 percent of the participants. Additional searches showed other secondary teachers reported positive results using teacher read-aloud (Albright, 2002; Tingley, 1986; Dreher, 2003; Richardson, 1994) even though research has shown the practice becomes less common as students progress through higher grades (Jacobs, Morrison, and Swinyard, 2000; Lickteig & Russell, 1993). These reports strongly influenced my own practices as a teacher, and I began to include teacher read-aloud regularly in reading and civics classes with good student responses. An important conclusion from this study is the positive attitude shown toward teacher read-aloud in middle school. This adds support to the current research and my personal experiences as a middle school teacher.

Finals results from any research should lead back to the relevance and importance of the original question. The lack of statistical significance for teacher read-aloud in this study does not eliminate its value as a teaching strategy. One must wonder if the drawing

of concept maps truly measures all student learning in any subject area. When so many students, especially those with lower reading achievement, indicate a strong preference toward teacher read-aloud, another type of assessment with a different population could provide different results and additional insights into the value of this strategy.

Each one of the students interviewed for this research could recall positive teacher read-aloud experiences. This usually included remembering a specific story or character and a relaxing time in the classroom. Reflecting on his recollection of a story heard 44 years earlier, Romano (2006) concluded that teachers reading literature aloud to older students helped promote the practice of creating mental pictures and seeing beyond the words. Two student interviews specifically mentioned the oral reading helped them picture or visualize the written words. Several students felt the teacher read-aloud helped them remember details better. While the individual benefits found from this oral presentation will vary, there is value for the modeling and information presented through teacher read-aloud and these advantages are not limited to young beginning readers. Based on the attitude survey and individual interview responses in this study, a sizable majority of these participants enjoy teacher read-aloud and view it as a helpful aid in their learning.

Recommendations

Results from this study have some practical implications for teachers in middle and high school classes. Teacher read-aloud has typically been considered most appropriate for young children and early literacy development. As children grow and develop, the need for teacher modeling begins to change and students move to reading

independently on a regular basis. However, older students can benefit from teacher read-aloud in several situations. This type of presentation is helpful when students must work with difficult texts containing new vocabulary. A teacher read-aloud is also appropriate to demonstrate pronunciation, model fluent reading, and help readers develop the ability to visualize beyond the written words of a text. Finally, a read-aloud is a helpful scaffold for lower ability readers with mature reasoning ability, allowing them to move their concentration from decoding words to the comprehension of new ideas found in texts. Teacher read-aloud is a frequently overlooked but an appropriate and potentially valuable strategy for adolescent learners.

When implementing teacher read-aloud with older students, it is important to consider student preferences when using this method of instruction. Student response showed a high level of concern for individual choice and classroom dynamics when using teacher read-aloud. Some students do not benefit from this practice and would be better suited to independent reading. Allowing some choice and flexibility in implementation could improve learning for students and accommodate different learning styles or ability levels in a class. Teachers should also be cautious about relying too heavily on this oral presentation and make the teacher read-aloud one component of the classroom learning.

Another important area to consider when implementing teacher read-aloud is the consistent and reflective use of high quality practices. Students value an oral presentation that includes expression, preparation, and enthusiasm. Teachers wanting to use teacher read-aloud effectively should make certain the material is valuable to student learning, prepare to provide a fluent reading model, provide accompanying activities to promote learning, and select a manageable amount of text capable of holding students' attention.

Activities should include using small amounts of text with accompanying discussion, connections to other texts and ideas, and opportunities for independent or small group responses. Subject area requirements and the age of students would determine which activities are most conducive for adolescent learning.

Limitations of the Study

The findings from this study were drawn from a small population in a high socioeconomic school district. Many of the students came from high-achieving families who were very involved in school and community activities. The school climate reflected the surrounding community and the majority of students were motivated by good grades, viewing them as a sign of academic success. The results of this specific study should not be generalized to a dissimilar population.

The use of two different units of study for each grade was necessary for a counterbalanced design using both seventh and eighth graders. Steps were taken to ensure that the text, content requirements, and evaluations were equivalent across all four units of study. However, combining the scores from concept maps over different units of studies and comparing the results may have affected outcomes since measures were collected on four distinct concepts.

The analyses of data required some modifications with the total number of participants. Since the eighth graders were divided into three separate classes, one of the groups ($n = 16$) was eliminated for the repeated measures analyses to balance the numbers for comparison between the two treatments. However, the correlation and multiple regression analyses were conducted using all 80 participants, suggesting the use of two different data sets within one study.

The only tool used to measure student learning in this study were the concept map scores. The validity of this one assessment may not accurately reflect reading comprehension, student learning, or growth. In addition, there was no measure of student motivation and how it would contribute to individual learning and school success.

There were only six items used to measure student attitudes toward teacher read-aloud. A small number of statements were placed together in two sequential groupings that openly addressed the read-aloud treatment. A random mixture of the attitude statements may have yielded different results.

