

THE IMPACT OF A METACOGNITIVE COLLEGE READING COURSE
ON STUDENTS' COMPREHENSION, READING SELF-EFFICACY,
AND SUBSEQUENT ENGLISH COURSE GRADES

by

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ABSTRACT

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The purpose of this study was to investigate the impact of the CTRS 1170 *Advanced Critical Thinking and Reading* course on the (a) reading self-efficacy, (b) reading comprehension, and (c) grades earned subsequently in English 1010 by college students who had completed that course. Three conditions influenced the settings of the study: (a) the treatment group received the metacognitive reading strategy instruction from the same professor, Professor Elaine C. Carter, (b) the treatment group received this instruction during their first semester of their college experience, which insured they had not taken other remedial reading courses offered at UVSC, and (c) both treatment and comparison groups were in the second semester of

their college experience when they completed the English 1010 *College Writing* comparison course.

Results showed positive gains were made while students were in the reading class. The analysis of the data for the three dependent variables included in this study showed two recurring patterns. The first pattern emerged within the duration of the class and became evident when the data on the variables of reading self-efficacy and comprehension were analyzed. A comparison of the pretest and posttest means showed that students who completed the course made significant gains. As a result of further analysis of the self-efficacy data, variance effects were discovered indicating that students' scores on the posttest were less variable (i.e., more tightly clustered about the mean) than on the pretest. Similar effect sizes, though not as large, were found for the reading comprehension variable. The pattern of gains made by the developmental students in both reading self-efficacy and in reading comprehension was consistent for all 27 sections taught during the eight years studied. The second pattern emerged during the comparison analysis of the grades earned in English 1010 during students' second semester at UVSC. In each of the eight years studied, developmental students who successfully completed CTRS 1170 earned higher grades than the students who did not have to take the reading course.

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CHAPTER 1

INTRODUCTION

Sizable populations of college students are under-prepared for the academic rigors of college (Wyatt, 1992). A recent report by the Digest of Education Statistics (2002) estimated that between 30-50% of the nation's fifteen-million first-year college students could benefit from a reading comprehension or study skills course designed to help them learn more effectively. Without some sort of assistance, many students entering college are likely to drop out of school and earn significantly less money to support themselves and their families during their lifetime.

An estimated 80% to 90% of all institutions of higher learning in the United States provide special reading courses designed to help under-prepared students (Boylan, Bonham, & Bliss, 1992). Each year the number of students enrolling in developmental level courses in postsecondary education increases. In fact, almost 42% of all freshmen enrolled in public two-year colleges were enrolled in at least one developmental course according to a United States Department of Education study conducted by the National Center for Education Statistics (NCES) (2002).

Many state legislatures, pressed with financial constraints, have looked for ways to lower educational costs in state-supported colleges and universities. Legislators have considered cutbacks in developmental education because these special courses add an additional strain to already tight budgets. These classes are often taught with 25 or fewer students per class, so they are particularly expensive to operate. Some taxpayers perceive that the classes only teach skills students should have already learned, and they believe the expenses involved with these classes are

(2003) found that the success of under-prepared readers in college "is directly and significantly related to taking and passing a reading skills course" (p. 170), and Boylan, et al. (1992) echoed the findings by Cox, et al. However, the study by Robyack and Patton (1977), also published in a national journal, and the study by Maxwell (1997), published in ERIC, contradict the findings of Boylan, et al. (1992) and Cox, et al. (2003). Since the research findings on the effectiveness of developmental reading courses are mixed, further investigation is needed.

In addition to the inclusive nature of the research, it is also important to keep in mind the powerful and compelling social need in America to help under-prepared students succeed in college. According to the NCES, the number of under-prepared students has expanded dramatically in the last three decades due to the sheer numbers of students going to college. About 40% of the freshmen entering college in both 1971 and 1999 were identified as not being ready for college work. However, due to increased student enrollment in college over the years, while there were about 800,000 under-prepared students in 1971, there were about 3.2 million in 1999 (NCES, 2002).

Because of the growing numbers of students entering colleges and universities inadequately prepared for the demands of college study, developmental programs have also increased in number (Boylan, 2002). McCabe and Day (1998) speculate that as many as two million students a year would leave postsecondary education if they were not provided access to developmental education.

Substantial financial costs are involved in providing developmental college courses, and more information is needed about their effectiveness.

This information should be valuable to tax payers, legislators, and college/university administrators.

Because of the number of under-prepared students in Utah Valley, it became necessary, shortly after Provo Technical College was chartered in 1941, to create a developmental education program there. This program has continued to evolve and currently serves 53% of the students at Utah Valley State College (UVSC). Yet, the reading aspect of the developmental education program at UVSC has not been fully studied. By measuring the effectiveness of the *Advanced Critical Thinking and Reading Strategies* course (CTRS 1170) and its subsequent impact on students' grades in English 1010, the current study may provide empirical evidence about whether developmental reading instruction is fulfilling the purpose for which it was created. This study was conducted to evaluate the effectiveness of UVSC's developmental reading course, CTRS 1170.

The impact of the CTRS 1170 course had not been fully studied. A compelling reason existed to evaluate the effectiveness of this course because hundreds of students are required to take it every year, which represents a large investment for the students and the taxpayers of the state.

Statement of the Purpose

The purpose of this study was to evaluate the effectiveness of the *Advanced Critical Thinking and Reading Strategies* course, CTRS 1170, at UVSC. Without a

complete analysis and evaluation of the available data on this course, regarding the effectiveness of its metacognitive instructional approach on students' reading strategies and academic performance, its value to students or its possible contribution to the body of developmental reading education literature is unknown.

Research Questions

It was the intent of this study to answer three research questions:

1. To what extent did the metacognitive comprehension training received in CTRS 1170, *Advanced Critical Thinking and Reading Strategies*, impact the students' perceived levels of reading self-efficacy?
2. What effect did participation in metacognitive instruction have on students' reading comprehension as measured by the *Degrees of Reading Power* (DRP) test?
3. How did the average English 1010 grades of under-prepared students who previously completed CTRS 1170 compare with the average English 1010 grades of better-prepared students who did not previously complete CTRS 1170?

Delimitations

This was a retrospective study employing archival data gathered over an eight-year period from 1996-2004. Pretest and posttest data consisting of student scores on measures of reading self-efficacy and reading comprehension were collected and averaged. Additionally, grades earned in English 1010 during the second semester at UVSC were used as an indicator of success for developmental students.

CTRS 1170 is the only course in the developmental reading program being evaluated in this study. It is also the prerequisite reading course for English 1010 for

students scoring below the threshold. Further reason for evaluating only CTRS 1170 is provided by Boylan, et al. (1992) who recommended the evaluation of only one segment of a developmental reading program rather than studying all courses and services at the same time.

