5-2011

Investigation of Comprehension Monitoring Skills of First-Year Students of College Reading Courses

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INVESTIGATION OF COMPREHENSION MONITORING SKILLS OF FIRST-YEAR STUDENTS IN COLLEGE READING COURSES

by

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Dissertation

Submitted to the Faculty of

Olivet Nazarene University

School of Graduate and Continuing Studies

in Partial Fulfillment of the Requirements for

the Degree of

Doctor of Education

in

Ethical Leadership

May 2011

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Dissertation Adviser	Date 5/4/11
Dissertation Reader	Date May 4, 2011
Dissertation Coordinator	Date May 4, 2011
Director of the Ed.D. program	Date May 4, 2011
Vice-President for Academic Affairs	Date June 14, 2011

ACKNOWLEDGEMENTS

I wish to thank my advisor, Dr. Sue Rattin, and my reader, Dr. Darcel Brady, for their encouragement and guidance along the way. Pam Greenlee and Sandy Harris and their people in the library were an invaluable resource also. Had I been on my own, I would have quit long ago lost in a sea of rules and protocol. I wish also to thank my mother whose inspiration and belief in education took me through some difficult times. Without the encouragement of family and friends I would not have been able to accomplish this mega dream, for it is when we stand on the shoulders of others that we are able to see farther. Thank you all for helping me see more than I could have seen on my own.

“We don’t accomplish anything in this world alone . . . and whatever happens is the result of the whole tapestry of one’s life and all the weavings of individual threads from one to another that creates something.”

--Sandra Day O’Connor

DEDICATION

This work is dedicated to my mother, Mary Alice Page (1917-2007), who inspires me to this day.

For all the days I walk on the face of this earth,

I will be rich because you were my mother.

You believed in me before I ever thought to.

You knew I could succeed before I even tried.

Your love makes me wealthy beyond belief.

--Barbara Revor (2007)

ABSTRACT

by

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Olivet Nazarene University
May 2011

Major Area: Ethical Leadership Number of Words: 110

This study investigates the comprehension monitoring skills of first-year readers at both a two-year institution and a four-year institution in the Midwest. The Metacognitive Awareness of Reading Strategies Inventory (MARSI) was used to assess skills. The MARSI, developed by Mokhtari and Reichard (2002), assesses reading strategies in the areas of problem-solving, support reading, and global reading. Simple *t*-tests were used to compare the items on the survey relating to understanding and comprehension monitoring. Results reveal no statistical difference between the students at the two institutions; however, the MARSI was able to show where instructors need to begin instruction to help adult readers deficient in comprehension monitoring strategies.

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CHAPTER I

INTRODUCTION

Postsecondary students come in a variety of types with diverse levels of academic preparation and learning needs. Some are continuing an education immediately following high school graduation; others are returning to school after work experiences that prompt a need for continuing education, additional training, or advanced degrees. These adult students will enroll in a traditional four-year institution or a two-year community college. Each of these groups of adult students may have gaps in their understanding of (a) how they learn and (b) the extent to which their basic learning skills, particularly their academic reading skills, have developed. Most are unaware that how they learn as adults differs greatly from how they learned as elementary or secondary students.

In the early 1970s the concept that adults and children learn differently was first introduced in the United States by Malcolm Knowles (Holton, Swanson, & Knowles, 1998). Flavell, an American developmental psychologist, noted that elementary students do not necessarily learn the same way as secondary students when they are given identical instructions (Jenkins, 1979). Dusan Savicevic, a Yugoslavian adult educator, first introduced the concept of andragogy into the American culture in 1967 (Reischmann, 2005). Andragogy can be defined as a set of core adult learning principles that apply to all adult learning situations. Holton (1998) further outlines adult learning as inextricably intertwined with adult development, occurring along multiple paths and multiple dimensions, varying primarily with stages of cognitive development, and

varying with motivation and readiness to learn primarily according to the stage of life-span. These adult learning characteristics are important for helping adult students understand their learning skills in general and improving their academic reading skills in particular.

Traditionally, the six essential threads of reading are readiness/phonemic awareness, phonics and decoding, fluency, vocabulary and word recognition, comprehension, and higher-order thinking (Tankersley, 2003). Obviously, adults returning to school for advanced training have mastered readiness, phonics, decoding skills, and most likely fluency. Vocabulary and word recognition skills taught to children include learning new words from class discussions, conversations, words encountered in reading, and those they hear read to them. Comprehension skills include interpreting the text at a literal level, making inferences from the text along with creating meaning that goes beyond the printed word, and elaboration on the text so that the meanings acquired in one context can be applied to other similar situations. Higher-order thinking skills include comprehension monitoring: checking for understanding, knowing what one does and does not know, and knowing how to apply a fix-up strategy to material not understood (Bell & McCallum, 2008).

In all likelihood there are gaps between what is taught today to elementary and secondary students and what adult students know about their higher order reading skills. Many college learners may have missed out on some of the innovative reading techniques developed since they were in school.

New research indicates that metacognitive strategies, hereafter referred to as comprehension monitoring skills, are important contributors to reading comprehension, above and beyond basic skills such as word recognition, and that evaluating and regulating comprehension are associated with better reading comprehension than evaluating alone (Baker, 2008). Baker further asserts that new research is needed to determine the most critical metacognitive strategies to teach. The knowledge that there are gaps in understanding which prevent further or additional understanding is an important key to literacy development. Not only does it permit teachers to find out how students think about reading and writing, it also permits students to have control over reading processes. Confidence and control over these processes help to ensure that students become lifelong learners who use their literacy to learn.

According to Rhodes and Shanklin (1993) “Students are not always metacognitively aware of what they do. But those who are aware of what they do as literacy users have greater control of the processes and are more likely to make use of their resources in solving the problems they encounter” (p. 112). Many studies (Block, 2005; Pang, 2008; Schmitt, 1990; Schraw & Dennison, 1994) have developed metacognitive assessments for elementary and secondary students, but little has been done to study the needs of the adult student. The purpose of this study was to (a) assess the comprehension monitoring skills of college readers, (b) compare the comprehension monitoring skills of first-year college students at a four-year school with first-year college students at a two-year school, and (c) assess the extent to which using the Metacognitive Awareness of Reading Strategies Inventory (MARSI) may enhance the comprehension monitoring abilities of first-year college students in reading classes.

Statement of the Problem

There are essentially two streams of students who are enrolling in colleges and universities today. College students may attend either traditional four-year colleges or two-year colleges. There have been changes in how reading has been taught in recent years with more emphasis on comprehension and higher-order thinking and reading skills. More emphasis has been put on linking comprehension monitoring and the development of reading skills. A problem exists in that some college students may have gaps in their understanding of how they learn or their understanding of the mastery of their executive function skills.

There are numerous metacognitive assessment techniques available, some involving informal classroom questions to ask students and some involving more formal techniques. Modern research has identified the importance of metacognitive processes, specifically comprehension monitoring skills, for readers to comprehend text (Baker, 2001; Block & Pressley, 2002). Comprehension monitoring is an important key to literacy development. Not only does it permit teachers to find out how students think about reading and writing, it also permits students to have control over the processes. Confidence and control over these processes help to ensure that students become lifelong learners who use their literacy to learn (Rhodes & Shanklin 1993). The research challenge of this study was to determine the extent to which two groups of students demonstrate comprehension monitoring skills: first-year college readers at four-year schools and first-year college readers at community colleges. Further, the purpose of this study was to measure differences between college students at four-year schools and college students at two-year schools.

Background

There is no gene for reading and, though there is evidence that humans are hardwired to listen and speak, reading is not a natural process (Fisher, Frey, & Lapp, 2009). Developmental models of reading show reading development beginning with early skills such as awareness of print and progressing toward reading for higher-order comprehension (Bell & McCallum, 2008). Chall's (1996) model of reading development contains six stages: (a) birth to grade one or emergent literacy where written language, alphabet, and phonemic awareness are learned; (b) beginning grade one or decoding where letter-sound correspondences are learned; (c) end of grade one to end of grade three or confirmation and fluency where automatic word recognition and use of context are learned; (d) grades four to five or learning the new single viewpoint where learning from text, vocabulary knowledge, and strategies are learned; (e) high school and early college or multiple viewpoints where reconciling of different views is learned; and (f) late college and graduate school or world view where developing a well-founded view of the world is learned. It is most likely within the college levels that comprehension monitoring, a higher order thinking skill, is developed.

An informational processing model of reading reveals where the higher-order thinking processes come to play in the reading process. Stimuli (sensory information such as text) come in from the environment initially through receptors (such as the ears and eyes). This information then interacts with information in memory so that new knowledge can be produced in working memory through the interaction of incoming information and information stored in memory (Bell & McCallum, 2008). Gagne, Yekovich and Yekovich (1993) stated that the working memory contains the ideas that

are in the awareness. This working memory consists of two fundamental memory stores: declarative knowledge and procedural knowledge. Declarative knowledge is the knowing about something, and this is the part that is relevant to reading. Procedural knowledge is knowing how to do something such as knowing how to extract meaning from the printed text.

Comprehension is developed as a student learns to recognize what he does not know and figures out how to overcome the unknown. According to Pressley (2002), awareness of one's thinking is necessary for a student to be able to monitor his comprehension. If students do not know they are lost, the directions will not help them. The purpose and aim of comprehension instruction is to teach students to find their way by giving them directions on how to get to the end product. A possible gap may exist between what students are taught about comprehension monitoring in the elementary school and what college learners know about their ability to monitor their comprehension.

It has long been known that the teaching of metacognitive skills is important in reading instruction. Rhodes and Shanklin (1993) point out that according to a summary of the research by the Institute for Research on Teaching:

> Students in low reading groups who receive such instruction [in metacognition] demonstrate better awareness and achievement than students of teachers who do not provide such instruction. . . . These students demonstrate higher achievement on a variety of traditional and non-traditional reading achievement measures than do other students. (p. 110)

"An important theoretical assumption is that the processes used when reading easy text are different (e.g., more automatic) than those used when reading challenging text (e.g., deliberate)" (Pressley & Afflerbach, 1995, p. 136). Elementary students or readers reading easier texts then will use different processes than adult learners who are using more challenging texts. The assessments then used for the easy texts should not be the same as those used for the more challenging texts.

Research Questions

The research questions for this study are as follows:

1. To what extent do first-year college readers at a four-year college report an awareness of their comprehension monitoring skills?
2. To what extent do first-year college readers at a two-year college report an awareness of their comprehension monitoring skills?
3. Are there differences in the extent to which college readers at a four-year school and college readers at a two-year school report an awareness of their comprehension monitoring?

Description of Terms

Adult learners. Adult learners are students of college age or older who have returned to school (Knowles, Holton & Swanson, 1998).

Andragogy. Andragogy is a set of core adult learning principles that apply to all adult learning situations (Reischmann, 2005).

Assessments. Assessments are devices used to measure learning (Bell & McCallum, 2008).

Clusters. Clusters are reading skills with similar characteristics (Pressley, 2006).

Cognition. Cognition is the process of acquiring a conscious awareness; perception; mental ability (Bell & McCallum, 2008).

Cognitive knowledge. Cognitive knowledge is a person's stored information about human thinking, especially about the features of his own thinking (Kluwe, 2000).

Community college. A community college is an institution of higher learning that typically instructs students for two years beyond high school (Lach, 1998).

Comprehension. Comprehension is the process of constructing meaning from what is read and relies on all reading sub-skills (Bell & McCallum, 2008).

Comprehension monitoring. Comprehension monitoring is regularly reviewing what has been read so the reader is able to regulate his own thinking processes in order to copy with changing situational demands. (Hacker, 1998).

Criterion. Criterion is a standard for comparison or judgment used to assess skills within a particular area of content (Spear-Swerling & Sternberg, 1998).

Declarative knowledge. Declarative knowledge is knowing about something or knowing that something is the case (Bell & McCallum, 2008).

Decoding. Decoding is the process or associating written symbols (e.g., letters) with sounds to create words (Bell & McCallum, 2008).

Domain. A domain is a sphere of action or knowledge of meaningful patterns in long-term memory (Chi, 1987).

Elementary students. Elementary students are those in grades preschool through eighth grade—ages 4-13 (Illinois State Board of Education, 2008).