The design of the concept maps, instructional objectives, teaching methodology, and assessments were all under the guidance of one instructor, providing consistency among the five science classes for treatment and control conditions. In addition, all curriculum standards and concept map evaluations were gathered and confirmed from outside sources. However, the individual instructor's teaching style and classroom procedures were integral to all results of the study and would have influenced any results.

A final limitation acknowledges the researcher was employed full-time in the school before, during, and after the research study. The researcher was also the reading teacher of all seventh and eighth grade participants who were not on an IEP.

Recommendations for Future Studies

Based on this research of teacher read-aloud with adolescents in science, it would be beneficial to examine an oral reading treatment with the following changes:

1. Look at the impact of teacher read-aloud in another content area with any students in sixth through twelfth grade.

2. Measure student learning through a different method besides concept maps. Content area evaluations appropriate for an older, high school student population were beyond the scope of this research and would require researchers to have experience and expertise in their respective area.
3. Conduct similar research with a different population, specifically a more diverse socioeconomic mixture and one without a high ability skew.

There is ongoing research that examines the motivation and attitude of adolescent students toward literacy. New evaluations may currently be available that could add to this research and provide new perspectives to the results. Also, the development of a more detailed and informative survey could provide additional insights into ways teacher read-aloud would be used effectively to improve the learning of students with all ability levels in middle and high schools.