This is not an exhaustive study of reading comprehension. The pretest-posttest reading comprehension design was a means to show student reading growth or gains through the metacognitive instruction and activities in the class. Because many characteristics of comprehension are unobservable and very complex, all scores or data produced by conventional tests of reading are indirect measures of the reading process (Farr, 1992).

Definition of Terms

Remedial courses. Remedial courses are those that address "deficiencies in prior learning"(Boylan, 2001, p. 1). At UVSC, remedial classes have course numbers less than 1000 and students who take them do not earn transferable credit. CTRS 0800 and 0900 are examples of remedial classes at UVSC.

Developmental courses. Developmental Courses are those that provide instruction beyond the remediation of skills and strategies that should have been taught in previous schooling. At UVSC, courses numbered above 1000, such as CTRS 1170, are considered developmental, and students who take CTRS 1170 earn transferable credit. The term developmental education is used when addressing the life-long trajectory of literacy development (Alexander, 2004). Developmental reading instruction, as the term is used in this study, meets students where they are in

their literacy trajectory, and it helps them bridge the reading competency gap between the demands of high school reading requirements and the rigors of college textbook reading tasks. This gap in students' academic literacy development, which is determined by their college entrance scores, may include both deficiencies in reading self-efficacy and in reading comprehension.

Under-prepared students. As used in this study, under-prepared students are those likely to be unable to successfully do the academic work required of them in college. Specifically, under-prepared students score below 19 on the *American College Test* (ACT), and score below 77 on the *Degrees of Reading Power* (DRP) test.

Metacognition. As used in this study, metacognition is defined as a conscious awareness and control of how one thinks while learning including self, task, and strategy awareness and the self-regulation and self-evaluation of the learning process. The term *metacognitive* is used to describe conscious and deliberate thoughts that have as their object other thoughts (Brown, 1987). Long (2000) suggests that engaging in self-regulation while learning is an active application of metacognition.

Long also asserted: "The human being is a thinking (cognitive) being who can be aware of certain cognitive processes. If, the human being can think, and be aware of his or her thinking, then the human being can control (regulate) thinking " (p. 19).

Metacognition is also the ability of the student to analyze, reflect on, and understand his or her own cognitive and learning processes. Students who identify and use appropriate learning strategies in the right context are using metacognition. When

they are aware of their own cognitive strengths and weaknesses, they are more likely to be able to adjust and compensate successfully.

Self-efficacy. This characteristic is defined as students' "judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, cited in Linnenbrink & Pintrich, 2003, p. 120). Self-efficacy is different from self-esteem in that it is a personal judgment of competence rather than an emotional reaction to actual accomplishments. Self-efficacy is more specific to a task (e.g., "I can find the main idea of a paragraph") instead of a generalized notion of competence (e.g., "I am a good reader"). (Bandura, 1986, 1997). Reading self-efficacy in relation to this study was defined as students' confidence in their ability to perform reading-related tasks.

Self-regulation. This aspect of the metacognitive process is the ability of the learner to control his or her interest, attitude, and effort, and the application of strategies toward an academic task or goal. The key to self-regulation is the ability of the learner to understand the requirements of the task or goal, and then to monitor and adjust his or her efforts, once the expectations are established, without further cues from others such as teachers, peers, or parents (Ley & Young, 1998). A student who has a clear understanding of an academic task (e.g., "I must read 20 pages in my biology text tonight") can then implement self-regulation to meet the requirements of the task (e.g., "I estimate that I can complete my reading in 90 minutes, if I first preview the chapter by reading the summary, headings and bold print,

then by looking up highlighted words I don't know, and while reading, employ study-reading strategies to stay focused and comprehend what I am reading").

CHAPTER 2

REVIEW OF RELATED LITERATURE

Developmental Education

Developmental education in America's colleges and universities dates back to 1636 when scholars at Harvard University in Boston, Massachusetts, taught classes for colonial students less accomplished in Latin and in other basic subjects. These bright, yet under-prepared, students were tutored to help them catch up with their more prepared classmates (Boylan & White, 1988; Stahl & King, 1999). This tutoring practice continued to be the norm at Harvard and many other colleges and universities for many years after the war for independence.

In 1849, the University of Wisconsin established the first official developmental program. By 1889, 80% of American colleges and universities had preparatory programs. In the early 1900s, half of the students enrolled in Harvard and Yale did not meet basic university entrance requirements. With the exception of a brief period from about 1963-1973 when the post World War II baby boom children reached college age, North American colleges and universities generally were unable to engage in highly selective admissions (Boylan & White, 1988). Many students were allowed to enter college unprepared for the academic rigor required of them. Therefore, the need for courses to help under-prepared students succeed in college was significant and universal, and colleges responded to the need. Courses and programs designed to help under-prepared students succeed in college have proliferated in recent decades (Cohen & Brawer, 1989). According to a recent study by the National Center for Education

Statistics (NCES, 2000), 99% of the nation's public community colleges currently offer developmental courses in math, writing, and reading.

Although courses for under-prepared students in college have existed for some time (Ignash, 1993), relatively little scholarly research has been conducted regarding their effectiveness (Astin, 1998; Boylan, Bliss, & Bonham, 1997; Grubb, 1998; Koski & Levin, 1998). O'Hear and MacDonald (1995) reason that since most remedial and developmental teachers are practitioners, not required to do research as a part of their job, one should not be surprised by the lack of research regarding preparatory courses. Developmental reading teachers may evaluate their own students and courses and track student progress, but they rarely publish their results in scholarly journals (Boylan, 2002; Koski & Levin, 1998; Reder, 2004). However, increased pressure on colleges to address student retention issues may motivate educators to do more research in the area of remedial and developmental education in the future (Boylan, Bonham, & Bliss 1992; Koski & Levin, 1998).

Developmental Reading Courses

Developmental programs are designed to help students develop academic skills and improve learning strategies needed for success in college. Although these learning assistance programs offer instruction in math, writing and reading, students with reading difficulties are found to be the most at-risk for success in higher education (Boylan, et al, 1992). Therefore this section of the literature review is focused on studies related to developmental reading courses and programs.

Only limited data are available regarding the scope of the literacy problems students face in college. The best data available come from the NCES (2002). The National Center's *Reading Skills Inventory* was used to assess entering college students' vocabulary and text comprehension in 1971, and again in 1999. Students were considered under-prepared for college if their reading scores were less than the 300-point minimum proficiency level, considered necessary for college level reading (NCES, 2002).

As previously mentioned, in 1971, when about 2 million students entered college nationwide, and again in 1999, when about 8 million students enrolled, the NCES found that nearly 40% of freshman students were not ready for the rigors of college-level work. Therefore, about 800,000 students were under-prepared for college reading in 1971, and approximately 3.2 million students were inadequately prepared in 1999. As the literacy problems faced by colleges and universities have grown over the last three decades due to the increased number of under-prepared college-bound students, developmental courses and programs have also increased. Discussions about the effectiveness of these courses and programs began to appear in the literature during the late 1970's.