Fix-up strategy. A fix-up strategy is a reading strategy used by the reader to help comprehend a difficult passage or word (Bell & McCallum, 2008).

Fluency. Fluency is the ability to read efficiently, accurately, easily, and with appropriate inflection, rhythm, intonation, and expression (Bell & McCallum, 2008).

Higher-order thinking skills. Higher-order thinking skills are sophisticated thinking skills toward the top of Bloom's taxonomy (1984) including comprehension, synthesis, and creativity (Torff, 2003).

KMA. The Knowledge Monitoring Assessment (KMA) is a survey that evaluates the discrepancy between a student's estimated ability and the actual demonstrated knowledge (Tobias and Everson, 2002).

Literacy. Literacy is the ability to read and write and is a continuously developing skill (Adams, 1990).

MAI. The Metacognitive Awareness Inventory (MAI) is a 51-item self-report scale measuring different aspects of students' metacognitive processes (Schraw & Dennison, 1994).

MARCI. The Memory and Reasoning Competence Inventory (MARCI) is a 16-item self-report that requires a Likert-type six-point scale (Kleitman & Stankov, 2007).

MARSI. The Metacognitive Awareness of Reading Strategies Inventory (MARSI) is a 30-item self-report using a five-point scale (Mokhtari & Reichard, 2002).

Memory. Memory is the mental capacity of retaining and reviving impressions; remembrance; recollection (Gagne, Yekovich, & Yekovich, 1993).

Metacognition. Metacognition is the understanding that there is a gap in your understanding which prevents further or complete understanding (Weinert & Kluwe, 1987).

ME-AT. The Metacognitive Expertise Assessment Tool (ME-AT) is a 50-item Likert metacognitive assessment tool (Pang, 2008).

Metacognitive assessments. Metacognitive assessments are tests or measures used to determine if a student comprehends what is being read (Israel, et al., 2005).

Monitor. To monitor means to set a goal, check to see if the goal is being reached, and implement remedial strategies if the goal is not being reached (Gagne, Yekovich, & Yekovich, 1993).

MPI. The Metacognitive Process Inventory (MPI) is an assessment tool developed to assess 11 metacognitive processes (Block, 2005).

Phonics. Phonics is the knowledge of the relationship between sounds and letters (Bell & McCallum, 2008).

Phonemic awareness. Phonemic awareness is the ability to appreciate differences in individual speech sounds (Bell & McCallum, 2008).

Postsecondary student. A postsecondary student is one who has completed high school and is pursuing further education (Illinois State Board of Education, 2007).

Procedural knowledge. Procedural knowledge is knowing how to do something; in reading, knowing how to engage the processes necessary to extract meaning from printed text (Bell & McCallum, 2008).

Processing. Processing involves always changing a response to a text as it is read. (Pressley & Afflerbach, 1995).

Proposition. A proposition is the basic unit of declarative knowledge which expresses or proposes relationships among concepts (Gagne, Yekovich & Yekovich, 1993).

Receptors. Receptors are sensory nerve ending organs such as eyes or ears (Bell & McCallum, 2008).

Regulation. Regulation means to direct or keep in good order (Vygotsky, 1978).

Schema. Schema is the mechanism by which readers access what they know and match it to the information in a text (Farstrup & Samuels, 2002).

Secondary students. Secondary students are those in high school or college—ages 14-22 (Illinois State Board of Education, 2008).

Skills. Skills are a coordination of higher-order processes and lower-order processes (Pressley, 2006).

Short-term memory. Short-term memory refers to things not stored in long-term memory; things of lesser importance such as grocery lists and directions to places attended only once (Bell & McCallum, 2008).

Stimuli. Stimuli are sensory information such as a text (Bell & McCallum. 2008).

Word recognition. Word recognition is the ability to recognize and understand new words and their meanings in text while consuming few mental resources (Spear-Swerling & Sternberg, 1998).

Working memory. Working memory contains the two fundamental memory stores called procedural knowledge and declarative knowledge (Bell & McCallum, 2008).

Significance of the Study

Comprehension monitoring is an important key to literacy development, and as such it not only permits teachers "to find out how students think about reading and writing, it also permits students to have control over the processes. Confidence and control over these processes help to insure that students become lifelong learners who use

their literacy to learn" (Rhodes & Shanklin 1993, p. 143). Becoming lifelong learners is the goal of education as many schools' mission statements recognize. Educators need to be able to meet the needs of all students, including adult learners. For this to happen, comprehension monitoring skills specifically for adults need to be studied. Most of the current studies have involved elementary or high school students. Little has been done to study comprehension monitoring in adults or assessments that measure comprehension monitoring for this group of learners.

"Too many students have reading assessment done to them, or for them. Only reading assessment that is done with students and eventually by students can foster true independence and success in reading" (Afflerbach, 2002, p. 99). Comprehension monitoring is understanding what is not known, and many adult learners return to school because they do not know specific knowledge or have specific skills and realize that education is the key to bettering themselves. These learners are more likely to realize the importance of comprehension monitoring assessments and be in a better position than younger learners to help with this self-assessment. Whether or not there is a difference in the comprehension monitoring abilities of first-year students at a four-year institution and the first-year students at a two-year community college was the purpose of this study.

Procedure to Accomplish

This study was accomplished by reviewing the literature on metacognitive reading skills in adult college students and selecting a metacognitive assessment for use with two categories of postsecondary students: (a) first-year students from a four-year institution and (b) first-year students from a two-year community college. Two college reading instructors were recruited: a first-year college reading instructor from a four-year college

and a first-year college reading instructor from a two-year school. Permission was sought and granted to assess the comprehension monitoring skills of the students in their respective classrooms in the fall 2009 term. No extra credit or course credit was offered for students participating in the survey. A second set of students was recruited from the same instructors for the fall of 2010 to give two groups of students per category for comparison. The MARSI was developed by Mokhtari & Reichard (2004) and was administered to the initial group of students of both instructors in the fall of 2009. In the fall of 2010 subsequent groups of first-year students with the same instructors were also given the MARSI. (Permission was granted from the author to use the MARSI for the study.) Students' responses from each data set were aggregated and data were analyzed using SPSS statistical software.

Descriptive statistics (i.e., means and stand deviations) were computed to describe student responses by category. Inferential statistics (i.e., *t*-tests) were computed to look for statistically significant differences between responses from the first-year students from the four-year institution and responses from the first-year students from the two-year college. Means were compared between the individual survey number items and between the two different groups. Standard deviations between the survey number items and the two groups were also compared.

Comprehension monitoring, a higher order thinking skill, helps students understand what they have read. Students who are able to understand what they do not know and are able to apply a fix-up strategy to remedy the situation are in a better position to learn and understand. This monitoring skill extends into the areas of reading, listening, and writing as well. Improvement with comprehension monitoring in one area

extends into other areas of students' learning providing overlapping improvements. It is hoped that by studying the comprehension monitoring of adult readers and comparing the first-year readers from four-year institutions with the first-year readers from two-year community colleges that the adult segment of learners can be better served and that adult learners will have a better chance to become better prepared for postsecondary learning opportunities.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The academic success of postsecondary college students is dependent, in part, on the academic skills students have developed in elementary and secondary education. College and university professors expect college students who enroll in postsecondary education to have mastered more than basic skills in math, writing, and reading; however, it is likely that such professorial presumptions about the readiness of college students for college level learning are erroneous. Another erroneous assumption is that students enter postsecondary education directly from stellar high school programs that prepare students for college learning.

The reality is that often students beginning their college experience are ill-prepared to handle the rigor of college-level learning particularly if their reading skills are not developed enough for the student to be able to monitor how well he comprehends what has been read. A review of the literature relative to the reading preparation of adult readers suggested that college readers (a) enter college from different educational backgrounds and experiences, (b) may be products of diverse approaches to reading instruction, (c) learn differently than children, (d) have not always developed higher order reading skills, and (e) sometimes lack the skills needed to monitor their reading comprehension, (Rattin, 2001). Assessing students' abilities to monitor their reading comprehension is an important first step in developing a curricular model for improving comprehension monitoring in adult learners. It is the purpose of this study to determine

what gaps might be missing in the previous reading experiences of college students in four-year and two-year institutions.

Educational Backgrounds of Postsecondary Readers

The educational backgrounds of postsecondary readers may not always reflect the same experiences especially with regard to reading skills acquired due to the fact that there is no universally required curriculum taught to high school students entering college. Postsecondary students may be defined as high school graduates enrolled in two-year or four-year degree granting colleges or universities. About half (54%) of first-time bachelor's degree recipients begin their postsecondary education at a public four-year institution while 16% begin at a public two-year college. Of those, 30% completed an associate's degree prior to earning a bachelor's degree (Knepper, 1996).

According to the Illinois College Board the community colleges of Illinois enrolled approximately 64.4% of all students who attended public college or university during the fall of 2004 (Data and Characteristics of the Illinois Community College Board, 2005). Horn (2006) reported that community colleges represent about 7.6 million students nationwide, most of whom were likely to be female, older, Black or Hispanic, and from lower socioeconomic status. Community college students also tended to be independent financially as compared to students at four-year institutions who were funded by family; community college students often worked full or part time and were parents or single parents. The majority of community college students younger than 24 were committed to attending regularly and were intent on transferring to a four-year school to complete a degree.

Studies of the reading habits and practices of college students are quite limited and results are often inconsistent (Mokhtari, Reichard, & Gardner, 2009). In a report from the Alliance for Excellent Education, Bianearosa & Snow (as cited in Wise, 2009) suggested that adult students were not fully prepared to "succeed in their courses because they had only partially mastered the more advanced reading capabilities increasingly needed for challenging high school work" (p. 369). Large numbers of high school graduates are unprepared for college work; one in three college freshmen take at least one remedial course in reading. In urban community colleges that percentage can be about three in every four new students with minorities less well-prepared than their white peers (Pennington, 2004). In addition, Rao (2005) suggested that students who have the option to skip developmental classes had lower persistence rates while those who took and passed remedial reading courses had greater success in college over the long term.

Models of Reading Instruction

Postsecondary students' reading skills are shaped, in part, by the reading instruction in the curriculum they have in elementary and secondary school. Elementary and secondary schools around the country employ a variety of models for reading instruction. The purpose of a reading model is to see the reader's mind at work (Ruddell & Unrau, 2004). Models give us a deeper understanding of the reading process and show us where comprehension is lacking. Models also provide perspective and context to enhance understanding (Bell & McCallum, 2008). Models are based on research and come from language processing, social and cultural contexts of literacy, literacy development, comprehension and comprehension theories, reader response and engagement or instructional effects on literacy development. For the purposes of this

study only developmental, cognitive, and information processing models are discussed in order to focus the study on the models that more closely link and support the development of comprehension monitoring.

Developmental Reading Models

Chall's (1996) reading model covers the development of reading skills from early childhood through adulthood. The stages for this model include (a) stage 0 which covers birth to grade one or emergent literacy where written language, alphabet, and phonemic awareness are learned; (b) stage 1 is beginning grade one or decoding where letter-sound correspondences are learned; (c) stage 2 is end of grade one to end of grade three or confirmation and fluency where automatic word recognition and use of context are learned; (d) stage 3 is grades four to five or learning the new single viewpoint where learning from text, vocabulary knowledge, and strategies are learned; (e) stage 4 is high school and early college or multiple viewpoints where reconciling of different views are learned; and (f) stage 5 is late college and graduate school or world view where developing a well-founded view of the world are learned. This model gives a picture of what happens developmentally as a reader works through the various stages of reading development.

Chall (1983) stated that the stages are less theory and more a model for reading stages and that the focus should be on the reader and the environment which has an effect on the individual reader. Theoretical foundations for each of the developmental stages were drawn from Piaget, Wolff, Freud, and Perry (as cited in Chall). Successive stages within the model are characterized by growth, and the reader's responses become more general and more inferential and critical throughout the successive stages. Chall also

noted that if a reader persists in techniques or habits within one stage for too long, it may delay the transition to the next stage. The reader's "attitudes toward reading are related to those of his or her family, culture, and school" (p. 12).