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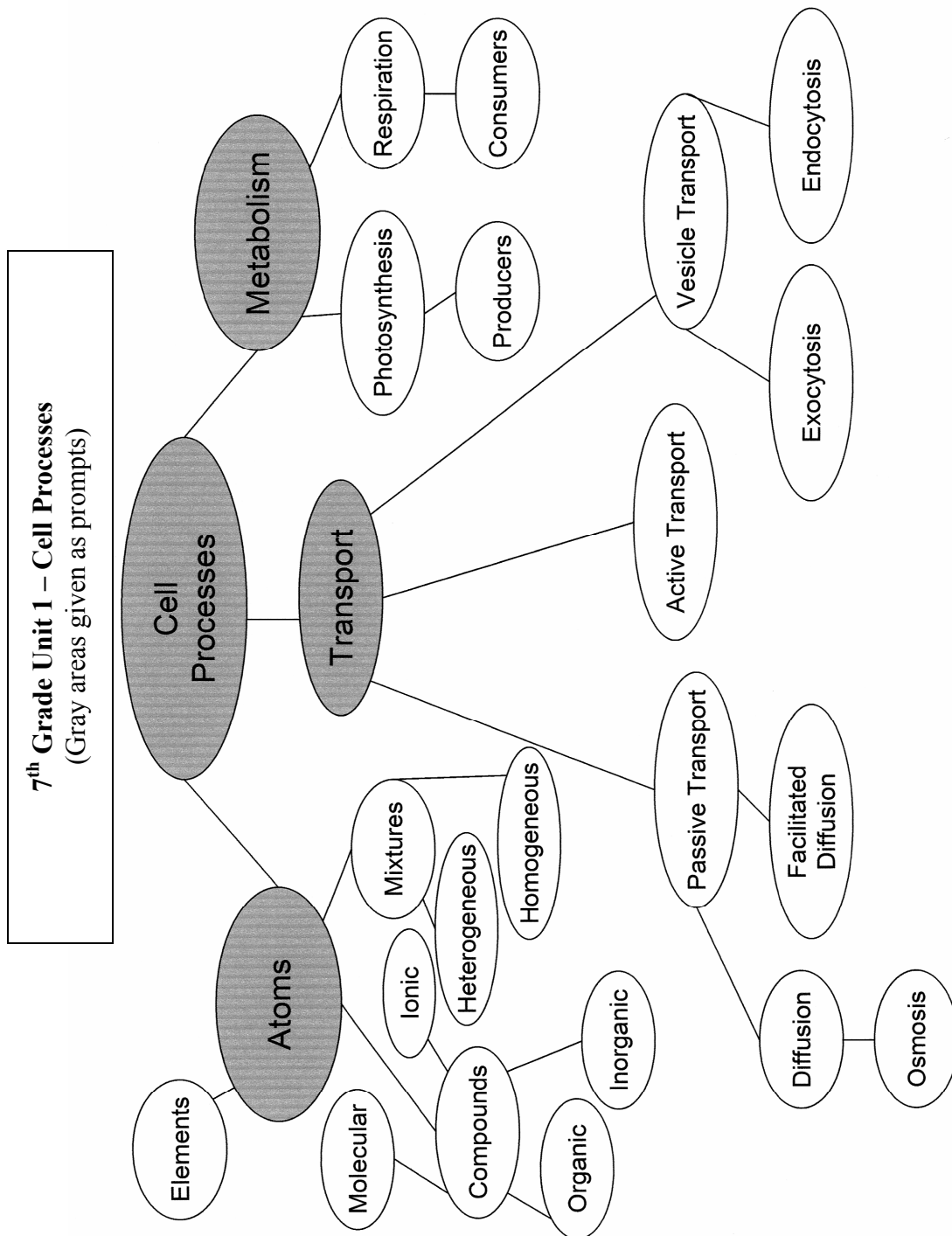
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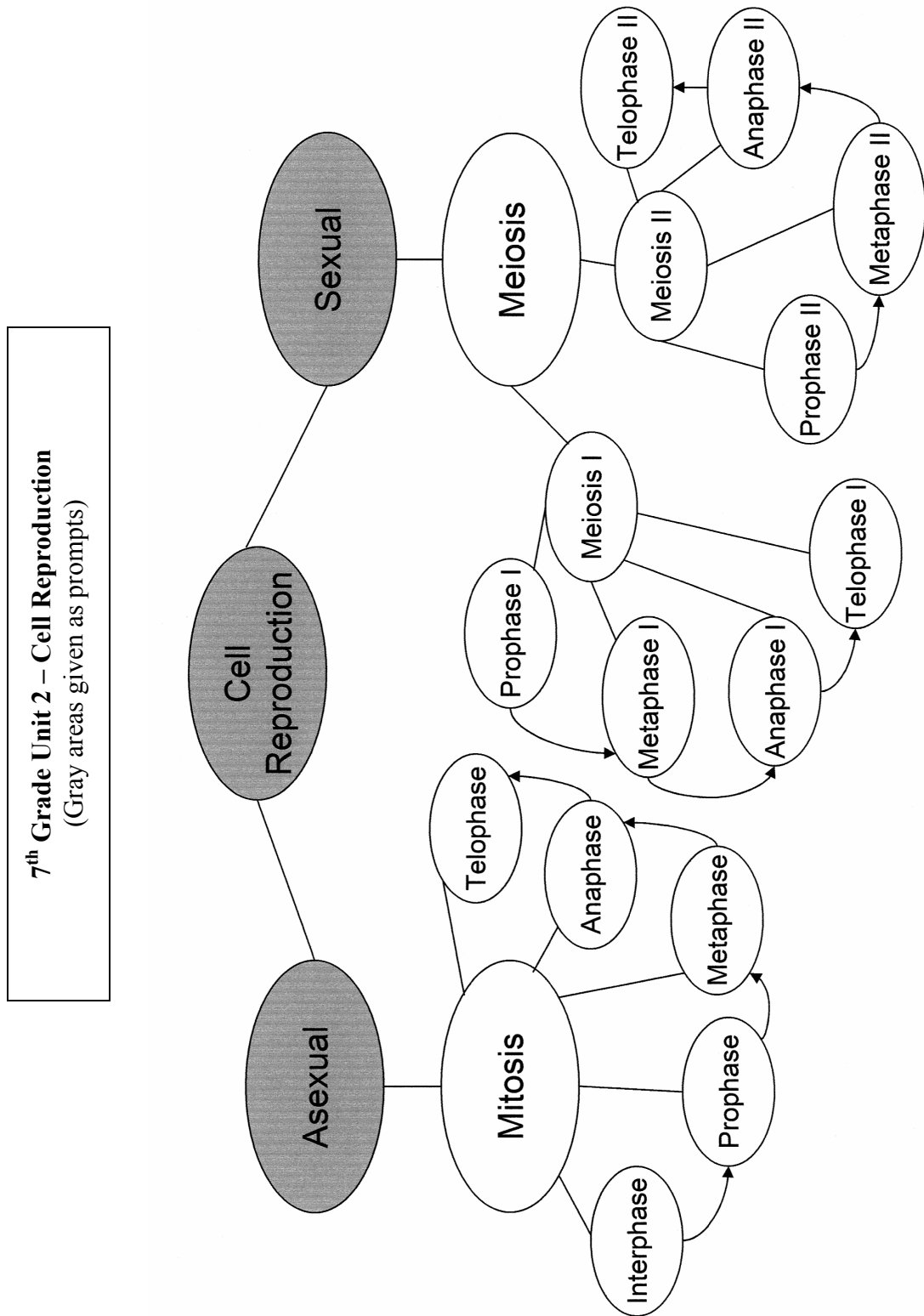