Developmental Reading Studies

Eighteen studies of developmental reading were found in the literature. The earliest study reviewed was published in the *Journal of Counseling Psychology* in 1977, and the latest in the *Journal of College Reading and Learning* in 2003. Of the 18 studies reviewed, only seven were published in journals (Boylan, et al., 1992;

Bullock, Madden, & Harter, 1987; Cox, Friesner, & Khayum, 2003; Hennessey, 1990; Napoli & Hiltner, 1993; Olson, 1995; Robyack & Patton, 1977). Five were published in educational clearing houses, such as ERIC (Maxwell, 1997; Reinertson, 1989; Reis, 1992; Snow & Britton, 1988; Seybert & Soltz, 1992); three were presented as papers at educational conferences (Britton & Pettes, 1998; Eanes, 1992; Rauch & Fillenworth, 1985); one was an unpublished doctoral dissertation (Randall, 2002); one was an unpublished manuscript (Simpson, 1984); and one was reported in a local newspaper (Swinton, 1996).

Five of the 18 studies were discussed in Chapter 1 to illustrate the need for this study (Boylan, et al., 1992; Britton & Pettes, 1998; Cox, et al., 2003; Maxwell, 1997; Robyack & Patton, 1977; Swinton, 1996). These studies reported conflicting data about the effectiveness of stand-alone developmental reading courses. Two studies indicated that stand-alone developmental reading classes were not effective (Robyack & Patton, 1977; Maxwell, 1997), and the others indicated that they were.

Of the remaining 13 studies, all of them but one (Eanes, 1992) reported positive outcomes resulting from college developmental reading courses. Eanes (1992) found no significant differences among the freshman-year grades of students who took the reading course and those who did not take the course.

Some studies were longitudinal (from two to six years) (Bullock, et al., 1987; Cox, et al., 2003; Hennessey, 1990; Napoli & Hiltner, 1993; Reinertson, 1989; Reis, 1992; Seybert & Soltz, 1992), and some were of a shorter duration (from 15 weeks to a semester) (Eanes, 1992; Olson, 1995; Randall, 2002; Rauch & Fillenworth, 1985;

Simpson, 1984; Snow & Britton, 1988). The sample size in the 13 studies varied from 18 students (Randall, 2002) to 6,433 students (Reis, 1992).

The dependent variable for five of the studies was the grades earned in another college class (e.g. psychology, history, business law, or geography) (Bullock, et al., 1987; Olson 1995; Rauch & Fillenworth, 1985; Simpson, 1984; Snow & Britton, 1988). The dependent variables for the other studies included (a) the grades earned in the developmental reading course itself (Reinertson, 1989), (b) a teacher-made survey (Randall, 2002), (c) the *College Board Computerized Placement Test* (CPT) (Napoli & Hiltner, 1993; Reis, 1992), and (d) grade point average (GPA) (Cox, et al., 2003; Eanes, 1992; Hennessey, 1990; Seybert & Soltz, 1992).

Of the seven studies published in journals, six of them reported positive outcomes associated with college developmental reading programs (Boylan, et al., 1992; Bullock, et al., 1987; Cox et al., 2003; Hennessey, 1990; Napoli & Hiltner, 1993; Olson, 1995) while one did not (Robyack & Patton, 1977). The Robyack and Patton study (1977) contradicted the findings of the Boylan, et al. study (1992) which supported the notion that stand-alone reading courses help students do better in other college classes.

The studies published in journals are summarized below: Bullock, et al. (1987) conducted a two-year study of their developmental reading course at the University of Cincinnati. All students involved in the study were enrolled in required psychology classes at the university but only the treatment students took the reading course in addition. At the end of the study, the researchers compared psychology test scores of students who had taken the developmental reading course with comparable students

who did not take the course. The psychology content test used was developed by the reading teacher. It was designed to measure reading comprehension and vocabulary. The researchers reported that the treatment students obtained significantly higher scores on the test than the comparison group.

Hennessey (1990) conducted a six-year longitudinal study (1982-1987) in an attempt to measure the effectiveness of her developmental reading course. Her study involved 284 students with poor reading abilities. Students were identified as needing help in reading if they scored below 70 on the *Degrees of Reading Power* (DRP) test. Hennessey's developmental reading course included instruction on study skills, reading rate, vocabulary development, organizational skills, critical thinking, identifying main ideas, figurative language, and interpreting graphic aids. The course was individualized so students could move through the program at their own pace. Students met with the instructor weekly to discuss their work and receive feedback on their assignments.

Hennessey found that the treatment students who completed the reading course earned a higher cumulative grade point average in all of their courses than those who had originally been placed into the program, but did not complete it. Those who had completed the course had also taken more college classes than those who did not.

Napoli and Hiltner (1993) studied 130 students who took developmental reading courses between the years 1988-1991 at Suffolk Community College in New York. They used the *College Board Computerized Placement Test* (CPT) reading test to assess the program's effectiveness. Eighteen percent of the students either received an incomplete grade or withdrew from the program; 10% failed the course. The

researchers reported that the average GPA for developmental students in all regular college credit courses completed was 2.4 as compared to 2.6 for nondevelopmental students. The CPT pretest average for lower group of developmental students was 55%, while their CPT posttest average was 72%. The CPT pretest average for the higher group was 64% while their posttest average was 76%.

Olson (1995) conducted a study at Sam Houston State University during the Spring Semester of 1992. The subjects of the study were 19 developmental students enrolled in a United States history course concurrently with the state-mandated developmental reading course. At the end of the semester, none of the developmental reading students failed the history course. In fact, all of them earned final grades above the average grade obtained from the 289 students taking the history course. During the summer semester following the study, all 19 developmental students passed the reading and/or writing section of the Texas Academic Skills Program (TASP) test. Three years after the study, all 19 students were still enrolled at the university, working towards their degree.

Cox, et al. (2003) conducted a study of 1,817 students at the University of Southern Indiana who took a one-semester developmental reading course sometime during the years of 1995 through 2000. At the end of the year 2000 they compared the average GPA of the students who earned A grades in the reading course with the average GPA of all of the other students at the university. They found that the average GPA of the target students exceeded the average GPA of the students not taking the developmental reading course.

The majority of developmental reading studies reported in this review suggest that developmental reading programs have a positive impact on college students. However, few of the studies were carefully designed according to acceptable research standards (e.g. Astin, 1998; Grubb, 1998; Maring, Shea, & Warner, 1987; Reder, 2004). Almost none of them provided detailed descriptions of the research treatment, i.e., specific descriptions of their courses. More quality research is needed to determine the effectiveness of college developmental reading courses (e.g. Boylan, et al., 1992; Koski & Levin, 1998; Maxwell, 1997; Reder, 2004). As Astin (1998) stated, "Further research is needed to identify the impact of [development reading] programs on students' learning" (p. 3).