The first stage of the Chall (1983) model covers a great deal of time and reveals the greatest series of changes from all the other stages. The reader gains control over syntax, words, rhyme, alliteration, and blends among other skills. Often the concepts gained during this stage are predictive of future reading success and cover the initial learning of the alphabet and cognitive knowledge about reading. Insights are gained in this stage about the nature of spelling patterns also. "Because it is difficult to hear the same sounds when they are in different positions in a word or in different contexts, a capacity for abstraction seems to be important, even for Stage 1" (p. 16). Biemiller's (1970) study gave three phases corresponding to three changes in oral reading errors that coincided with increasing ability in reading. These include a first phase characterized by word-substitution errors, a second phase characterized by increased no response with more errors of a graphic resemblance to the printed word and a loss of some of the semantic acceptability, and a third phase characterized by concern with graphic exactness and a greater semantic acceptability. The study noted that all readers seemed to move through the phases in the same order, and it was only when they "let go of the 'meaning' substitutions and worked instead on what the word looked and sounded like that they made substantial progress" (p. 17). Biemiller noted that the second phase with its greater emphasis on graphic accuracy seemed necessary for entrance into the seemingly easier third phase. Chall explained it as having to "know enough about the print in order to leave the print" (p. 18).

Stage two involves increased fluency and confirmation of what was learned in stage one. There is increased attention to high-frequency words, and complex phonic elements and generalizations were learned during this stage. Chall (1983) noted that it is possible that stage two continued throughout life, and those adults who read fiction, magazines, mysteries, etc. were confirming and satisfying their reading ability. Readers in this stage used decoding knowledge and the redundancies in the language as they gained skill and learned to use context to gain fluency and speed. Reading of familiar books along with greater practice set the stage for the more difficult challenges of stage three.

New knowledge, information, and experience marks stage three, which relates print to ideas. By the end of this stage reading might equal or surpass learning by listening as growing importance of word meanings and prior knowledge become more prominent. Stage three is also marked by the ability to find information in a paragraph, chapter, or book. The reader begins to go beyond the elemental and common experiences of the unschooled to more abstract words and longer and more complex sentences. Mastering ideas and concepts are apparent as the reader develops the ability to read beyond egocentric purposes and to read about conventional knowledge. This stage is characteristic of the adult reader who has the ability to analyze what is read and to react critically to different viewpoints.

Stage four involves dealing with more than one point of view as it developed the ability to deal with layers of facts and concepts acquired earlier. The basic knowledge acquired in stage three makes the reading of materials with multiple viewpoints possible. Most of stage four is acquired through formal education and requires the ability to

comprehend ever-more difficult concepts and new points of view gained through the reading.

Stage five is the most mature stage where the reader learns to read for specific purposes and decides whether or not to read only the beginning, middle or end of a work. It is open to discussion as to whether all people are able to achieve stage five which is essentially constructive. The reader constructs knowledge for himself or herself by analyzing, synthesizing, and judging as he or she balances comprehension of ideas read with one's analysis of those ideas along with one's own ideas. The reader is able in this stage to construct knowledge on a "higher level of abstraction and generality and to create one's own 'truth' from the 'truths' of others" (Chall, 1983, p. 24). Chall noted that each stage presupposes skills acquired in the previous stages, but that does not mean that the reader cannot learn to read without the full range of pre-reading abilities and skills.

Another developmental model is that of Spear-Swerling & Sternberg (1998). In this model the reader progresses through various stages ranging from the visual cue recognition stage to the strategic reading stage. Readers at the beginning stages have very little comprehension and progress to the strategic stage where higher-order thinking and comprehension take place. This model shows the development of comprehension and constructing meaning from what is read as the reader moves through the stages. The Spear-Swerling & Sternberg model includes the following stages ranging from non-alphabetic readers to high proficient readers: visual cue word recognition, alphabetic insight, phonetic cue word recognition, controlled word recognition, automatic word recognition, strategic reading, and highly proficient reading. This model is an additional way of looking at developmental reading where stages as opposed to ages are used. Part

of Spear-Swerling & Sternberg's model comes from work in psychology known as information-processing research (Spear-Swerling & Sternberg, 1998). An interactive view of reading was taken; in other words, reading acquisition came about as a result of intrinsic characteristics and factors in the environment and was not merely the appearance and development of innate aptitudes. Readers go through cognitive phases, which appear linked to age, as they learn to read; the sequence of the phases is similar to others although some variances might appear.

Word recognition skills, which are tied to the development of phonological-processing skills, are so much a part of the Spear-Swerling & Sternberg (1998) reading model. The authors even state that "progress in reading is tied to the development of word-recognition and phonological skills" (Spear-Swerling & Sternberg, p. 82) and describe four phonological processes: phonological awareness, phonological reading, phonological coding in working memory, and phonological processes in lexical access. Spear-Swerling & Sternberg noted that readers do begin formal reading instruction with their own individual phonological processing system which may be different from other readers.

The phonological awareness system is based on an awareness of the sound structure of spoken language according to Spear-Swerling & Sternberg (1998). The phonological reading system measures the phonological reading of written words in isolation. The phonological coding of working memory is concerned with the information that is mentally represented such as a speech-based code or phonological code; this appears especially important during reading. The final system mentioned by Spear-Swerling & Sternberg is the phonological processes in lexical access system in which the

focus is not on reading for comprehension but in reading words in isolation. “Lexical access means accessing the mental representation of a word in memory” (p. 84). This process measures both the recognition of a string of letters as a word and the rapid naming of pictures of objects, numbers, words, or letters. This recognition may be either by a mental pathway for recognition or by a phonological route according to the authors, though other researchers view the dual route as artificial.

It is evident that readers do begin formal reading instruction with different phonological processing systems (Spear-Swerling & Sternberg, 1998), and the authors note that not all reading development unfolded naturally and automatically even though exposure to literacy experiences was provided. It is, for example, not possible to isolate the phonemes of the word big in normal speech. If all phonemes were pronounced, our language would be altered unnaturally, and it would take excessive time to converse. Awareness then of phonemes is not a natural process but one that exists below the level of conscious awareness. It is also a process that must be achieved to some degree in order for a reader to decode and make meaning from words in print, a similarity that exists in a variety of alphabetic languages including English, French, Russian, Italian, and Swedish.

In the visual-cue word recognition phase the reader uses some kind of salient visual cue such as the shape of the word or the logo to make meaning. The reader recognizes the visual-cue word but does not yet recognize that the letters comprise the information to make the word. This phase does not require total alphabetic knowledge or sounds in order to implement. The reader at this stage has difficulty deducing the alphabetic principle from his whole-word instructional approach (Spear-Swerling & Sternberg, 1998). The authors note that Seymour and Elder (1986) concluded that

deducing the alphabetic principle from the whole-word technique alone is extremely difficult.

During the phonetic-cue word recognition phase the reader begins to use partial phonetic cues to recognize words, often involving first or last letters. This phase requires reliance on context to facilitate word recognition and requires alphabetic insight, which in turn requires memory of at least some letter-sound relationships and a rudimentary level of phonological knowledge (Spear-Swerling & Sternberg, 1998). Phonological knowledge is bidirectional; in other words, it is caused by both awareness of sound-letter relationships and reading skill. Stahl and Murray (as cited in Spear-Swerling & Sternberg, 1998) noted that onset-rime awareness appeared to be essential to early reading acquisition.

The third phase of controlled word recognition requires accurate word recognition skills. The reader has to be able to use all the letters in the word in order to make meaning even though this might be a difficult process and is not yet automatic. Orthographic knowledge, knowledge about spelling patterns within the language, is critical in order to attain controlled word recognition at this phase. Context is important to make meaning, and exposure to text helps to influence the development of orthographic knowledge.

Automatic word recognition or reading and recognizing words with little effort occur in the next phase. This sets the stage for increased rapid reading comprehension. The reader begins to spend more time on understanding the text and less time on deciphering the words (Spear-Swerling & Sternberg, 1998). The authors defined automatic word recognition as word recognition that consumed few mental resources (p. 100). Word recognition is not defined by prior knowledge or by context and can vary

depending on the type of words being read. Practice without mistakes seems to be particularly important in development of automatic word recognition.

Strategic reading involves the use of strategies to aid in reading comprehension. When the reader does not understand, he uses a fix-up strategy. These strategies are general strategies that can be applied across a wide variety of tasks and domains. This stage is marked by development of automatic word recognition, increasing metacognitive development, and increased demand for the understanding of text read. Strategies needed are of less demand if a strong prior knowledge exists. Strategies might be revealed in one situation but not in another, being less likely to show up in an unfamiliar setting. Transition to strategic reader might occur quickly but continues to expand throughout life (Spear-Swerling & Sternberg, 1998).

The proficient adult reader stage involves the use of insightful, analytical, and reflective knowledge from a variety of sources. This is accomplished with maturation, increased knowledge base, and better vocabulary understanding. Increased exposure to reading as well as specific comprehension demands experienced by the reader seems to make a difference as to when this stage is reached (Spear-Swerling & Sternberg, 1998).

Frith's developmental phase model organizes diverse reading predictors for success into a logical hierarchical development. Five phases of reading were identified and the types of skills to be acquired and consolidated in each phase were listed. These basic phases were logographic phase, early alphabetic phase, late alphabetic phase, early orthographic phase, and late orthographic phase. The Tennessee Center for the Study and Treatment of Dyslexia created a checklist of competencies within each phase which can be used as a valuable tool to target an appropriate entry point for remediation for early

readers because the elements listed in each phase describe the skills to be attained within that particular phase (Sawyer, Kim, & Lipa-Wade, 2000, p. 88).

Gough & Juel (1991) developed a partial reading model involving the first stages of word recognition. The authors divide the process into three stages. The first stage is called selective association and involves a response associated with a cue the learner noticed in relationship to the word. The reader might cue in on a letter, matching letters, or the entire property of the word and ignore the word itself. As the cueing system begins to become saturated, it becomes harder and harder to find a new cue for each new word. In order for the system to work, the reader must have seen the word before and selected an identifying cue for each word. The context in which the word is found may or may not help the reader identify the word meaning.

The second stage for Gough & Juel's (1991) model came when the first phase was saturated and no longer worked due to volume. This second stage is called the cipher and is related to orthography. However, the rules of the cipher are many more than those found in phonics and the rules are implicit. Mastery of the cipher can be seen in the pronunciation of pseudowords. The cipher internalizes a process called cryptanalysis (p. 51) which requires cryptanalytic intent or a grasp of knowledge of a system of correspondence, awareness of letters in correspondence to sounds, awareness of the corresponding sounds, and data in the form of printed words paired with spoken equivalents. Phonemic awareness seems to be the trigger for the transition to the cipher stage. "Mastery of the cipher alters the reader: it changes how he recognizes words, and it changes how he spells them" (p. 54) making it essential that readers learn to decode early

in the reading process. “The early mastery of the cipher is the critical step in reading acquisition” (p. 56). Following this step, the child learns to read.

Ehri (1991) also had a partial reading model that involved spelling, recoding, and sight words. According to this model readers utilize various sources of knowledge that are stored in the memory in order to process words and read. Individual word recognition has three successive phases: first, unfamiliar words are recognized with increasing accuracy as readers attended to letter-sound relations while reading; second, words become familiar enough to be recognized automatically as a result of more practice; third, words become recognized with increasing speed as processes are consolidated in the memory. Stage one is the initial reading and decoding stage, stage two is where the reader acquires fluency in reading, and stage three is when the reader emerges with the ability to acquire new information from the text. Ehri stated that “learning to process graphemic cues accurately, automatically, and rapidly is one of the hardest parts of learning to read” (p. 58).

Ehri (1979) stated that movement into Chall’s (1983) stage one or decoding phase required letter knowledge and phonemic awareness. However, Ehri disagreed with Gough’s two-stage conception of word reading requiring a visual cue stage followed by a cipher word stage and believed instead in a three stage process with a phonetic cue reading stage inserted between Gough’s visual cue and cipher stages. This phonetic cue reading is seen as a primitive form of deciphering because “phonetic cue readers use letter-sound relations to read words just as cipher readers do” (Ehri, 1979, p. 63). The difference lays in the fact that phonetic cue readers make associations from only some of the letters and can only read words they have seen before and stored in their memory.

Learning the spelling system helps the reader manipulate phoneme constituents and provides visual symbols of pronunciations. Prereaders then use visual or context cues to identify words while later decoding skills allowing the reader to analyze phonemic symbols for pronunciations that are stored in the memory.