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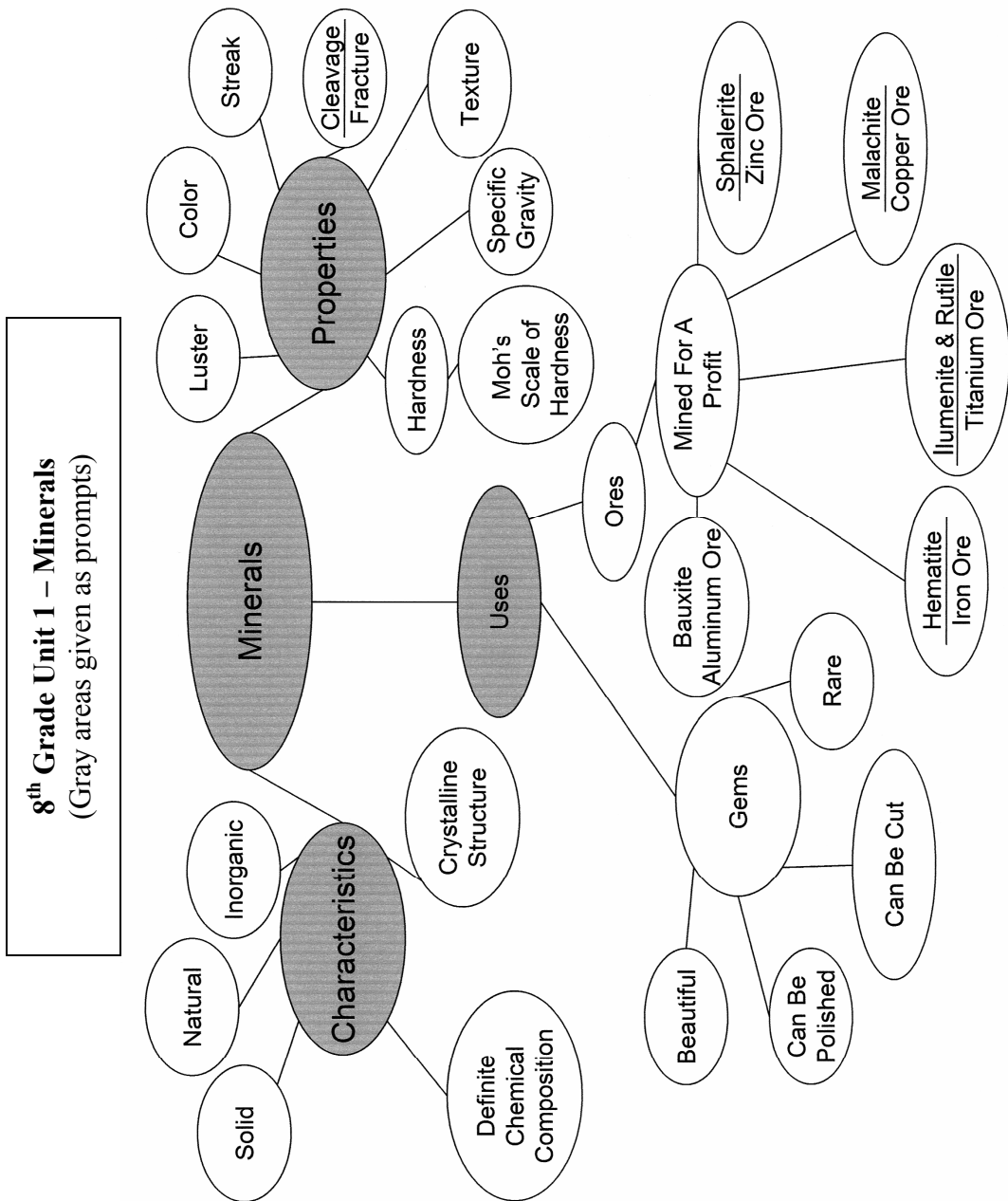
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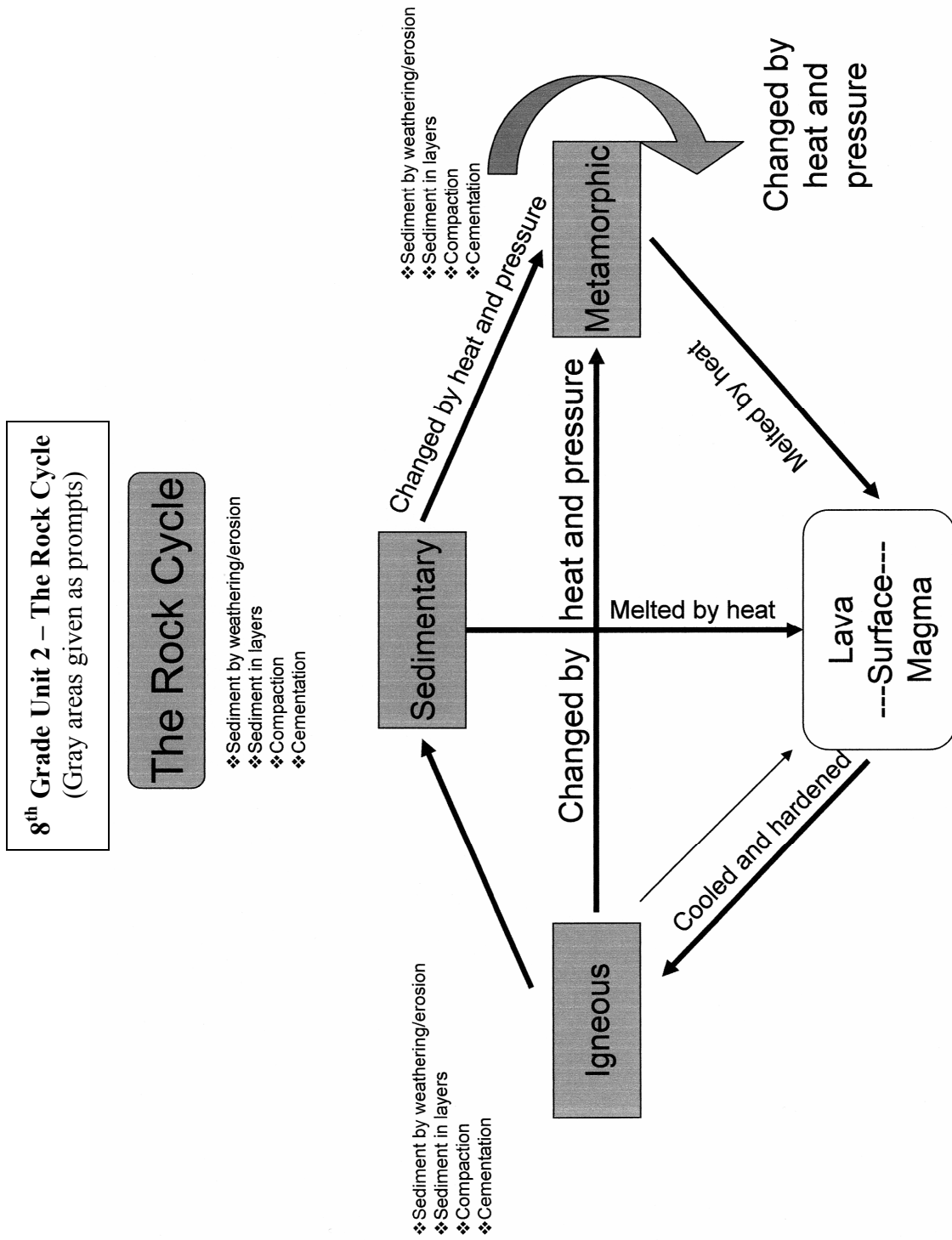
APPENDICES