Research about Metacognitive Variables in Reading

Since metacognitive instruction is an integral part of the developmental reading course evaluated in the present study, research regarding metacognition is discussed here. Metacognition research includes the investigation of students' self-awareness and their efforts to monitor and guide their text comprehension as they attempt to read. This area of research reflects a growing interest in assisting readers to develop practical ways to exercise control of reading and learning tasks. To help students understand metacognition and improve their self-monitoring skills, educators have attempted to (a) identify what successful and less successful students do to understand and remember what they read, and (b) teach metacognitive strategies so that students can become independent, self-directed learners.

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Most researchers agree that metacognition includes a knowledge component and a self-regulation component (Johnston & Winograd, 1985; Swanson, 1989). The knowledge component can include knowledge or awareness of (a) oneself as a learner, (b) the academic tasks to be performed, (c) the relationship between the text and prior knowledge, and (d) reading strategies available for achieving comprehension. Resnick (1983) refined the knowledge component by distinguishing between two specific types of metacognitive knowledge: (a) *declarative knowledge* (knowing that) and (b) *procedural knowledge* (knowing how). She viewed declarative knowledge as being a combination of personal awareness and task knowledge, including propositional characteristics about personal abilities and task characteristics. She saw procedural knowledge as knowledge of useful strategies.

Paris and Winograd (1990) argued that the two types of metacognitive knowledge proposed by Resnick were insufficient to account for reading competence because declarative and procedural knowledge do not include awareness of the conditions under which the skills and information are utilized by readers. Hence, Paris and Winograd (1990) proposed *conditional knowledge* as a third type of metacognitive knowledge. Conditional knowledge is having the good sense to select the appropriate strategies for the tasks to be completed.

The self-regulation component of metacognition can include (a) coordinating metacognitive knowledge such as self-knowledge and knowledge of text organization: (b) planning, (c) monitoring and understanding, and (d) identifying and remediation the causes of comprehension failures (Brown, 1987). Although the metacognitive

components of knowledge and self-regulation can be distinguished from each other, Brown suggested that attempts to separate these components may lead to oversimplification of a complex process.

As it relates to reading, metacognition includes (a) awareness of one's interpretation of a text, (b) evaluation of the adequacy and completeness of one's understanding, and (c) attempts by a person to monitor and improve their comprehension (Brown, 1987; Johnston & Swanson, 1989; Winograd, 1985). Metcalfe and Shimamura (1994) further clarified the concept of metacognition in the context of reading, by stating that it includes (a) recognizing when one does not understand and (b) knowing how to proceed in order to clear up the confusion.

Garner (1994) classified metacognitive reading knowledge into three main categories: (a) knowledge about oneself, (b) knowledge about the reading tasks one faces, and (c) knowledge about which strategies to apply to best accomplish the task. Garner explained that these three types metacognitive knowledge are interconnected and overlapping. Nevertheless, she asserted that considering them independently can be advantageous to the reader.

Studies of the utility of metacognitive reading strategies. Schunk and Rice (1992) studied whether metacognitive strategy instruction on main ideas would be more effective for elementary readers if knowledge about strategy usefulness was included. A 100-point reading efficacy scale measuring students' confidence in answering main idea questions was used as a pretest. Students were expected to answer questions about the main idea presented in a passage and to rate their confidence in the correctness of

the answer they had selected. The study consisted of six groups of students all taught by the same teacher but randomly assigned to two instructional treatments: (a) strategy-knowledge alone, and (b) strategy knowledge accompanied by feedback regarding the value of the particular strategy selected. The main idea strategies investigated had five steps requiring students to (a) read the passage questions, (b) read the passage to determine what it was mostly about, (c) think about what the details have in common, (d) think about what would make a good title, and (e) reread critical parts of the passage when they could not answer the questions. The researchers reported significant differences between the groups on the reading efficacy posttest and on the maintenance-comprehension measures. They found that strategy-value feedback increased the reading self-efficacy of the students. Overall, they found that strategy instruction was beneficial for under-achieving elementary school readers only when feedback was provided on the effectiveness of the strategy.

Rottman and Cross (1990) studied two measures of strategy-awareness and a measure of perceived self-competence. They found that metacognitive knowledge about reading tasks was more useful when students were informed about the value of when to use one strategy over another. Findings also indicated that learning disabled children, who have been described in many ways, benefited from the use of informed strategies to improve their awareness about reading and their strategic comprehension skills.

The value of metacognitive reading instruction for diverse learners. Brown (1987) described diverse learners using such terms as (a) learning disabled, (b) low

achieving, (c) developmental readers, (d) disabled readers, and (e) less capable summarizers. In relation to metacognition and characteristics of students, learner differences were reported in several studies involving normally achieving and developmental learners. For example, Young and Ley (2001) found that developmental and regular admission students differed significantly in their metacognitive strategy deployment. The results of their study suggested that self-regulation may be a distinguishing characteristic between some developmental and regular admission students. Brown and Palincsar (1985) posited that successful learners monitor their own comprehension and adjust their learning strategies accordingly. Effective comprehension seems to require the use of strategies that higher-achieving students use, almost intuitively, and that lower-achieving students can be taught.

Chan, Cole, & Morris (1987) tested the hypothesis that metacognitive instruction facilitates reading comprehension. They randomly assigned 32 average readers and 32 students with learning disabilities matched by reading level to specific and general reading groups. They reported a moderate, positive correlation between measures, indicating that student performance on comprehension monitoring and comprehension measures were related. The data suggested that diverse learners benefited more from specific metacognitive instruction than from general instruction.

Ryan (1981) compared successful and unsuccessful students designating them respectively as *expert* readers (those who utilize metacognition) and *novice* readers (those who do not utilize metacognition). He reported that expert readers use more strategies and use them more effectively than novice readers do. Anderson and

Armbruster (1982) suggested that novice readers do not skim, scan, reread, integrate information, plan ahead, take notes, or make inferences as often as do expert readers. Tei and Stewart (1985) found that successful readers adjust their reading rate for ambiguous words or confusing parts within a text and may return to inconsistent sentences several times to compare what they know with what is written in the text. In addition, they are more likely to notice whether or not their comprehension is altered because of text inconsistencies. Successful students tend to go beyond the text in search of deeper meaning. They are apt to paraphrase, summarize, anticipate test items, take notes in their own words, and relate material to their background (Long & Long, 1987). Kaufman and Randleret (1983) reported that successful readers are more likely than poorer readers to become actively involved with their reading tasks. They interact with content material by asking themselves questions, making inferences, and visualizing. In contrast, less successful students rely on skimming, pointing to key words, and rereading on a surface level.

Considerable research has been conducted to identify instructional variables that influence students metacognitive functioning when reading. Brown, Campione and Barclay (1979) investigated the role of metacognition in reading and found that when readers without metacognitive skills were instructed to read passages, they often read them only once, did not check the difficult parts, and said they were ready for tests without effective study. Simpson (1984) found that only 40% of college freshman could identify strategies to evaluate their test readiness indicating a need for further instruction.