Cognitive Reading Models

A cognitive model of reading is helpful to identify underlying mental processes that take place as the reader processes meaning from written text. Adams' (1990) cognitive model of reading includes four major components. Information is taken in either through orthographic processing (print) or phonological processing (speech/sounds). Meaning processing determines what this information means, and context processing determines how the information relates to context. The context processor helps create meaning based on the situation in which the word is used or on its context (Bell & McCallum, 2008). Basically stimuli come in through the eyes and ears, interacted with information in the memory, and then new insights are produced in the working memory by the interaction of the incoming information and the information stored in the memory. Output in the form of thinking, speech, or movement are produced. Processing speed, memory, and environmental support from peer or teachers all influence this output.

Orthographic processing requires that the reader be able to accurately recognize individual letters for it is through the excitation or stimulus with the other letters within the word that associations and recognition capacity are strengthened. In order for word recognition to become proficient, the reader has to be able to recognize individual letters relatively quickly. The reader needs also to fully attend to the ordered sequence of letters

within the word in order to make meaning; this requires phonics or some system of word by sound. Adams (1990) suggested that readers be discouraged from skipping or glossing over words they do not immediately recognize. The best instructional strategy is to induce readers to "focus on the likely sequences that comprise syllables, words, and frequent blends and digraphs" (p. 134). Once the reader becomes familiar with spelling patterns, he begins to recognize syllables and words.

Adams (1990) stated that even though readers did not depend on phonological processing in order to recognize familiar words, they did seem to automatically use the process. Phonological translations add a degree of redundancy to the learning process which aid in fluency and comprehension. The phonological encoding serves as an alphabetic backup system to increase speed and completeness of meaning in unfamiliar words. It also expands the reader's memory of verbatim words and thus supports comprehension. Phonological processing "adds a critical degree of insurance and efficiency to the reading system" (p. 191). It accepts information from the outside (speech) and uses the information to activate or reactivate sounds or speech of its own.

The context processor constructs a coherent and ongoing interpretation of the text (Adams, 1990). It sends excitation units to the meaning processor in amounts depending on how predictable the meaning units are. Strong excitations gave a head start toward consciousness and meaning. The context processor also selects the correct meaning from among many and facilitates the reader's awareness of the appropriate word's meaning. The context processor does not prevent inappropriate answers but quickly settles on one particular answer. The context processor helps the reader across orthographic difficulties and thus increases the capacity to comprehend the text being read.

The meaning processor receives input from the other processors and is influenced by the speed and accuracy and precision of all the other processors (Adams, 1990). Inputs from the other processors give the system a degree of reliability: one might be misleading whereas several would detect incompatibility. If the meaning processor is unable to produce a coherent response, the meaning of the word will not be established. The meaning processor is the system that regulates the responses of the system as a whole. Context reinforces the system's understanding of a word's meaning, and the quality and completeness of the orthographic and phonological input aides the meaning processor in doing its work of making meaning from text. Remediation for any problems found in the meaning processor is more learning.

Information Processing Model

In a general information-processing model, information is received and then working memory works with the new information. The information is stored in long-term memory where it can later be retrieved. Then, the information is communicated via writing or speech. Such information processing models occur at a conscious level and are helpful to characterize mental processes that do not get much attention (Gagne, Yekovich, & Yekovich, 1993). "Information-processing analysis is the process of analyzing the cognitive elements underlying intellectual performances. . . and involves identifying the essential processes and mental representations and then specifying the sequence in which the processes occur" (p. 26).

Gagne, et al., (1993) developed a significant processing model reflecting the reading process. This model starts with stimuli such as text and concludes with comprehension which might include such complicated processes as thinking or other

internal responses. Between the input and the output are a series of complicated activities including the memory system which consists of three components: short-term memory, long-term memory, and working memory. Short-term memory involves rote memorization and is often not moved into long-term memory but is lost after a short period of time, whereas long-term memory involves the ability to successfully retrieve information after a longer period of time. Working memory holds thoughts and ideas in the mind so they can be used or transformed by the addition of new thoughts. It is used in performing conscious mental work. Long-term memory consists of two memory storages: declarative knowledge and procedural knowledge.

Declarative knowledge is knowledge that something is the case. This includes facts, theories, events, and objects. Procedural knowledge is knowing how to do something; it includes motor skills, cognitive skills, and cognitive strategies (Gagne, et al., 1993). "A reader's schema, or organized knowledge of the world, provides much of the basis for comprehending, learning, and remembering the ideas in stories and texts" (Anderson, 1984, p. 243). A reader understands a message when he is able to recall a schema that fits with the account of the objects and events of the message given. Comprehension occurs when "a schema is activated that provides a coherent explanation of the objects and events mentioned in the discourse" (p. 247). Gagne built on Anderson's ideas and theories of human intelligence in the informational processing model.

The basic unit of declarative knowledge is the proposition which expresses or proposes relationships among concepts; it corresponds to our ideas. A proposition is further broken down into a relation and one or more arguments. Relations have narrow

focus and might contain one or more arguments. Arguments are broken down into five types: subjects, objects, goals, instruments, and recipients. Words, phrases, and sentences are ways of expressing ideas; propositions represent the ideas themselves because they are more abstract. Propositions that share the same elements are said to be related in networks which store bits of information that are closely related (Gagne, et al., 1993).

Declarative knowledge can also be in the form of images or linear orderings. Images are units of knowledge about perceptual entities; linear orderings represent sequential or rank order information. Images are useful to represent special information, while linear orders are useful for sorting and retrieving order information. Propositions can be useful for thinking about abstract ideas. These three types of declarative knowledge (images, linear orderings, and propositions) afford an economical representation in a limited capacity working memory (Gagne, et al., 1993).

Procedural knowledge is knowledge of how to do something; its acquisition depended upon one's experiences. While declarative knowledge is static, procedural knowledge is active and represented in productions (Gagne, et al,, 1993). A production is represented in a condition-action rule which has both an if portion and a then portion. The conditions can be external or internal/mental to the individual as can actions. Productions produce purposive actions or behaviors, and cognition flows from one production to another. "This flow-of-control idea essentially states that in areas where we have acquired procedural knowledge, the control of our overt and cognitive behavior resides within this knowledge" (p. 97). As a result, the information processing system does not need to be under a separate executive control. Some procedural knowledge can be used across domains; for example, knowledge of the organization of reading expository text

can be used to recreate a written work that imitated the organization of the material read. Such knowledge helps the student to become expert and skilled. Thinking skills are referred to as procedural knowledge; they are under conscious control of the thinker. Other procedures are automatic. “Reading skill is really comprised of numerous sets of complicated procedures, some of which are automated and others of which are more controlled” (p. 105).

Both declarative and procedural knowledge are systems for economical storage of knowledge and experiences, and they both represent rules that control our behavior. Procedural knowledge, however, reduces working memory by controlling cognition and by becoming automated. Declarative knowledge is helpful for reflection, while procedural knowledge provides rapid performance of practiced skills. Declarative knowledge cannot be activated until a production is fired, whereas procedural knowledge is dynamic. Declarative knowledge can be learned quickly while procedural knowledge is slower because it does not produce or control behavior directly. Procedural knowledge can be modified in the early stages but once set in memory, it is very difficult to change. Both procedural and declarative knowledge run through the working memory (Gagne, et al., 1993).

Working memory is where new knowledge is added to old knowledge which is made up of a very active schema. New propositions triggers retrieval of related prior knowledge which stimulates the generation of new propositions that are stored close to the related prior knowledge activated during learning. A connection is established between the old and new knowledge. If a connection is not established, little is learned. In construction of new learning, cues of related information operate on the new information

to generate answers. Elaboration facilitates retrieval by providing alternate pathways along which activation can travel, and it aids retrieval by providing additional information from which an answer may be chosen (Anderson, 1983). Although information is organized spontaneously, elaboration enhances the memorability of the material and helps to improve recall by providing tight connections to relevant information already in long-term memory. Imagery and analogies may also aid in recall and retrieval of knowledge.

According to Gagne, readers used procedural knowledge in summarization and integration of text (Gagne, et al., 1993). "Procedural knowledge appears to have an impact on the component processes associated with reading comprehension" (p. 301). Yekovich, Walker, Ogle, and Thompson (as cited in Gagne, et al.) indicated an existing relationship between declarative knowledge and reading skill. According to Bell and McCallum (2008) in Gagne's model the declarative knowledge base, which included decoding sounds, letters, and words, stimulated literal or inferential comprehension. This comprehension requires integration of ideas, summarization or combining of ideas, and elaboration or logical consistencies from the new ideas. This complex processing of information, which is guided by comprehension monitoring or strategy-building components, implies that reading is a thinking process that requires higher-order thinking skills which includes comprehension monitoring.

Learning Characteristics of Adult Readers

Adult readers have different needs and learning guide lines than children. Holton and Swanson (1998) stated that andragogy, the study of adult learning principles that apply to all adult learning situations, consisted of six principles: (a), the learner's need to

know, (b,) self-concept of the learner, (c), prior experience of the learner, (d), readiness to learn, (e), orientation to learning, and (f), motivation to learn. Knowles (1978) listed the characteristics of the adult learners as (1) motivation to learn as needs are experienced, (2) learning as life-centered, (3) experience as the richest resource of learning, and (4) need for self-direction. Scales (1984) noted that as early as 1926 Lindeman had isolated key assumptions about adult learners: they were motivated to learn as they experienced needs and interests that learning will satisfy, their orientation to learning was life-centered, their experiences were the richest source for their learning, they had a deep need to be self-directing, and individual differences among people increased with age.

Education as a life-long process was identified as far back as 1930 by the president of Bennington College (Holton & Swanson, 1998). Thomas (1939) stated that "adult education is as different from ordinary schooling as adult life. . . Adult education, accordingly, makes special allowance for individual contributions from the students" (p. 365). In other words, adult education takes into consideration the learner's past experience and implements different techniques of instruction than might be used with younger learners. This might include gaps in the learner's experience or strategies not learned at a younger age. Important contributions to the theory of adult learning have come from the field of psychotherapy where Erikson's eight ages of man include the adult years in the last three stages: young adulthood, adulthood, and the final stage (Boeree, n.d.).

Houle (1961) conducted a study to isolate the reasons why adults engaged in continuing education. He found three basic types of individuals: goal-oriented learners who possess clear-cut objectives, activity-oriented learners who seek social contact, and

learning-oriented learners who seek knowledge for its own sake. Tough (as cited in Holton & Swanson, 1998) noted that most adults desire to keep learning and developing but that these desires are often blocked by such things as negative concepts, lack of opportunities, time constraints, or poor programs.

Cranton (1989) also noted four basic assumptions of adult learners and listed some implications that are commonly practiced: a learning climate that makes adults feel at ease, taking into consideration the student's self-directed tendencies, involving learners in their own learning, providing mutual responsibility for learning, practical applications of learning, and problem solving as a learning activity. Gagne (as cited in Cranton, 1989) identified seven types of learning (stimulus response, motor and verbal chaining, multiple discrimination, concept learning, rule learning, problem solving and signal learning) from a hierarchy of learning types that can be used for adults.

Rogers (1969) emphasized the self-actualization of the learner as a goal of education. He incorporated six characteristics of experiential learning as typical of adult education: perception of the subject matter as relevant, changes in self-perception, a non-threatening atmosphere for learning, facilitation by doing as a learning aide, learning as facilitated by active participation, and self-directed learning involving the whole person.

Brundage and Mackeracher (1980) conducted a voluminous search of adult learning and created a set of learning principles for educators. A total of 36 learning principles cited in the work include: self-esteem based on past experience, past experience presenting the adult learner with a paradox in the learning situation, the solutions for personal problems implemented by the individual, transforming previous

experience takes time and energy, adults learn best when they can set their own pace, and each individual adult has an individual learning style.

Higher Order Reading Skills

Reading skills develop along a progression beginning with sound recognition at just a few months of age to assimilation and production of complex thought processes into adulthood. Traditionally, the six essential threads of reading are readiness/phonemic awareness, phonics and decoding, fluency, vocabulary and word recognition, comprehension, and higher-order thinking (Tankersley, 2003). Higher order thinking skills include evaluation, synthesis, analysis, and interpretation. Bloom (1984) listed higher order thinking skills at the top of the hierarchy, which also includes analysis (separating, distinguishing, and discriminating), synthesis (combining, creating, explaining, organizing, and summarizing), and evaluation (appraising, contrasting, critiquing, defending, justifying, and supporting).