Appendix A. Concept Maps









Appendix B. Attitude Surveys

7th STUDENT ATTITUDE SURVEY

Using the following choices, pick your best response for each statement.

Strongly agree - SA Agree - A Disagree - D Strongly disagree - SD

- | | | | | | |
|-----|---|----|---|---|----|
| 1. | It is helpful to me when Mr. Bxxxx reads the science book aloud. | SA | A | D | SD |
| 2. | Teacher read-aloud is good for understanding hard subjects. | SA | A | D | SD |
| 3. | Teacher read-aloud would be helpful in other classes besides science. | SA | A | D | SD |
| 4. | The science unit on cell processes was interesting to me. | SA | A | D | SD |
| 5. | The science unit on cell reproduction was interesting to me. | SA | A | D | SD |
| 6. | I learn more when I can read the science book by myself. | SA | A | D | SD |
| 7. | It is usually distracting to have a teacher read the book to the class. | SA | A | D | SD |
| 8. | I think teacher read-aloud is used by teachers too often. | SA | A | D | SD |
| 9. | Reading is not difficult for me. | SA | A | D | SD |
| 10. | Reading is usually hard for me. | SA | A | D | SD |

Appendix B. (cont.)

8th STUDENT ATTITUDE SURVEY

Using the following choices, pick your best response for each statement.

Strongly agree - SA Agree - A Disagree - D Strongly disagree - SD

- | | | | | | |
|-----|---|----|---|---|----|
| 1. | It is helpful to me when Mr. Bxxxx reads the science book aloud. | SA | A | D | SD |
| 2. | Teacher read-aloud is good for understanding hard subjects. | SA | A | D | SD |
| 3. | Teacher read-aloud would be helpful in other classes besides science. | SA | A | D | SD |
| 4. | The science unit on minerals was interesting to me. | SA | A | D | SD |
| 5. | The science unit on rocks was interesting to me. | SA | A | D | SD |
| 6. | I learn more when I can read the science book by myself. | SA | A | D | SD |
| 7. | It is usually distracting to have a teacher read the book to the class. | SA | A | D | SD |
| 8. | I think teacher read-aloud is used by teachers too often. | SA | A | D | SD |
| 9. | Reading is not difficult for me. | SA | A | D | SD |
| 10. | Reading is usually hard for me. | SA | A | D | SD |

Appendix C. Student Interview Questions

STUDENT INTERVIEW QUESTIONS

(Note: All questions may be expanded by prompting the student to explain more, tell details about their response, or be rephrased for better understanding.)