Metacognitive reading strategy-based instruction. Another aspect of reading instruction focuses on how to teach metacognitive strategies. Garner (1994) presented several guidelines for effective metacognitive training: (a) teachers should be genuinely interested in the processes involved in reading, (b) they should carefully analyze the metacognitive strategies associated with both reading and learning, (c) they should present and model the use of these strategies in several content areas, (d) metacognition should be an ongoing theme throughout the school year, not just a topic for a couple of lessons, and (e) students should practice metacognitive strategies in many different situations in order for the behavior to become habitual.

Paris and Winograd's (1990) research supported the idea that metacognition can be taught. Their study showed that students could be instructed in how to enhance their learning by becoming aware of their own thinking as they read, write, and solve problems in school. Pearson (1993) concurred with these researchers and suggested the use of teacher modeling and student practice to teach metacognition. Peters (2000) concluded that instruction in metacognitive skills enabled students to develop as independent learners by teaching them to become self-managers and appraisers of their own thinking. Underwood (1999) also identified a specific metacognitive strategy that students could be taught: generating questions or self-questioning. Underwood's research showed that when readers generate questions before or during reading, they are more likely to direct their reading in search of answers.

Volet (1991) studied university students' use of metacognitive strategies. She concluded that metacognitive training should occur within the confines of a specific

content area. She recommended that instructional approaches should be employed that promote interaction. Volet suggested that teachers should first model, then coach students in the transfer of high-level thinking skills. Content-specific metacognitive training offers students immediate feedback regarding when they have comprehended the text and under what conditions they understand best.

Other kinds of instruction, such as the use of scaffolding and modeling when teaching metacognitive strategies, are supported by research findings of Roueche and Roueche (1999). They found that lower-achieving students required a high degree of structure for their learning experiences. Cross (1976) found that highly structured learning experiences and modeling helped under-prepared students compensate for their lack of organizational schema, which is necessary for mastering many academic concepts. Kulik and Kulik (1991) and Casazza and Silverman (1996) also found that students in remedial courses were likely to be more successful when a variety of instructional methods such as the ones described above were used.

Young and Ley (2001) reported that teaching metacognitive comprehension monitoring helped students make more accurate self-regulative decisions. Cornoldi (1990) broadly defined self-regulation as the metacognitive effort put forth by students to deepen, monitor, manipulate, and improve their learning. Currently, educators have great interest in teaching self-regulation of learning. "Theoreticians seem unanimous--the most effective learners are self-regulating" (Butler & Winne, 1995, p. 245). Key to effective self-regulation is accurate self-assessment of what is known or not known

(Schoenfeld, 1987). Teaching students this process of self-assessment clearly requires instruction of metacognitive knowledge.

Instructional strategies that may be key to the progress made by developmental students tie to statements made by Young and Ley (2001) that the metacognitive self-regulation concepts and principles discussed in the research literature must meet two important criteria: (a) they must be supported by research results that suggest a positive influence on learning, and (b) they must address a need, or a self-regulation gap associated with achievement between regular admission and under-prepared college students.

Research on metacognition is relatively new and subject to a variety of interpretations. Making comparisons of studies is difficult because of the ambiguities and variations in strategies and components reported. Most of the studies had limited samples, were lacking in detail, or were reported in secondary sources. Therefore, caution needs to be exercised when making generalizations from the findings of such studies.

The literature reviewed revealed three consistent components of metacognition (a) metacognitive knowledge or awareness, (b) self-regulation, self-management of cognition, or self-monitoring, (c) and self-appraisal or self-evaluation. As reported in the literature, many researchers and educational practitioners have examined and recognized that the above aspects of metacognitive instruction have facilitated learning.

Research about Reading Self-efficacy

Reading Self-efficacy is described in the literature as students' "judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura cited in Linnenbrink & Pintrich, 2003, p. 120). Self-efficacy is more specific to a task instead of a generalized notion of competence (Bandura, 1997). Self-efficacy differs from these other *self* processes by focusing on self-evaluation or personal ratings of performance in domain specific tasks. The results of each specific performance, in terms of success or failure, can influence both self-esteem and self-concept (Zimmerman, 1990).

McCombs (1986) and others suggest that self-efficacy differs from self-concept and self-esteem in important ways. Self-concept is best described as a collection of beliefs about one's self that directly influences learning behavior (Marsh, 1990). Self-esteem is one's overall feeling of worth (Issacs & Duffus, 1995) or the evaluation and identity about self compared to the personal ideal self (Coopersmith, 1967). Self-concept involves an external comparison of self to others, while self-esteem is an internal comparison of a "real" to an "ideal" (Pascarella & Terenzini, 1991).

It appears evident that students' application of metacognitive reading strategies is potentially related to their self-efficacy and outcome expectancy beliefs. In addition, the influence of self-efficacy on performance has been found to be stronger in lower achieving students than in students at higher levels of achievement (Moulton, Brown, & Lent, 1991).

Bandura (1982) reported that the relationship between self-efficacy and outcome expectancy may have relevance for reading instruction. Results from his research revealed that people are motivated to choose and practice behaviors that they are confident they can successfully perform, and that they feel are related to obtaining desired outcomes. Both self-efficacy and outcome expectancy influence choice of behavior and persistence in that behavior, determining the amount of time and effort that one is willing to expend. Motivation is supplied by self-efficacy and outcome expectancy beliefs and is a critical determiner of the student's level of achievement. Self-efficacious monitoring of motivation was regarded as an aspect of metacognitive (Borkowski, 1992). Students' application of study-reading strategies seems to be directly related to their self-efficacy and their outcome expectancy beliefs. The review of the literature identified studies in which the relationship between reading and writing self-efficacy, academic self-efficacy, and reading comprehension self-efficacy were investigated.

Academic self-efficacy. Academic self-efficacy is a broader application of the term to the extent to which students believed that they could control the outcomes of their attempts at college learning tasks, Thomas, Iventosch, and Rohwer (1987) examined the relationship between study processes, self-efficacy, and academic achievement in specific courses. They used the Self-Concept of Academic Test (SCAT) to measure this construct. Results showed that the best single predictor of students' achievement in college courses was a correlation between the course requirements and positive self-efficacy.

Additional research on the self-efficacy of college students was conducted by Wilhite (1989). He assessed the self-efficacy of 184 college students enrolled in an introductory psychology course. Like Thomas et al. (1987) he used the SCAT as a measure of self-efficacy. Results of his research showed that the measure of academic self-concept was not as important a predictor of academic achievement as was self-efficacy, and that the best predictor of course achievement was the subjects' self-assessment of their memory ability which is an academic task.

Bouffard-Bouchard (2001) presented findings from a study that “investigated the influence of self-efficacy on cognitive performance when subjects had equivalent knowledge and experience in the performance domain” (p. 353). The authors reported a relationship between academic self-efficacy and performance of college students in a variety of tasks. The tasks included successful reading comprehension, effective writing composition, and accurate mathematical computation by the students.