Duke and Pearson (2002) identified six higher-level strategies that readers use: (a), prediction/activation of prior knowledge, (b), using think-aloud strategies to monitor comprehension, (c), using text structures, (d), using and constructing visual models such as graphic organizers and imagery, (e), summarizing, and (f), questioning and answering questions while reading. These six strategies help the reader take meaning off the page. Rosenblatt (1965) noted that readers use prior knowledge and experience to make meaning from the text, and it was this background knowledge that helped the reader understand. Anderson (1984) saw the connection between background and understanding and named it “schemata” noting that the reader pulled meaning from a certain framework or picture and that a different background might provide a different meaning or set of

understanding. According to this theory, each reader brings a different set of unique experiences and background information sets, known as “schemata”, to the individual reading experience (Tankersley, 2003) making background information or prior knowledge of importance in the ability to display higher-order thinking skills.

Allington (2006) cited thoughtful literacy as discussions about literature that involved text to text, text to self, and text to world connections but went beyond simply making connections with the text. Literate talk involves summarizing, analyzing, and evaluating the ideas read from the text. Summarizing may include references to one’s own experiences (text to self) or references to other things read (test to text). Summarizing is rarely a mere collection of facts from what is read. The reader often displays an analysis of the speaker’s stance on the issues cited. Analysis is often a connection of other experiences from text to world comparisons the reader rejects or accepts using summary and synthesis to come up with a stance. Text to text similarities may be noted and text to self analysis made as the reader works through the text. Synthesis combines multiple sources to form a coherent framework which may involve analysis of some kind. This involves text to text, text to self, and text to world comparisons. Evaluation requires connections to themes and topics studied previously and involves comprehension, understanding, and a clear idea of what is read. Summarizing, analyzing, synthesizing, and evaluating are all part of higher order thinking skills needed to make meaning from the page.

Higher order thinking skills (HOTS) were described as the learner going above and beyond the information read to engage in processes such as discovery learning, reasoning, and organizing (Torff, 2003). Mansilla (2008) noted that learners must be

agents of their "own learning, critical inquirers, able to collaborate, able to apply higher order thinking skills to real-life problems, to manage cultural complexity and to make meaningful connections across disciplines." (p. 2). In other words, Mansilla believed that higher-order thinking skills are needed for students to be a success in today's society and to live lives that contribute to a society that functions well.

Since our knowledge base doubles every 18 months (Reinhold, 2004), it is important for educated individuals to be able to do more than just memorize facts. Today's educators need to emphasize educational techniques that involve problem solving where students will take the facts and figures and use the information to think (Boone, Boone, & Gartin, 2005). Critical thinking tests indicate instruction in higher-order thinking skills and the understanding of thinking itself shows gaps in inference, analysis, and evaluation skills (Young, 1992). Thinking skills can be defined as several generic terms: skillful thinking, critical thinking, and higher-order thinking skills all of which can be affected by instruction.

Current educators are beginning to look at Bloom's taxonomy as "interactive rather than a series of discrete, hierarchal entities. Knowledge, comprehension, application, analysis, synthesis, and evaluation are not necessarily regarded as consequential steps" (Young, 1992, p. 48). A rather recent look at Vygotsky's stages of sign use/concept development reveals stages that reflect the stages of self-regulatory/mastery of one's own thinking. These stages culminate in the development of higher mental functions (Gredler, 2009). This finding is a rather new development stemming from the fact that Vygotsky's writings were not properly translated into English until the late 1990s. Vygotsky labeled his stages as two premastery stages, a

stage of external regulation of one's thinking, and an internal regulation stage which usually occurred in adolescence. The first premastery stage is called the primitive stage; students rely on natural processes, and this first stage is characterized by attempts to address complex structures with primitive ways of thinking. This is followed by the premastery stage called the naïve psychology stage where a student is guided by concrete characteristics observed at the moment. The external regulation stage follows and is characteristic of the early school years. This stage is a bridge of ideas in the child's mind between concrete and abstract thinking. The fourth stage is one of internal regulation and two major changes are noted here: (a) entire new connections, and (b) internal processes. This final stage is what Vygotsky described as true conceptual thinking where the individual begins to think in concepts that lead to deep discovery and connections. This is the area of higher-order thinking skills where the highest level of mastery is attained and where self-regulation that involves a system of acts of thinking and the mastery of one's own thinking is at the highest level (Vygotsky, 1978).

Glade and Rossa (1985) listed thinking skills to include thing making, qualification, classification, operation analysis, seeing analogies, and structure analysis. Matthews (1989) asserted that many of the popular programs that promise to teach students to analyze, synthesize, and evaluate are often nonspecific and adaptable to an established curriculum. Ennis (1985) and others believed higher-order thinking skills were teachable because intelligence includes thinking skills and cognitive abilities that are teachable. Matthews' 1989 study concluded that "intelligence, as measured by scores on tests of cognitive ability, can be increased" and that "higher order thinking tests can be affected by instruction" (p. 204).

Marzano's system (as cited in Grice and Jones, 1989) included 21 thinking skills divided into the components of focusing, information gathering, remembering, organizing, analyzing, generating, integrating, and evaluating. Chuska's (1986) system grouped 27 thinking skills into five categories. These five categories include creative or inventive skills, logical skills, experimental or investigative skills, analytical or critical skills, and reflective skills. The literature reveals much overlapping in the area of what is considered a thinking skill pointing to a healthy agreement on what should be taught. Still many students lack thinking skills even though many organizations have endorsed its inclusion in their curricula.

The literature classifies higher order thinking skills into broad categories: critical thinking and creative thinking (Grice & Jones, 1989). In his book deBono (1986) named "generative thinking" and "lateral thinking" as creative thinking skills with lateral thinking as a description of the process. Ennis (1985) listed Bloom's skills of analysis, synthesis, and evaluation as higher order skills often considered essential for critical thinking. This gives a broad base on which to build thinking skills or higher-order thinking skills.

Metacognition is a broad term that includes knowledge of thinking processes in the here and now and in the long term (Pressley, 2002). For the here and now a student might question knowledge of an introduction or knowledge of an individual concept or word. Long term includes such thinking as planning to write or revise a piece of writing. Comprehension monitoring, however, is more specific than metacognition and includes specific strategies that an individual might consciously use to figure out a present assignment. "Metacognition, which is needed to use comprehension (monitoring)

strategies well, can begin during direct teacher explanations and modeling of strategies but develops most completely when students practice using comprehension strategies as they read" (p. 292).

Comprehension Monitoring

Higher-order thinking skills often require the student to make an assessment of what he or she knows or does not know about his or her learning. This comprehension monitoring is a critical skill adult readers need to develop in order to succeed at a two-year or a four-year institution of higher learning. Several models of comprehension monitoring have evolved over the past thirty years. Flavell, Brown, Kluwe, and Tobias and Everson (as cited in Pang, 2008) serve as models representative of the latest literature cited and the most widely recognized for expounding and clarifying the general definitions of comprehension monitoring. Flavell (1979) coined the term metacognition and claimed that cognitive enterprises occur through the actions of and interactions among four classes of phenomena: metacognitive knowledge, metacognitive experience, goals or tasks, and actions or strategies (p. 906). Metacognitive knowledge was further broken down into three major categories: person, task, and strategy (p. 907). Flavell believed the four classes needed to be considered together and not as separate items functioning independently of each other.

Brown's (1987) model divided the process into two main categories: reflection on cognitive abilities and self-regulation during a learning task. A learner needed to be aware of his cognitive abilities in order to perform a self-regulation assessment during the learning process. Brown (1978) introduced the term of executive control to explain the

regulation of the cognitive abilities the learner used. This control oversaw planning, monitoring, checking, and revising done at the time learning took place.

Hacker (1998) stated that a definition of metacognition should include at least knowledge of one's knowledge, processes, and cognitive monitoring as well as regulation of this knowledge and processes. In addition, Paris and Winograd (1990) noted that most researchers recognize a definition of metacognition or comprehension monitoring that includes self-appraisal and self-management of cognition (p. 17). Hacker divided the research into studies of cognitive monitoring, studies focused on "regulation of one's own thinking processes in order to cope with changing situational demands", studies involving both monitoring and regulation, and studies with a strong focus on educational application (p. 12).

Kluwe (2000) based his model on Flavell and Brown. As a result he came up with the two areas of metacognitive knowledge stored in long-term memory, and metacognitive strategies or skills that have to do with procedural knowledge. Information processing requires both data and processing. Data can be either domain knowledge such as educational or physical knowledge or cognitive knowledge such as stored assumptions and beliefs about thinking. Kluwe assumed that stored knowledge about cognition did not differ from other stored information about the domains of reality. Cognitive knowledge is stored, organized, and processed in the same way as other knowledge. An individual has some knowledge about cognitive states and activities and some knowledge about ways to change those states and activities. Kluwe came up with six categories of cognitive knowledge: general cognitive knowledge, diagnostic cognitive knowledge about oneself, diagnostic cognitive knowledge about others, knowledge about cognitive subject affairs,

and knowledge about means to transform cognitive subjects and affairs. Kluwe maintained that most studies were concerned with general cognitive knowledge and developmental problems. He saw the monitoring of one's own cognitive processes as an executive process with executive control being broken down into executive monitoring and executive regulation.

Tobias and Everson (2002) emphasized knowledge monitoring in their model. Their plan divided metacognitive processes into three components: knowledge about metacognition, monitoring one's learning processes, and the control of those processes. Tobias and Everson believed that accurate knowledge monitoring was critical for learning in school and training in business, industry, and government. Individuals who are able to see the difference between what they have learned and what they need to learn are able to focus on the task of learning the new material. In a 2002 report of 11 studies on knowledge monitoring, Tobias and Everson stated that "the ability to differentiate between what is known (learned) and what is unknown (unlearned) is an important ingredient in all learning activities for success in all academic settings" (p. 21). Their information on the metacognitive skill of knowledge monitoring is based on an assessment developed by Tobias and Everson and is called the Knowledge Monitoring assessment (KMA). The KMA is a 34-item word list where learners indicate the words they think they know and the ones they think they do not know. Their knowledge is then tested by a follow-up, multiple-choice vocabulary test.

In addition, Block (2005) identified eleven metacognitive processes that could be pulled from the various models of metacognition. These include semantic, syntactic, fusion of semantic and syntactic, internal consistencies, external consistencies,

propositional cohesiveness, structural cohesiveness, informational processes, character's personality development, personal reflections, and metacognitive coherence. Little research has been done to determine if these processes can be measured accurately (Bauserman, 2005).

Schraw and Dennison (1994) devised an easily administered test of comprehension monitoring suitable for adolescent and adults. The researchers divided metacognitive understanding into two basic areas: knowledge about cognition and regulation of cognition. Knowledge about cognition is further subdivided into the areas of declarative knowledge, procedural knowledge, and conditional knowledge. These areas correspond to knowledge about self and strategies, basic strategies, and when and why to use strategies. The area of regulation of cognition is divided into planning, information management, comprehension monitoring, debugging strategies, and evaluation. Results of Schraw & Dennison's study showed that the two basic areas of knowledge about cognition and regulation of cognition reveal a statistically significant relationship; however, results did not support the multiple subcomponents view of metacognition.

Jenkins (1979) argued that human cognitive processes are very complex and depend on four types of variables in interaction: (a) subject characteristics: knowledge, short-term memory capacity, spatial ability, age, motivation, and so on; (b) orienting tasks provided to the subject: instructions, apparatus, reading goal, modality, and so on; (c) materials, being processed: genre, length, difficulty, topic, and so on; and (d) criterion task: free recall, recognition, question answering, summarization, and so on. Flavell, Friedrichs, and Hoyt (1970) showed that younger children and older children do not always respond the same way when given the same instructions. Hypothetically, if there

is a difference in the way older and younger children interpret instructions on a given assignment, there will be a difference between the way elementary students and adult students interpret instructions to a given assignment. It also follows that their comprehension monitoring abilities may be different as well.