1. Do you consider yourself a good reader? Explain why or why not.
2. What are your favorite subjects in school? Tell about and explain why.
3. Was the teacher reading aloud in science class helpful to you? Explain.
4. Did teacher read-aloud cause any problems in your learning? Explain.
5. When do you think teacher read-aloud would be most helpful? Give specific examples.
6. Can you think of other things that would help you be more successful when reading a science book in class? What about social studies or math? Explain.
7. What helps you read successfully in any of your classes? Be specific and give examples.
8. Can you remember any important facts you learned from Mr. Barnes reading out loud to you in class? Which ones? Any others? What helps you remember?
9. Can you recall a time when you really liked having the teacher read-aloud? What happened? What made it enjoyable? Give specific details.
10. What would you say was the best book you've ever read by yourself? Best book ever read with some help? Tell about it. Give details.
11. What advice would you give a teacher before he/she reads out loud to the class? Can you give specifics?

Appendix D. Teacher Interview Questions

TEACHER INTERVIEW QUESTIONS

(Note: All questions may be expanded by prompting the teacher to explain more, tell details about their response, or be rephrased for better understanding.)

1. How successful do you feel the read-aloud treatment is in science?
2. What observations do you have about implementing this strategy on a regular basis? Specifically tell about difficulties, successes, or your observation of student response.
3. Which students (no names will be used) do you feel received the most benefit from teacher read-aloud? Explain.
4. Which students (no names will be used) do you feel received little or no benefit? Explain.
5. In your experience, is this an appropriate intervention for adolescent student learning? Explain your perspective.
6. What recommendations would you have for future research, particularly what kind of things did we fail to examine in this study? Why would that be beneficial?
7. What kinds of things added to the quality of reading aloud to the students? What detracted? Do you have suggestion to improve teacher read-aloud?
8. Do you recall being read to by a teacher? Did you enjoy the experience? Did any of those memories come into play as you read to your students?
9. Any other suggestions? Was this research worth the trouble? Explain.

Appendix E. Institutional Review Board Approval Letter



The University of Oklahoma

OFFICE FOR HUMAN RESEARCH PARTICIPANT PROTECTION

IRB Number: 11422
Approval Date: September 13, 2006

September 14, 2006

Sylvia Hurst
Instructional Leadership and Academic Curriculum
820 Van Fleet Oval, ECH 114
Norman, OK 73019

RE: An Examination of the Effect of Teacher Read-aloud in Middle School

Dear Ms. Hurst:

On behalf of the Institutional Review Board (IRB), I have reviewed and granted expedited approval of the above-referenced research study. This study meets the criteria for expedited approval category 5, 6, 7. It is my judgment as Chairperson of the IRB that the rights and welfare of individuals who may be asked to participate in this study will be respected; that the proposed research, including the process of obtaining informed consent, will be conducted in a manner consistent with the requirements of 45 CFR 46 as amended; and that the research involves no more than minimal risk to participants.

This letter documents approval to conduct the research as described:

Assent Form Dated: September 11, 2006
Consent form - Parental Dated: September 11, 2006
Consent form - Other Dated: September 11, 2006 Teacher Consent form
Survey Instrument Dated: August 21, 2006 8th Student Attitude survey
Survey Instrument Dated: August 21, 2006 7th Student Attitude survey
Other Dated: August 21, 2006 Student Interview questions
Other Dated: August 21, 2006 Teacher Interview questions
IRB Application Dated: August 21, 2006
Letter Dated: August 18, 2006 Approval letter - Oakdale School, Edmond, OK

As principal investigator of this protocol, it is your responsibility to make sure that this study is conducted as approved. Any modifications to the protocol or consent form, initiated by you or by the sponsor, will require prior approval, which you may request by completing a protocol modification form. All study records, including copies of signed consent forms, must be retained for three (3) years after termination of the study.

The approval granted expires on September 12, 2007. Should you wish to maintain this protocol in an active status beyond that date, you will need to provide the IRB with an IRB Application for Continuing Review (Progress Report) summarizing study results to date. The IRB will request an IRB Application for Continuing Review from you approximately two months before the anniversary date of your current approval.

If you have questions about these procedures, or need any additional assistance from the IRB, please call the IRB office at (405) 325-8110 or send an email to irb@ou.edu.

Cordially,

A handwritten signature in black ink, appearing to read "Lynn Devenport".

Lynn Devenport, Ph.D.
Vice Chair, Institutional Review Board

Appendix F. Student Assent and Parental Consent Letters

CHILD ASSENT FORM

**For research being conducted under the auspices of the University of Oklahoma
Norman Campus**

Dear 7th and 8th grade students:

Along with being your reading teacher, I am currently working on finishing a degree at the University of Oklahoma (don't be mad, OSU fans). I am interested in learning more about ways to help middle school students read successfully in all their classes, particularly science.

In reading, you've already taken the reading part of the Stanford Achievement Test and been learning how to do concept maps. Mr. Bxxxxx will be trying some different reading techniques in your regular science class and evaluating some of your progress with concept maps and a short survey. After the winter break in January 2007, I will ask some of you for a short interview to talk about ways to help you read and understand your science book better. I am hoping to learn something new I can share with other teachers and schools.