Chemers, Hu, and Garcia (2001) offered findings from a study that explored “the effects of academic self-efficacy and optimism on students’ academic performance, stress, health, and commitment to remain in school” (p. 55). The authors demonstrated a relationship between these variables and first-year students’ abilities to successfully negotiate the transition to higher education. They also found that students who are academically efficacious performed at a higher level (academically) than their counterparts because of the positive relationship of self-efficacy and academic expectations (p. 59).

Reading self-efficacy. Shell (1986) studied the relationships between the motivational variables of reading self-efficacy, outcome expectancies, and performance in reading comprehension tasks. Subjects consisted of 153 college students who completed measures of self-efficacy for the above variables. Achievement was measured by the DRP test, and by writing samples that were scored holistically. Results from regression and canonical analysis revealed a strong motivation component in reading and writing achievement. Self-efficacy and outcome expectancy beliefs were found to be significant predictors of reading and writing performance. Shell concluded that if students viewed reading and writing as important behaviors related to desirable life goals for themselves, family, and friends then they were more likely to engage in reading or writing activities and persist in reading or writing tasks.

Moulton, et al. (1991) found a positive relationship between beliefs of reading comprehension self-efficacy and academic performance and/or persistence in reading and study skills. The authors stated that a “positive and statistically significant relationship” (p. 35) existed between students’ belief in their ability to succeed with college reading and study skills tasks and their persistence in completing them.

The literature review of self-efficacy supports the findings that a connection exists between self-beliefs and academic success. In general, it was found that metacognition is related to self-efficacy and that this relation may have a significant effect on student motivation to learn and persist in difficult academic tasks. This clearly relates to reading comprehension of college students in the Moulton et al study.

Summary of the Literature Review

A review of the literature on metacognitive-based reading instruction suggested that this type of learning may be effective for diverse college students. Because the amount and quality of the research in this field is limited, the evaluation conducted in this study is warranted.

Because of the increase in the number of students entering college academically underprepared for higher education, there is a compelling social need to provide effective instruction for diverse learners. The purpose of this study was to evaluate the available data on whether the metacognitive instruction which was employed in the course being studied was effective. This review of the literature supported the need for research to be conducted on the effectiveness of developmental reading instruction.

CHAPTER 3

METHODS AND PROCEDURES

The purpose of this study was to investigate the impact of the CTRS 1170 *Advanced Critical Thinking and Reading* course on the (a) reading self-efficacy, (b) reading comprehension, and (c) grades earned subsequently in English 1010 by college students who had completed that course. To conduct the study, individual student data and institutional records were utilized.

Setting

Utah Valley State College (UVSC) has evolved to meet the needs of the growing population of Utah Valley. The school was founded in 1941 in Provo, Utah where it served the community as the Provo Technical College until 1975. In 1975 the school moved to Orem, Utah and was renamed Utah Valley Community College. In 1993 the name was changed again to the Utah Valley State College. It was at this time that the college became a four-year post-secondary institution combining the philosophies and missions of a both a comprehensive community college and a state college. The college offers 54 vocational/technical programs and 35 baccalaureate degrees. Because UVSC has an open-door policy that admits all applicants, students from a broad range of ability levels enroll in UVSC classes. Therefore, the college is required to meet the needs of an academically diverse student population.

There were two instructional settings for the treatment group in this study: the CTRS 1170 *Advanced Critical Thinking and Reading Strategies* course, and the English 1010 course. The CTRS 1170 course contained the treatment population, and the English

1010 course was taken by both the treatment and non-treatment population. The CTRS 1170 course was provided by the Department of College Success and Academic Literacy within the School of General Academics. The English 1010 course was offered by the English Department within the School of Humanities, Arts, and Social Sciences (UVSC Catalogue, 2004-2005).

Three conditions influenced the settings of the study: (a) the treatment group received the metacognitive reading strategy instruction from the same professor, (b) the treatment group received this instruction during their first semester of their college experience, which insured they had not taken other remedial reading courses offered at UVSC, and (c) both treatment and comparison groups were in the second semester of their college experience when they completed the English 1010 comparison course. These conditions appear to make the present study fit the description of research Sloane (2005) described as multilevel or scaled research. These studies obtain results on instructional effectiveness as well as on student outcomes. In such research, time is a boundary condition, which relates to the fact that both groups took English 1010 during their second semester. This similarity in time frame adds descriptive value to the quality of the data found from the study.

Design

Two basic designs were used in this study. The dual one group pretest posttest design was employed to address research questions related to reading self-efficacy and reading comprehension. The one group posttest only design was used to compare the English 1010 grades of those who had and had not taken CTRS 1170.

Pretest posttest design. Professor Carter taught CTRS 1170 one to four times a year throughout the years between 1996 and 2004 inclusively. Each time she taught the course, she used the same instruments as a pretest and as a posttest. Shadish, Cook, and Campbell (2002) described this design as the *one-group pretest posttest* design (p. 106). Pretest and posttest observations are represented by the letter O. The symbol for the treatment is the letter X. This same design was used repeatedly to study the data gathered for the first two dependent variables in all 27 sections taught by Professor Carter from 1996-2004. Since two measures of student characteristics were obtained before and after the course, it was more correct to label this modified version used for the first two dependent variables as the *one-group dual pretest-dual posttest* design. This design depicted graphically would appear as $O_1 \quad O_2 \quad X \quad O_1 \quad O_2$, where the following specific labels apply to this study:

1. X = Treatment (CTRS1170)
2. O_1 = Literacy Skills Assessment (LSA)
3. O_2 = Degrees of Reading Power (DRP)

Posttest-only design. The posttest only design replicated each year for eight-years was employed to examine the English grades. This design described by (Shadish, et al. 2002) was used to assess the impact of taking CTRS 1170 on students' subsequent grades in English 1010. Mean grades for the treatment and non-treatment groups who took English 1010 were also analyzed and compared. This design depicted graphically would

appear as (XO₃) and O₃ where the following specific labels apply to this study in each of the eight years studied:

1. XO₃ = Treatment (CTRS 1170) + grades earned in English 1010
2. O₃ = Non-treatment group grades earned in English 1010

Sample

The treatment sample consisted of intact groups of students who enrolled in Professor Elaine C. Carter's CTRS 1170 classes at UVSC during the years 1996-2004. Data were archived for Professor Carter's CTRS 1170 students for the eight-year period studied. The students were not randomly selected to participate in this course nor were they randomly assigned to the treatment or comparison conditions. The comparison group used to study the third variable included students attending UVSC in the same years as the treatment sample. Students in the treatment sample took English 1010 for the first time in their second semester since the critical thinking and reading strategies course was a prerequisite for that course.

A total of 667 students were taught in Professor Carter's critical thinking and reading sections over the years studied. However, since 236 students did not meet the restrictions applied to the sample, the number of students studied in the treatment group was reduced to 431. Consequently, the CTRS1170 sections appear smaller although the actual average class size of Professor Carter's sections was generally 25 students per class.