Kleitman and Stankow (2007) defined metacognition as one's awareness of one's own cognitive processes. They referred to metacognition as the assessment of one's own ability, knowledge, and understanding of task-relevant factors and define metacognition as an essential aspect of information processing. Kelitman & Stankow stated that most theories of metacognition distinguish between knowledge of cognition (i.e., knowledge about one's own cognitive processes or capabilities, as well as knowledge about how, when, and why to use strategies and allocate cognitive resources), and regulation of cognition (i.e., the control aspect of learning). The authors cited three processes of metacognitive regulation: planning, monitoring, and evaluation. It is this regulation of processes in this theory that falls into the area of comprehension monitoring. An assessment of the comprehension monitory skills of postsecondary readers is important for helping adult learners attain the college-level reading skills need for academic success.

Assessing Comprehension Monitoring Skills

The Learning and Study Skills Inventory (LASSI) was developed in the 70s by Weistein (Murray, 1998). It quizzed students about the learning-related thoughts and behaviors that predict their academic performance. LASSI is a 177-item assessment used in high school study skills workshops and college transition programs. LASSI is divided into a skill section involving strategies such as note taking, listening effectively in class,

and reading for main ideas; a will section involving motivation, curiosity, and commitment to high achievement; and a self-regulation section involving concentration, reflection, and goal setting.

The Metacognitive Strategy Index (MSI) is a multi-choice questionnaire used to evaluate middle and upper elementary students' knowledge of strategic reading processes (Schmitt, 1990). It was originally developed to measure strategic awareness of students who participated in a metacomprehension training study (p. 454) and covered predicting and verifying, previewing, purpose setting, self questioning, drawing from background knowledge, and summarizing and applying fix-up strategies. This assessment is a 25-item, 4-option, multiple-choice questionnaire that questioned students about their reading behaviors before, during, and after reading a narrative selection. MSI has been shown to be a reliable measure of metacomprehension strategy awareness according to Lonberger (1988). Validity came from a comparison of MSI to The Index of Reading Awareness (IRA; as cited by Schmitt, 1990). MSI can be used "to interpret qualitatively the kinds of strategies students consider to be important and to evaluate their awareness of the need to match strategies to the appropriate reading phase." (p. 458).

The Metacognitive Awareness of Reading Strategies Inventory (MARSI) was developed by Mokhtari and Reichard (2002). The inventory consists of a 30-item Likert assessment of reading strategies used by a learner and was developed to be used by students from sixth grade through adult. The purpose of MARSI is to "assess the degree to which a student is or is not aware of the various processes involved in reading and . . . to learn about the goals and intentions he or she holds when coping with academic reading tasks" (p. 251).

Initially a pool of 100 questions was generated from Pressley and Afflerbach's (1995) thumbnail sketch of conscious constructive responses to text. These included overviewing before reading, looking for important information in text and paying greater attention to it than other information, attempting to relate important points in text to one another in order to understand the text as a whole, activating and using prior knowledge to interpret text, relating text content to prior knowledge, especially as part of constructing interpretations of text, reconsidering and/or revising hypotheses about the meaning of text based on text content, reconsidering and/or revising prior knowledge based on text content, attempting to infer information not explicitly stated in text when the information is critical to comprehension of the text, attempting to determine the meaning of words not understood or recognized, especially when a word seems critical to meaning construction, using strategies to remember text, changing reading strategies when comprehension is perceived not to be proceeding smoothly, evaluating the qualities of text, with these evaluations in part affecting whether text has impact on reader's knowledge, attitudes, behavior, and so on, reflecting on and processing text additionally after a part of text has been read or after a reading is completed, carrying on responsive conversation with the author, and anticipating or planning for the use of knowledge gained from the reading, (p. 105).

MARSI measures three broad categories of strategies: global reading strategies, problem solving strategies, and support reading strategies. Global reading strategies are generalized or global strategies that set the stage for reading. These might include setting a purpose for reading, previewing the text, predicting what the text is about, and other global strategies. Problem solving strategies are localized, focused problem-solving or

repair strategies that can be used when problems arise in understanding of textual information. These strategies might include checking for understanding upon encountering conflicting information, reading again for better understanding, and other problem solving strategies. Support reading strategies use support mechanisms or tools that sustain responsiveness to reading. These strategies might include use of reference materials, asking a peer, or asking an instructor for help. The internal consistency reliability coefficients for the three documented subscales ranged from 0.89 to 0.93 with reliability for the total sample was 0.93. This indicated that MARSI is a reasonable dependable instrument for measuring the comprehension monitoring skills of readers (Mokhtari & Reichard, 2004).

Since metacognitive awareness distinguishes among skilled and unskilled readers (Paris and Jacobs, 1984), metacognitive awareness showed the differences between these two types of readers.

> Skilled readers often engage in deliberate activities that require planful [strategic] thinking, flexible strategies, and periodic self-monitoring. They think about the topic, look forward and backward in the passage, and check their own understanding as they read. . . Novice readers often seem oblivious to these strategies and the need to use them. (p. 2083)

Mokhtari and Reichard (2002) stated that "reading strategies can and should be learned to the point of automaticity, after which they become skills, and that learners must know not only what strategies to use but also when, where, and how to use them." (p. 250). With this in mind, they developed MARSI to "assess 6th through 12th grade students' awareness and perceived use of reading strategies, particularly comprehension

monitoring, while reading academic or school-related materials." (p. 251). The purpose of MARSI was to assess whether students were aware or not aware of the various processes involved in reading and to learn about the students' intentions and goals as they worked through the academic reading tasks. Mokhtari and Reichard were guided by the premise that "constructed meaning from text is an intentional, deliberate, and purposeful act" (p. 251). This assessment can also be used with postsecondary college readers to assess the extent to which college students monitor their comprehension while reading.

Conclusion

Reading and language experts have compared teaching reading to rocket science (Moats, 1999) because of the depth of learning needed to teach and diagnose difficulties that may come up along the way. It is a process that takes many years and much practice to perfect. When students have not learned the basics in elementary and secondary school, it sets the stage for problems in college. Because the populations in four-year universities are different from the populations in two-year community colleges, students may not be at the same place with their reading skills. Assessing where these students are along the learning continuum is a first step toward helping to illuminate the differences. Honing in on comprehension monitoring proficiencies can be done by means of MARSI. This assessment can further help point out differences between the two populations and show us where remediation needs to begin.

CHAPTER III

METHODOLOGY

Introduction

Learning to read is a comprehensive and extensive skill. If the basics are taught well in elementary and high school, the process will follow smoothly into college; however, often there are gaps in students' educational experience. A comparison of comprehension monitoring skills of college students in four year universities and two-year colleges may show evidence as to which reading skills need to be targeted and where developmental instruction needs to begin. Findings from this study may contribute to the development of an approach to teaching reading for college students that improves their comprehension monitoring abilities.

The purpose of this study was to (a) assess the comprehension monitoring skills of college readers, (b) compare the comprehension monitoring skills of first-year college students at a two-year institution with first-year college students at a four-year institution, and (c) assess the extent to which using MARSI may enhance the comprehension monitoring abilities of first-year college students in reading classes. With that in mind the purpose of this chapter is to describe the research design, population, data collection, analytical methods, and limitations of this study designed to assess the comprehension monitoring skills of first-year college students.

Research Design

Three research questions guided this study. They are as follows:

- To what extent do first-year college readers at a four-year college report an awareness of their comprehension monitoring skills?

- To what extent do first-year college readers at a two-year college report an awareness of their comprehension monitoring skills?
- Are there differences in the extent to which college readers at a four-year school and college readers at a two-year school report an awareness of their comprehension monitoring?

As noted in the research questions, this study was designed to compare the comprehension monitoring skills of students at a two-year institution to the comprehension monitoring skills of students at a four-year institution. In addition to collecting demographic data, students were asked to respond to a survey instrument designed to facilitate students' assessments of their comprehension monitoring skills. Both descriptive and inferential statistics were computed to compare student responses.

Population

The sample population consisted of students at a two-year community college in the Midwest and a neighboring four-year university in the same area. The two-year school was recognized by its state and accredited by the Commission on Institutions of Higher Education of the North Central Association of colleges and schools. It awarded associate degrees, associate in Applied Science degrees, and certificates of completion. Students who attended the two-year institution did so both to prepare to transfer to four-year institutions and to prepare to enter the job market directly from the institution. At the two-year school the fall 2009 enrollment totaled 7,153 students with 4,027 in the credit division. Class size average was 22 with most ranging from 15 to 25 students. Females accounted for 60% of the population and male students made up 40%. The average student age for the credit division was 28 years old.

The four-year institution was a private liberal arts college offering associates, bachelors, masters, and doctoral degrees. The university was organized into four schools and one college and offered more than 100 areas of study. The four-year institution held the accreditation and approval of the nation's top associations, including the Higher Learning Commission of the North Central Association of Colleges and Schools.

Data Collection

MARSI was developed in 2001 as a means to assess adolescent and adult readers' metacognitive awareness or reading strategies while reading academic material (Mokhtari & Reichard, 2002). According to Mokhtari and Reichard (2002) "the psychometric data demonstrate that the instrument is a reliable and valid measure for assessing students' metacognitive awareness and perceived use of reading strategies while reading for academic purposes" (p. 254). MARSI was the instrument chosen to be given to students at both a two-year and a four-year institution in order to compare comprehension monitoring in students.

Permission was obtained from Mokhtari and Reichard to use MARSI survey for research comparing two-year institutional students to four-year institutional students in this particular study. MARSI is a 30-item Likert survey used to assess the strategies used in comprehension monitoring. IRB approval was obtained from a two-year institution in the Midwest and a four-year institution nearby to give MARSI to students enrolled in reading classes for credit. Surveys were given at the end of September in 2009, which was the beginning of the term for both institutions. Surveys were also given at the same time in the fall of 2010.

The two-year institution class was taught by an experienced instructor who had been with the facility for ten years. The room was bright and cheerful with a bank of windows that covered the north wall of the room. The class met at 8:30 in the morning and most students arrived on time. Students were quiet and most had already arrived when the researcher and instructor arrived. The researcher was introduced at the beginning of class after attendance was taken. The consent form was explained to the students as well as the purpose of the research. Students were made aware of the fact that lack of participation would not affect their grade in the class in any way. MARSI was distributed and directions were read to the students. Students began the survey at 9:10 A. M. and the last survey was turned in at 9:13 A. M. Many of the 21 students finished at approximately the same time so papers were numbered on the back as they were turned in. After the final paper was turned in, the researcher collected materials and left.

MARSI was given the following day to a four-year institution nearby. There were 22 students in this class which met at noon on the third floor of an older building. The room, which faced south and had tall windows, was actually a computer lab where the class met for that particular day. Students were waiting in the hall for the instructor to unlock the door and let them in. None were late. Tables with computers ran along the north and the south of the room allowing a wide space for the instructor to walk around in the middle. The instructor introduced the researcher and took attendance while the research was explained to the students. The consent form was explained along with a brief history of MARSI and its purpose. Students were told that they did not have to participate and that not doing so would not adversely affect their grades. Students began taking the MARSI at 12:08 P. M. and finished at 12:12 P. M. Papers were numbered on the back as

to which ones were turned in first, second, and so on. After the last survey was turned it, the researcher collected the papers and left.

The same procedure was followed the following year in the fall of 2010. At that time the total of students in the class at the two-year institute numbered 22. The instructor at the two-year institution was the same as the year before. The instructor at the four-year institution was the same as the year before. The total number of students in class at the four-year institution was 28.

Analytical Methods

The analytical methods used can be divided into two sections: (a) description of the population differences based on the variables of two-year institutions and four-year institutions, and (b) inferential statistics. The demographics collected included age, gender, number of credits attempted, high school GPA, and ACT reading score. The variables included the two-year institution and the four-year institution. The frequency of each individual demographic for each institution was run and then comparisons were viewed from each institution making it possible to compare the two institutions according to the various demographics used. Additionally, since the same research was collected the following year, it was possible to compare the two institutions from year to year.

Inferential statistics are used to generalize the results of research based on a sample to a population (Salkind, 2005, p. 384). The sample collected from the two-year and the four-year institutions was used to make inferences to the general population of college students throughout the United States. Statistical methods run through the SPSS program showed differences between the scores of one institution as opposed to the scores of the other institution. Then a conclusion was reached about the relationship between the

sample and the general population. Statistics results allowed a determination as to whether the sample differences might be due to chance or actually contained a statistical significance.