While all of you will be participating in the science class, many of you may have ideas, opinions, and examples of work that would be helpful in my research and writing. For me to use any of your work, words, concept maps, interviews, or ideas in my writing, I need to have your permission. If you do not want me to use any of your work, I absolutely will not! If you say yes at first and then change your mind, that's okay too; just tell me and I will gladly respect your wishes. If you do agree, I will use a fake name or number on any of your papers and no one will know it came from you. If I interview you on tape, we'll visit for less than 15 minutes, I'll type up what you said, change the name, keep it locked at home, and erase the tapes when we're finished. To top it off, if you get a little concerned and want to visit or e-mail with my teacher, her name and e-mail are on the letter I'm sending your parents. How often do you get the chance to tell on your teacher to her teacher?

So no matter what, Mr. Bxxxxx and I will do a few small things differently in science and reading this year; we'll still do activities, read, and take some grades no matter how you sign the form. If you are willing to let me use your work and ideas, please sign on the next page and remember you can change your mind at any time.

Thanks,

Mrs. Hurst

Appendix F. (cont.)

Please select one of the following options for each item.

Class work: { } I do agree to let Mrs. Hurst use my work in her research study

 { } I do **not** want any of my class work used in Mrs. Hurst's study.

Taped interview:

 { } I do agree to be audio taped.

 { } I do not agree to be audio taped.

Name

Date

PARENT/GUARDIAN PERMISSION FORM
For research being conducted under the auspices of the University of Oklahoma-
Norman Campus

In addition to my teaching responsibilities at Oakdale School, I am currently working on research for my dissertation in reading education at the University of Oklahoma. Since my focus is middle school literacy, I designed a study to fit into the regular school curriculum. The overall purpose is to examine ways a teacher can improve reading comprehension in science and focus on how reading ability affects student learning. Results from data gathered here can potentially benefit current students in the reading and science classes and will hopefully provide new insights that can be shared with other educators.

Mr. Bxxxxx has agreed to help conduct research in his regular science classes at Oakdale in seventh and eighth grade during 2006-2007. This entire project is designed to fit into the state-mandated curriculum of science and reading at Oakdale and will not alter the currently planned classroom structure or activities. During the first six weeks of the school year, all seventh and eighth graders will take the reading portion of the Stanford Achievement Test. This will take approximately two class periods and will provide a basic reading score. Evaluation of science learning will be gathered over eight weeks covering two units through pre and posttest concept maps, an attitude survey, and a few students will have individual interviews. In order to not interfere with science instruction, the attitude survey will take approximately five minutes to complete and student interviews will require less than fifteen minutes. Over the course of the study, every student will receive all types of comprehension instruction during their science classes.

Even though all students will be participating in the reading and science classes, any data collection or involvement in the study is completely voluntary. Your child may choose not to provide data initially or can stop contributing at any time. The decision whether or not to participate will not result in any penalty or loss or instruction. No risks beyond those in everyday life are anticipated in this study. Research records will be stored at my home and only approved researchers will have access to the records. The results of the research study may be published, but your child's name will not be used. All the information provided during the school project will remain strictly confidential and published results will be presented in summary form only. Any written materials from your child included in the data collection will be copied and given a pseudonym, and all original work will belong to the child.

To assist with accurate recording of participant responses, interviews may be recorded on an audio recording device. The tapes will be transcribed and students on the tapes will be assigned a pseudonym. The tapes will be stored in a locked cabinet at my home. After the tapes have been transcribed they will be erased and destroyed.

Appendix F. (cont.)

Participants have the right to refuse to allow such taping without any penalty. A permission option is given at the end of this letter.

If you have any questions about this research project, please feel free to stop by school, call me at xxx-xxxx, or e-mail at shurstXXXXX. You may also contact my advisor, Dr. Priscilla Griffith at xxx-xxxx or e-mail her at pxxxxxxx. For information on your rights as a research subject, please contact the University of Oklahoma--Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu. Thank you for your time and ongoing support.

Sincerely,

Sylvia Hurst / Oakdale School
10901 N. Sooner Road
Edmond, OK 73013

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

STATEMENT OF CONSENT

I have read the above information. I have asked questions and have received satisfactory answers. I understand my child's participation is voluntary and that I may withdraw at any time without penalty. I give permission for my child to participate in the study.

Name of Participant

Date

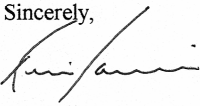
Parent or Legal Guardian

Audio Taping of Study Activities:

{ } I give permission for my child's interview to be audio taped.

{ } I do **not** give permission for my child's interview to be audio taped.