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measure more than eight weeks before beginning the CTRS 1170 course. Twenty students who did not take the reading comprehension or reading self-efficacy posttest were also excluded from the study. The sample was further reduced by excluding 87 students who waited more than one semester after completing CTRS 1170 to enroll in English 1010. Another 71 students were excluded from the CTRS 1170 treatment group because they did not take English 1010 at all. Only CTRS 1170 students who took English 1010 in their second semester at UVSC immediately following the reading course were included in the sample. Of the students in the treatment sample 97.4 % were required to take the course as a prerequisite before enrolling in English 1010, only 11 students in the sample voluntarily enrolled in the CTRS 1170 course. The treatment sample is reported in Table 1.

The non-treatment or comparison group consisted of 14,862 students who did not take CTRS 1170, but who took English 1010 for the first time in their second semester at UVSC during the years studied. Only small differences were found between the treatment and non-treatment groups in terms of gender and age, but significant differences were found in their mean ACT scores. Students in the non-treatment group had higher mean scores on the ACT admissions test suggesting that they were better prepared for college than students in the treatment group and thus were not required to take the critical thinking and reading strategies course.

UVSC students who earn a composite score below 19 on the ACT, are required to take the college assessment tests in reading, writing, and math. Students who score below 77 on the reading comprehension test are required to take CTRS 1170.

Table 1

Number of Students who Completed Professor Carter's CTRS 1170 by Year and Section that Were Included in the Study

Semester	Section	Number of Students
Fall 1996	A	17
	B	10
Spring 1997	A	13
	B	13
Fall 1997	A	15
	B	17
Spring 1998	A	16
	B	16
	C	12
	D	17
Fall 1998	A	17
	B	15
	C	16
Spring 1999	A	16
	B	16
Fall 1999	A	18
Spring 2000	A	15
Fall 2000	A	17
Spring 2001	A	18

Table 1 (continued)

Semester	Section	Number of Students
Fall 2001	A	20
	B	17
Spring 2002	A	15
Fall 2002	A	15
Spring 2003	A	16
Fall 2003	A	18
Spring 2004	A	20
Total	27	431

Table 2 summarizes the demographic characteristics of both groups and their mean ACT scores before taking English 1010. This connection between the two courses makes the comparison of grades in English 1010 a logical dependent variable for this study. It is relevant because of the importance of knowing whether requiring CTRS 1170, as a prerequisite for English 1010, is beneficial for developmental students. ACT scores are also reported to show the initial difference in the groups. The ACT scores of the non-treatment group were obviously higher than the treatment group, suggesting they were better prepared for college work than the treatment group.

Table 2

Demographic Characteristics by Gender and Treatment Condition

Gender	Treatment Group				Non-Treatment Group			
	n	Percent of sample	Median Age	Mean ACT	n	Percent of sample	Median Age	Mean ACT
Male	198	46%	20	17.85	7,194	49%	20	20.68
Female	233	54%	19	18.44	7,488	51%	19	20.78
Total	431	100%	19.5	18.15	14,682	100%	19.5	20.73

Note. Data for Table 1 were gathered from the SIS admissions survey by the UVSC Institutional Research department (2004).

Description of the College Reading Treatment

CTRS 1170 is a fifteen-week, stand-alone developmental reading course. Students met for three hours a week to earn the three-credit hours offered for the course. According to Professor Carter, the major course objectives and the course instruction changed very little over the years covered in this study. The reading selections and student exercises varied somewhat over the years, but the basic instructional strategies did not vary. Students were taught reading strategies utilizing a metacognitive awareness framework organized in general phases: (a) before reading, *get ready*; (b) during reading, *read actively*; (c) after reading, *reduce information according to importance, and retain*

important information. Within each phase of the metacognitive awareness framework mentioned above, students were taught to monitor self, task, and strategy awareness (e.g., Ellis & Lenz, 1987; Field, 1999; Garner, 1994; Peters, 2000).

In addition, instructional objectives included the following three levels of reading comprehension: (a) literal recognition, involving syntax and vocabulary knowledge (*reading the lines*), (b) inferential reading, involving the use of schemata and text to make logical inferences (*reading between the lines*) (e.g., Anderson & Pearson, 1984), and (c) critical reading, involving the making of judgments based upon internal and external criteria (*reading beyond the lines*) (Bloom, 1976).

Most of the Metacognitive Training Activities (MTA), critical thinking exercises, and reading strategies taught in CTRS 1170 were contained in the textbook: *Taking Control of Your College Reading and Learning* by Byrd, Carter, and Waddoups which was first custom published in 1995 at the college and then published nationally in 2000 (See Appendix A for a bookmark illustrating the four stages). The text was written directly for developmental reading students who have not intuitively grasped the need to involve themselves in conscious and self-regulated processes before, during, and after reading college text material.

Professor Carter provided a list of elements that she believed were critical to her course: (a) clearly communicated instructions and expectations, (b) high encouragement and support, (c) modeled strategies which involved *think alouds*, that engage students in discussion, question, and response, (d) guided and independent practice with frequent,

ongoing and timely feedback, (e) consistent accountability, and (f) frequent testing to determine whether mastery of course skills was achieved.

In order to motivate her students and build class unity, Professor Carter provided her students with class mean scores for each major assignment or exam in the course. The scores provided by Professor Carter were recorded by the students after each of these feedback sessions. After each of these sessions, she encouraged them to set realistic goals, put forth more effort to improve their performance, and to spend more time applying the concepts and strategies taught (e.g., Billingsly & Wildman, 1991; Whilhite, 1989). She tried to follow the teachings of Tinto (1997) who believed that students performed better academically if teachers fostered a collaborative atmosphere for learning and helped students connect to the class as a community of learners. According to Professor Carter, this helped to create a sense of cooperation, interdependence, and accountability to each other as they strove to become a community of metacognitive critical thinkers and readers. (E. C. Carter, personal communication, July 18, 2005).

Before reading, get ready. During this phase of the course, students were taught to (a) analyze possible external distractions in their study area, (b) identify internal distractions in their emotional or motivational state of mind, (c) assess the difficulty of the material to be read, and (d) identify circumstances related to how they were feeling physically.

Students were also taught to preview certain features of the text that signaled important information. They were then taught how to set *check points* in the text. Students placed these points where they felt they wanted to stop and paraphrase what

they had just read in the text (See Appendix B for a specimen copy of this Metacognitive Training Activity). They would not actually read the text at this time, only identify logical places in the text where they would later stop and check their concentration and comprehension. After the logical stopping points were chosen, boxes were drawn on the page to designate them for later use.

Also during this phase, the importance of accountability was reinforced with the students. They were reminded that they were expected to attend class on time; be prepared for class, involved themselves in class activities; and turn in class assignments on time. They were also told that no unexcused late work would be accepted.