Inferential statistics are the "numerical techniques for making conclusions about a population based on the information obtained from a random sample drawn from that population" (Argyrous, 2005, p. 380). Three separate sets of numbers helped to achieve this. Raw data was obtained from the individual MARSI results, which included a total of 80 students. Descriptive statistics were then used to summarize the raw data (mean, standard deviation, and frequency distribution). Finally, inferential statistics were computed to assess differences between responses from students at four-year institutions and students from two-year institutions

Limitations

Limitations to this study include self report of information on MARSI. Participants may have felt that a positive report would help them in their reading course even though they were assured that the information would be anonymous. Also, self reports depend on the mood of the individual at the given time. The same survey given a week later might have resulted in different assessments of the same items. Items could be misinterpreted also or read in a different way than was originally intended by the survey creators or interpreted differently than by the majority of other survey takers. "When human subjects are involved in research, there is a tendency for them either to resist and hide data that they feel defensive about or to exaggerate in order to impress the researcher" (Schein, 2004, p. 204).

Students were told that the survey was anonymous and that they were not to put their names on the survey; however, some may have felt that information could in some way be traced back to them. This might have prevented students with poorer comprehension monitoring from reporting and have biased the results for those students who are academically doing well or who might have wished to respond in a favorable manner.

Additionally, students could have misinterpreted an item on the survey or read it in a different intent than was originally meant. The brief, 30-item MARSI did not allow for lengthy explanation of any one particular item. Also, no students requested additional information about the survey as could have been requested from information provided on the consent forms.

The survey was administered to students in the Midwestern section of the United States only. Results of these students might not generalize to other sections of the country or other countries of the world. Also, ethnicity was not taken into consideration. A group of survey participants, such as those from a particularly low ethnic group, could have provided very different results. In general, the participants were white Caucasian although this demographic information was not requested from the participants or the institutions from which the survey was taken.

CHAPTER IV

FINDINGS AND CONCLUSIONS

Introduction

The purpose of reading is to gain understanding. Comprehension monitoring is an important skill for any reader to have in order to gain that understanding. When a reader realizes that understanding has been lost, he can use comprehension monitoring strategies he has learned to find his way back to comprehending and making meaning from the text. Becoming aware of the loss of comprehension is a valuable first step in developing good reading skills as inexperienced readers often do not realize that what they are reading is not making sense. Readers who can quickly grasp this idea and apply a fix-up strategy will be able to immediately move back to a place where they can comprehend what they are reading.

The successful postsecondary college student depends in part, on academic skills developed in elementary and secondary education. College and university professors expect college students who enroll in postsecondary education to have mastered more than mere basic skills in reading; however, it is likely that such assumptions about the readiness of college students for college level reading skills are erroneous. It is also often assumed that students enter postsecondary education directly from stellar high school programs that prepare students for college learning. Often students entering college are ill-prepared to handle the rigor of college-level learning particularly if their reading skills are not developed to monitor their comprehension of what has been read. A review of the literature relative to the reading preparation of adult readers suggested that college readers (a) enter college from different educational backgrounds and experiences, (b)

may be products of diverse approaches to reading instruction, (c) learn differently than children, (d) have not always developed higher order reading skills, and (e) sometimes lack the skills needed to monitor their reading comprehension, (Rattin, 2001).

Reading is a skill that requires diagnosis and depth of learning and has been likened to rocket science (Moats, 1999) because of the difficulties required to figure out and understand material. The development of collegiate reading skills takes many years and much practice to perfect. When students have not learned the basics in elementary and secondary school, it sets the stage for problems in college. College students, whether they attend two-year or four-year institutions, may lack the requisite comprehension monitoring skills necessary for successful collegiate reading. Therefore, it is important to know students' capabilities early in their college experience.

Assessing where these students are along the learning continuum can be done by means of the MARSI. This assessment can inform best practices in reading instruction and help practitioners improve reading programs for both two-year college students and students who attend four-year institutions. This study was conducted by administering the MARSI to first-year students at both a two-year institution and a four-year institution in the Midwest. Students were assessed in the fall 2009 and fall 2010 terms at each institution respectively. At both institutions students were assessed in the same course from year to year. Data from both institutions were then aggregated. Students were nearly equal in distributed between the two schools. From 2009 to 2010 the four-year school students totaled n = 41 (49%) and the two-year students totaled N = 43 (51%) of the participants.

Students were given the assessment with the understanding that lack of participation would not in any way harm their grade. Data was kept separate by classes, and demographic information consisting of age, gender, ACT reading score, high school GPA, and credit hours attempted was collected from each institution.

The purpose of this study was (a) to find out to what extent first-year college readers at community colleges report an awareness of their comprehension monitoring skills, (b) to find out to what extent first-year college readers at four-year schools report an awareness of their comprehension monitoring skills, and (c) to find out if there are differences in the extent to which community college readers and four-year college readers report an awareness of their comprehension monitoring. With that in mind the intention of this chapter is to describe the results of the research data collection, make conclusions, and report the limitations and recommendations from this study of the assessment of the comprehension monitoring skills of first-year college students.

Findings from the Metacognitive Awareness of Reading Strategy (MARSI)

One purpose of this study was to assess the comprehension monitoring skills of first-year college readers. Comprehension monitoring refers to knowing whether or not what you have read makes sense and is associated with a variety of individual skills such as having a purpose when reading and using context clues to help figure out the meaning of the text. Good readers summarize, analyze, and evaluate the ideas read from the text. They also make use of Bloom's (1984) lists of higher order thinking skills, which includes analysis (separating, distinguishing, and discriminating), synthesis (combining, creating, explaining, organizing, and summarizing), and evaluation (appraising, contrasting, critiquing, defending, justifying, and supporting). Block (2005) identified

eleven metacognitive processes that can be pulled from the various models of metacognition which include semantic, syntactic, fusion of semantic and syntactic, internal consistencies, external consistencies, propositional cohesiveness, structural cohesiveness, informational processes, character's personality development, personal reflections, and metacognitive coherence. The assessment used in this study attempted to measure how well the first-year college student used these higher order thinking skills while reading.

The MARSI was developed by Mokhtari & Reichard (2002). The inventory consists of a 30-item Likert assessment of reading strategies used by a learner and was developed to be used by students from sixth grade through adult. The MARSI was developed with the help of three expert judges experienced in teaching and assessing reading strategies and was distilled down from 70 questions. MARSI has been demonstrated as a valid and reliable measure for assessing student comprehension monitoring (Mokhtari and Reichard, 2002). The purpose of MARSI was to "assess the degree to which a student is or is not aware of the various processes involved in reading and . . . to learn about the goals and intentions he or she holds when coping with academic reading tasks" (p. 251).

Each item on MARSI can be answered with a number between one and five with one meaning "I never or almost never do this", two meaning "I do this only occasionally", three meaning "I sometimes do this—about 50% of the time", four meaning "I usually do this", and five meaning "I always or almost always do this". It can be expected that a "three" would be the midpoint for an answer to each item and that a

number above this point could be interpreted as better use of the skill and a score of less than three representing a skill that needs more attention.

Findings

The MARSI has been documented as a reasonable dependable instrument for measuring the comprehension monitoring skills of readers (Mokhtari & Reichard, 2004) and as such measures three broad categories of strategies: Global reading strategies, problem solving strategies, and support reading strategies. Global reading strategies set the stage for reading. These might include setting a purpose for reading, previewing the text, or predicting what the text is about. Since the focus of this study is on the comprehension monitoring abilities of two-year and four-year college students, only items related to comprehension monitoring from MARSI were reported.

Global Reading

Table 1 presents comprehension monitoring results from the Global Reading portion of the survey. Global reading strategies are measured by numbers 1, 3, 4, 7, 10, 14, 17, 19, 22, 23, 25, 26, and 29, (Mokhtari & Reichard, 2002).

Table 1

Analysis of Global Reading Items from MARSI

Survey Item	Two-year Students		Four-year Students		
	n = 43		*n* = 41		
	M	*SD*	*M*	*SD*	*p*
Think about what I know to help understand (3)	3.5	1.2	3.5	1.3	1.00
Use tables, figures, and pictures to understand (17)	3.7	1.2	3.6	1.2	0.92
Use context clues to understand (19)	4.1	1.1	3.4	1.0	0.10
Check understanding when I find conflicts (25)	3.7	1.1	3.2	0.8	0.82

$p < .05$

T-tests conducted on the mean scores of two-year and four-year student responses to global reading items on MARSI indicated that there were no statistically significant differences between responses between the two groups. Comparisons of two-year and four-year student responses to global reading items on MARSI indicated that two-year students usually use context clues to understand (*M* = 4.1, *SD* = 1.1) whereas four-year students report that they use context clues to understand only about 50% of the time (*M* = 3.4, *SD* = 1.0). Both two-year students (*M* = 3.5, *SD* = 1.2) and four-year students (*M* = 3.5, *SD* = 1.3) reported that they thought about what they knew to help understand slightly more than half the time.

Problem Solving

Problem solving strategies are localized, focused problem-solving or repair strategies that can be used when problems arise in understanding of textual information such as checking for understanding upon encountering conflicting information or re-reading for better understanding. Problem solving strategies are measured by numbers 8, 11, 13, 16, 18, 21, 27, and 30. Table 2 presents student response to comprehension monitoring items from the problem solving items on MARSI.

Table 2

Analysis of Problem Solving Items from the MARSI

Survey Item	Two-year Students		Four-year Students		
	n = 43		*n* = 41		
	M	*SD*	*M*	*SD*	*p*
Read slowly to understand (8)	4.1	1.0	4.0	1.0	0.73
When text difficult, reread to understand (27)	4.3	1.0	3.7	1.2	0.91
Try to guess meaning of unknown words and phrases (30)	4.7	0.9	3.6	1.1	0.08

$p < .05$

T-tests conducted on the mean scores of two-year and four-year student responses to problem solving items on MARSI indicated that there were no statistically significant differences between responses between the two groups. The two-year students reported their lowest score on reading slowly to understand ($M = 4.1$, $SD = 1.0$) and the highest score on trying to guess meaning of unknown words and phrases ($M = 4.7$, $SD = 0.9$)

even though the results are things they usually do. The four-year students reported that they sometimes try to guess meaning of unknown words and phrases (M = 3.6, SD = 1.1) and that they usually read slowly to understand (M = 4.0, SD = 1.0).

Support Reading

Support reading strategies use support mechanisms or tools that sustain responsiveness to reading. Examples would be use of reference materials, asking a peer, or asking an instructor for help. Support reading strategies are measured by numbers 2, 5, 6, 9, 12, 15, 20, 24, and 28 on MARSI. Table 3 presents student response to comprehension monitoring strategies from the support reading items on the MARSI.

Table 3

Analysis of Support Reading Items from the MARSI

Survey Item	Two-year Students		Four-year Students		
	n = 43		n = 41		
	M	*SD*	*M*	*SD*	*p*
Take notes to understand (2)	2.7	1.3	2.8	1.3	0.71
Read aloud to help understand (5)	3.3	1.4	3.8	1.2	0.07
Discuss what I read with others to help understand (9)	2.7	1.2	2.5	1.1	1.00
Use reference materials to help understand (15)	3.0	1.4	2.6	1.2	0.81
Paraphrase to better understand (20)	3.8	1.0	3.4	1.0	0.70

$p < .05$

T-tests conducted on the mean scores of two-year and four-year student responses to support reading items on MARSI indicated that there were no statistically significant

differences between responses between the two groups. The two-year students reported that they only occasionally take notes to understand (M = 2.7, SD = 1.3) and discuss what has been read with others to help understand (M = 2.7, SD = 1.2). They report that they sometimes paraphrase to better understand (M = 3.8, SD = 1.0). The four-year students reported that they sometimes discuss what has been read with others to help understand (M = 2.5, SD = 1.1) and that they sometimes read aloud to help understand (M = 3.8, SD = 1.2).

Comprehension Monitoring

The focus of this study was primarily on the comprehension monitoring abilities of college students; therefore, particular attention was paid to those variables on MARSI that were in direct association with student understanding. Table 4 presents a summary of student response to comprehension monitoring items from the global reading, problem solving, and support reading on MARSI.