Appendix G. Permission to Conduct Research Letter

Tom Harris - Asst. Admin / A.D. M - 405.313.5452 tharris@oakdale.org	Susan Honeycutt - Principal M - 405.820.9507 shoneycutt@oakdale.org	Kim Lanier - Superintendent M - 405.202.7253 klanier@oakdale.org	 10901 N Sooner Edmond, OK 73013 V: 405.771.3373 Fax: 405.771.5220 Date: August 18, 2006 To: University of Oklahoma Institutional Review Board Re: Research Study I have read and approved of the research study concerning teacher read-aloud in content classes to be conducted by Sylvia Hurst in the seventh and eighth grade reading and science classes during the 2006-2007 school year. I have also read and approved the parental consent and student assent forms Ms. Hurst will be using to obtain permission for the study involvement. Sylvia Hurst has taught at Oakdale for 25 years. I am confident that any educational activities will be done in conjunction with our regular curriculum, which is aligned with state mandates and P.A.S.S. skills. If you have any questions or concerns, please feel free to contact me at 771-3373 or klanier@oakdale.org. Sincerely,  Kim Lanier Superintendent
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Appendix H. Teacher Consent Form

TEACHER INFORMED CONSENT FORM

For research being conducted under the auspices of the University of Oklahoma-Norman Campus

In addition to my teaching responsibilities at Oakdale School, I am currently working on research for my dissertation in reading education at the University of Oklahoma. You are being asked to volunteer for a research study. This study is being conducted at Oakdale School during the 2006-2007 school year. You were selected as a possible participant because you currently teach all the seventh and eighth grade science classes at Oakdale. Please read this form and ask any questions that you may have before agreeing to take part in this study.

The purpose of this study is to examine the effects of a teacher read-aloud intervention in middle school content area classes. It will look specifically at each student's reading ability and examine which participants benefit the most from an instructor reading text aloud. If you agree to be in this study you will be asked to do the following things:

1. For two consecutive units, you will read assigned text aloud to half your classes and have the other half read silently. At the conclusion of the first unit, you will switch the read-aloud intervention to the classes that were reading silently. This will allow all students to receive instruction with silent reading and teacher read-aloud. You will determine the time necessary for silent and oral reading since this should be a part of the regularly planned science instruction. The eighth grade units studied are *Minerals* (3 lessons, 17 p. of text) and *Rocks* (4 lessons, 19 p. of text). The seventh grade units studied are *Cell Processes* (3 lessons, 18 p. of text) and *Cell Reproduction* (3 lessons, 17 p. of text). Each unit contains 3-4 lessons of written text and should be completed in three or four weeks, depending on your classroom requirements.

2. At the beginning of each unit, students will complete a pretest concept map over the unit. This will require approximately 10 minutes of class time. At the conclusion of the unit, students will complete a posttest concept map that would require 10 to 20 minutes of class time. A total of four concept maps will be drawn during the regular science classes. Three weeks after the conclusion of the study, students will complete one delayed posttest concept map over each unit of study, requiring a total of 30 minutes. This can be completed in the regular science class or the researcher's reading class. You have the option of grading the concept maps and using the scores as part of your regular classroom evaluation. The researcher's scores will be available for your ongoing assessment if you choose not to grade concept maps.

Appendix H. (cont.)

3. At the conclusion of the study, you will be asked to participate in an interview with the researcher. All questions will pertain to the read-aloud intervention and your experiences and observations during the research project. If you agree, the interview may be recorded on audio tape to allow for transcription and documentation.

The research should not interfere with the regular science curriculum requirements. Participation in this study is voluntary and your decision whether or not to participate will not result in any penalty or loss of benefits. If you decide to participate, you are free to not answer any question or withdraw at any time. There are no anticipated risks beyond those typical in everyday instructional responsibilities. The benefits to participation can potentially benefit current students in their reading and science classes. The results will hopefully provide new insights for other middle school teachers in reading and content area classes.

The records of this study will be kept private. In published reports, there will be no information included that will make it possible to identify the research participants. Your name will not be linked with your responses unless you specifically agree to be identified. Please select one of the following options:

- ☐ I prefer to leave my identify unacknowledged when documenting findings; please do not use my name when citing the findings.
- ☐ I consent to the use of my name when recording findings and that I may bequoted directly.

To assist with accurate recording of responses, interviews may be recorded on an audio recording device. Participants have the right to refuse to allow such taping without penalty. Please select one of the following options:

- ☐ I consent to the use of audio recording.
- ☐ I do not consent to the use of audio recording.

If you have any questions about this research project, please feel free to contact me at school in person, by phone at xxx-xxxx, or through e-mail (sxxxxxxx). You may also contact my advisor, Dr. Priscilla Griffith at xxx-xxxx or e-mail her at pxxxxxxx. For information on your rights as a research subject, please contact the University of Oklahoma-Norman Campus Institutional Review Board (OU-NC IRB) at 325-8110 or irb@ou.edu. Thank you for your time and ongoing support.

Sincerely,

Sylvia Hurst

Appendix H. (cont.)

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

STATEMENT OF CONSENT

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

Signature

Date