Table 4

Analysis of Comprehension Monitoring Items from the MARSI

Survey Item	Two-year Students		Four-year Students		
	n = 43		n = 41		
	M	*SD*	*M*	*SD*	*p*
Take notes to understand (2)	2.7	1.3	2.8	1.3	0.71
Think about what I know to help understand (3)	3.5	1.2	3.5	1.3	1.00

Read aloud to help understand (5)	3.3	1.4	3.8	1.2	0.07
Read slowly to understand (8)	4.1	1.0	4.0	1.0	0.73
Discuss what I read with others to help understand (9)	2.7	1.2	2.5	1.1	1.00
Use reference materials to understand (15)	3.0	1.4	2.6	1.2	0.81
Use tables, figures, and pictures to understand (17)	3.7	1.2	3.6	1.2	0.92
Use context clues to understand (19)	4.1	1.1	3.4	1.0	0.12
Paraphrase to better understand (20)	3.8	1.0	3.4	1.0	0.73
Check understanding when I find conflicts in info (25)	3.7	1.1	3.2	0.8	0.82
When text difficult, reread to understand (27)	4.3	1.0	3.7	1.2	0.91
Try to guess meaning of unknown words & phrases (30)	4.7	0.9	3.6	1.1	0.08

$p < .05$

T-tests conducted on the mean scores of two-year and four-year student responses to support reading items on MARSI indicated that there were no statistically significant differences between responses between the two groups. Findings from MARSI seem to indicate that the first-year students, at both two-year and four-year institutions in the Midwest, are generally aware of their comprehension monitoring skills. The two-year students see themselves as doing well with "Try to guess meaning of unknown words & phrases" ($M = 4.7$, $SD = 0.9$), while the four-year students see themselves doing well with

"Read slowly to understand" (*M* = 4.0, *SD* = 1.0). Both the two-year and the four-year institutions agree that their lowest score is in "Discuss what I read with others to help understand" (*M* = 2.7, *SD* = 1.2, and *M* = 2.5, *SD* = 1.1 respectively). In addition, both institutions report one of their lowest scores in "Take notes to understand" (*M* = 2.7, *SD* = 1.3 for two-year; *M* = 2.8, *SD* = 1.3 for four-year). Though not statistically significant, there is a substantial difference in the report of the scores between the two-year and the four-year institutions for "Use reference materials to help understand" (*M* = 3.0, *SD* = 1.4; *M* = 2.6, *SD* = 1.2), for "Use context clues to understand" (*M* = 4.1, *SD* = 1.1; *M* = 3.4, *SD* = 1.0), and for "When text difficult, reread to understand" (*M* = 4.3, *SD* = 1/0; *M* = 3.7, *SD* = 1.2).

In summary, *t*-tests were computed and alpha was set at the .05 level. Results suggested that there were no statistically significant differences between any of the mean scores collected from the students from the two-year institution and the mean scores of students from the four-year institution for any of the comprehension monitoring items from the global reading, problem solving, or support reading items on MARSI. These findings suggest that subsequent conclusions, implications, and recommendations from the study have utility for reading programs at both two-year and four-year colleges or universities.

Conclusions

A comparison of the comprehension monitoring skills of first-year college readers at a two-year institution to readers at a four-year institution shows no statistical differences in responses from students in the two groups. Basically the students from both institutions reported that their comprehension monitoring skills were practiced about 50%

or more of the time and that they practiced these skills as they read. The two-year students self-reported slightly higher over all scores for items on comprehension monitoring indicating that they feel they are doing a little better in the areas surveyed than the four-year students.

The survey can give us valuable information about the habits of first-year college readers as self-reported on MARSI. Lower mean scores indicate areas of weakness, while high mean scores would indicate that students use specific reading skills more often. Students generally rated themselves lowest in discussing what they had read indicating a curricular need for skill development.

With regard to curriculum development, MARSI can be used as a tool to make students and instructors aware of gaps and missing strategies in students' comprehension monitoring skills. Because MARSI measures three main strategies of global reading strategies, problem solving strategies, and support reading strategies, it may be an effective pre and posttest measure. As a pretest measure, MARSI results may affect practitioners' curriculum plans to address weaknesses in these group strategies generally or comprehension monitoring skills specifically once the responses from MARSI have been recorded. MARSI can also be used later in the year as a posttest to determine if the students are progressing with regard to obtaining comprehension monitoring skills or to determine which strategies or group of strategies still need work. The assessment can be used in conjunction with individuals and their personal comprehension monitoring strategies or results can be used to give the instructor a general idea of where the class is deficient and where remediation needs to take place. MARSI is specific enough to address individual or group needs.

Limitations

Limitations exist in the form of whether or not a self-assessment is valid and reliable. Students might not answer the questions honestly when asked about their comprehension monitoring habits either because they inflate their scores or under report them. Some might fail to see a discrepancy in the reporting of their scores. Such problems always exist with a self-report survey. The researcher is dependent on the participants giving honest and knowing answers to the survey items. Some students might have thought that participating in the survey would have helped their grade. Others might have thought that they were not qualified to participate due to lowered grades or poor self-image and so might not have done as good a job as they could have had their frame of mind been more positive.

An additional limitation can be seen in that complete demographic information from each of the student groups was not available. It was not possible from the demographic information obtained from the institutions to provide information on the ethnic backgrounds of students without express written permission from the students. The researcher felt that obtaining that particular piece of information would have hampered getting answers to the survey in general as it would have required specific individual information and tagging the survey with the participant, which might have made the participants feel that the survey was less than anonymous even though they were told the results would be reported anonymously. Some students might have been held back by the thought of the answers being easily traced back to them.

It is also possible that students might have misinterpreted or even misread some of the survey items. No questions were asked during the survey, and no participants sought clarification later by phone or email though that information was provided. It is possible that some or many students might have taken an item interpretation in a different meaning than their peers did.

Only two institutions in the Midwest were surveyed. This limits the results which might not generalize to other schools in other areas of the United States. The limited number of participants (84 total) hampers the study, though the idea of giving the survey over a two-year period strengthens the findings.

Implications and Recommendations

Developing reading curriculum can be extrapolated from the data given in MARSI. The authors themselves recommend the survey be used as "a tool for helping students increase metacognitive awareness and strategy use while reading" (Mokhtari & Reichard, 2002, p. 255). They further recommend the survey be used as a supplement along with other assessments. Pressley, Beard, El-Dinary, and Brown (1992) suggested that it may take as long as one year or longer for students to become strategic readers. MARSI can be used as a tool to help students remain aware of the strategies they are trying to develop. The assessment serves as a reminder of the strategies and skills students are developing. MARSI needs to be given at periodic times throughout a reading course to make students aware of what strategies they are applying and what strategies they still need to work at to become more proficient.

Further research needs to be done with adult reading programs that make students aware of their comprehension monitoring strategies. MARSI is a good beginning place

for making students aware of comprehension monitoring, but programs that specifically target the strategies identified within MARSI need to be introduced into the curriculum. Findings from this study suggest that the comprehension monitoring skills of the first-year students from both two-year and four-year institutions appear to be about the same; therefore, MARSI has utility for college reading course instructors at both two-year and four-year institutions for measuring the efficacy of reading curriculum designed to improve the comprehension monitoring skills of beginning college readers. MARSI is also is a good way to inform students of their progress in skill development.

Additional research needs to be done to determine if comprehension monitoring skills are developed more in high school or in college. Also, research is needed to follow the students' comprehension monitoring skill development from elementary school, through high school, and to college. It is possible that comprehension monitoring strategies may be developed at younger ages and improved at earlier stages if tools like MARSI are used systematically to assess students' abilities and monitor skill development. Additional study is needed to determine exactly where in the educational span comprehension monitoring skills are most likely to develop. Finally, further study might investigate the effect of ethnicity or gender or other demographic variables on the comprehension monitoring skills of college readers.

Advice for future researchers includes listing dates given for each MARSI, instructor’s name, class location, and class identification numbers with the separate classes and keeping each class in a separate folder. Numbering surveys with who finished first to last is of no value. It might be interesting to redo this particular survey with the individual demographic information linked to each survey participant. Linking the survey

to demographics might further tell if high school GPA and ACT reading scores had any effect on the results. This would give a truer picture of the connection between GPA and ACT reading scores and comprehension monitoring and point out if there is a connection.

Comprehension monitoring can be a valuable tool for understanding reading when used by first-year college readers. Few studies have been conducted for this age and population though a study of the literature makes it clear that this population learns differently than younger students. The literature further points to the benefits derived from learning comprehension monitoring strategies, which include the development of higher order learning skills as well as the use of insightful, analytical, and reflective knowledge from a variety of sources. The purpose of this study was to compare the comprehension monitoring of first-year readers in both a four-year institution and a two-year institution and to note the differences in the extent to which they practice comprehension monitoring skills. MARSI was used as the survey instrument, and the survey results indicate that there is no statistical difference between the first-year college readers at a four-year institution as opposed to a two-year institution in the Midwestern institutions surveyed. First-year students indicate a need to be instructed in comprehension monitoring as pertaining to discussion with others of what they have read after the reading, taking notes to understand, using reference materials to help understand, using context clues to understand, and rereading difficult passages.

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APPENDIX A
Metacognitive Awareness of Reading Strategies Inventory

Metacognitive Awareness of Reading Strategies Inventory (MARSI, Version 1.0)

Directions: Listed below are statements about what people do when they read academic or school-related materials such as textbooks or library books. Five numbers follow each statement (1, 2, 3, 4, 5), and each number means the following:

- 1 means "I never or almost never do this."
- 2 means "I do this only occasionally."
- 3 means "I sometimes do this" (about 50% of the time).
- 4 means "I usually do this."
- 5 means "I always or almost always do this."

After reading each statement, circle the number (1, 2, 3, 4, 5) that applies to you using the scale provided. Please note that there are no right or wrong answers to the statements in this inventory.

DO NOT PUT YOUR NAME ON THIS PAPER. PLEASE COMPLETE BOTH SIDES OF THE SURVEY.

Strategy	Scale				
1. I have a purpose in mind when I read.	1	2	3	4	5
2. I take notes while reading to help understand what I read.	1	2	3	4	5
3. I think about what I know to help me understand what I read.	1	2	3	4	5
4. I preview the text to see what it's about before reading.	1	2	3	4	5
5. When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5
6. I summarize what I read to reflect on important information in the text.	1	2	3	4	5
7. I think about whether the content of the text fits my reading purpose.	1	2	3	4	5
8. I read slowly but carefully to be sure I understand what I'm reading.	1	2	3	4	5
9. I discuss what I read with others to check my understanding.	1	2	3	4	5
10. I skim the text first by noting characteristics like length and organization.	1	2	3	4	5
11. I try to get back on track when I lose concentration.	1	2	3	4	5
12. I underline or circle information in the text to help me remember it.	1	2	3	4	5
13. I adjust my reading speed according to what I'm helping.	1	2	3	4	5
14. I decide what to read closely and what to ignore.	1	2	3	4	5
15. I use reference materials such as dictionaries to help me understand what I read.	1	2	3	4	5
16. When text becomes difficult, I pay closer attention to what I'm reading.	1	2	3	4	5
17. I use tables, figures, and pictures in text to increase my understanding.	1	2	3	4	5
18. I stop from time to time and think about what I'm reading.	1	2	3	4	5
19. I use context clues to help me better understand what I'm reading.	1	2	3	4	5
20. I paraphrase (restate ideas in my own words) to better understand what I'm reading.	1	2	3	4	5
21. I try to picture or visualize information to help remember what I read.	1	2	3	4	5
22. I use typographical aids like boldface and italics to identify key					

information.	1	2	3	4	5
23. I critically analyze and evaluate the information presented in the text.	1	2	3	4	5
24. I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
25. I check my understanding when I come across conflicting information.	1	2	3	4	5
26. I try to guess what the material is about when I read.	1	2	3	4	5
27. When text becomes difficult, I reread to increase my understanding.	1	2	3	4	5
28. I ask myself questions I like to have answered in the text.	1	2	3	4	5
29. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
30. I try to guess the meaning of unknown words and phrases.	1	2	3	4	5

(K. Mokhtari and C. Reichard, 2002)