Students were next given out-of-class reading assignments. The assignments were designed to help students apply everything they had been taught in the class. Specifically, the strategies taught in Professor Carter's class were to be applied when reading textbooks used in other classes. Students reported on the completion of each assignment by (a) handing in the completed work, or (b) reporting the completion of the assignment on the *Homework Report Sheet* (See Appendix C for a specimen copy). Professor Carter believes that this feature of the course enhanced student preparation for all class assignments and also improved the personal accountability of each student in the class (E.C. Carter, personal communication, March 23, 2005).

During reading, read actively. During this phase of the course students were taught to connect their prior knowledge with the content covered in the text, a strategy advocated by various teachers of literacy (e.g., Anderson & Pearson, 1984; Pearson, Roehler, Dole, & Duffy, 1991). They were also taught to identify key information in the

text such as main ideas and supporting details. In addition, Students were taught to identify expository text structures and to capture key information obtained from the use of text structural knowledge. These strategies are also advocated by literacy educators (Afflerbach & Johnston, 1986; Bauman, 1986; Tierney & Cunningham, 1984).

As the students read, they were taught to stop at the check points they had previously identified by drawing small boxes in the text. When they reached a control box they were asked to assess their concentration and paraphrase what had been read up to that point. If they felt confident that they had comprehended what was read up to that point, they indicated their level of confidence in their comprehension and concentration, then they would proceed to read until they came to the next check box (e.g., Chan, Cole, & Barlett, 1990; Kuiper, 2002; Schraw, 1997). If students did not feel confident that they had comprehended what they had read, they would note it, then attempt to use various fix-up strategies Professor Carter had taught them (E. C. Carter, personal communication, May 23, 2005).

The other college-level reading textbook used in the course was *Bridging the Gap*, by Brenda Smith (1995-2002, 5th ed.) Most of the expository text selections used in the course are found in this text. Carter modeled the strategies she taught students before she asked them to use them. For example, when she taught the students how to identify main ideas and major supporting details, she would model the process for students many times with various texts before she asked them to find main ideas and supporting details on their own. She used a *think aloud* strategy as she modeled the questioning strategies for the students (e.g., Palinscar, Winn, David, & Stevens, 1991; Pearson 1993). When she

asked them to apply what they had learned she guided them through a questioning process (e.g., Andre & Anderson, 1979). She did this by giving all of the students sample paragraphs. These paragraphs were also projected on the whiteboard where Professor Carter employed the examples to further instruct and interact with the students (E. C. Carter, personal communication, July 8, 2005).

Furthermore, students who needed additional tutoring or encouragement which Professor Carter described as “mentoring” met with Professor Carter during her office hours for feedback, further instruction, and the retesting of skills as advocated by Hennessy (1990). In these feedback sessions, students were mentored individually or in small groups. Carter evaluated their responses in practice exercises and/or on exams to determine their competency levels. She then clarified misunderstandings, modeled correct responses, and coached students through more guided and independent practice until they were able to retest with success. For some students this process required several feedback sessions before they gained the confidence and skills they needed to comprehend college textbooks (E. C. Carter personal communication, May 6, 2005).

After reading, reduce and retain. During this phase of the instruction, students were taught how to organize and retain information obtained from text. They were taught to make summaries, to create outlines, and to do concept mapping (Brown & Day 1983; Ellis & Lenz, 1987). They employed a rating scale for evaluating the key components of their visually-enhanced concept maps (Harris & Pressley, 1991) (See Appendix D for a specimen copy of the rating scale).

Carter also taught students to use a reflective writing process. The students applied this process to written assignments that were recorded in a *Critical Thinking Application* (CTA) journal. At intervals throughout the course, these journal assignments were given so students could reflect on their attempts to apply the strategies learned in class and from their homework to textbooks used in other courses. This activity was designed to fit various learning styles as several researchers have stressed (Canfield, 1976; Lamire, 1998) (A specimen copy of a CTA journal assignment, including a student example, can be found in Appendix E).

Instrumentation

The Literacy Skills Assessment (LSA). The LSA is a teacher-created questionnaire created in 1996. It was designed to measure students' self-efficacy regarding their ability to successfully perform college-level reading tasks. The LSA was created primarily by Associate Professor, Stacy D. Waddoups in consultation with other developmental reading instructors at UVSC in the Department of College Success and Academic Literacy (S. D. Waddoups personal communication, May 16, 2005).

The LSA consists of fifteen items. Specific statements on the instrument were constructed from the metacognitive objectives of the CTRS 1170 course. Each item describes an activity identified by research as those that proficient readers use (Afflerbach & Johnston, 1986; Baumann, 1986; Brown & Palincsar, 1985; Pearson, et al., 1991; Tierney & Cunningham, 1984). The LSA asks students to rate their ability to successfully perform each of 15 tasks on a seven-point confidence scale. For example, a successful CTRS 1170 student was expected to be able identify main ideas and major

support details. The reliability and validity of the LSA was not studied (see Appendix F to view a specimen copy of the LSA).

Degrees of Reading Power. The *Degrees of Reading Power* (TASA, 2000) was the instrument used to measure reading comprehension growth, the second dependent variable in this evaluation study. The pretest posttest design for measuring this variable is very much like the one explained above, but unlike the LSA it was not taken in the classroom. Students completed both the pretest and the posttest DRP in the nationally certified UVSC Assessment Center where their scores were entered in the Student Information System (J. E. Hoyt personal communication, November 8, 2004).

The DRP is designed to measure student growth in reading comprehension (Flippo, Hanes, & Cashen, 1991). As explained above, a fundamental objective in CTRS 1170 has been to measure student growth and not just to assess end-of-semester performance. The Standard DRP test assesses student growth in paragraph level reading comprehension (Flippo, Hanes, & Cashen, (1991). The technology of the DRP relies on a link between readability using scale of text difficulty and test results; thus, DRP tests are designed to be interpretable in a criterion-referenced manner (Kostlin, et al., 1987); that is, test results can be interpreted directly in terms of what a student can do without reference to what other students of the same age can do (Flippo, Hanes, & Cashen, (2000). The average reliability score of the adult forms F-J of the DRP is .98. The F-J forms average validity score is .95 (Kostlin, et al, 1987).

Procedures

The pretest LSA was given as a homework assignment and the data were recorded by the instructor during the first week of a 16-week semester. The students did not see their pretest scores again until after the post LSA had been completed during the last week of class. As a part of their first-week's homework, students responded to the 15 statements about completing reading related tasks. As stated in the instrumentation section above, these tasks are directly related to the CTRS 1170 course objectives.

Students were instructed to mark the assessment as realistically and honestly as possible by circling the number that best described their current level of confidence in their ability to perform each of the tasks, using a seven-point scale. Students who rated their ability to perform a task with a 1 indicated no confidence in their ability to successfully complete that item. If they rated their ability as a 7, that indicated complete confidence in their ability to successfully complete that CTRS 1170 task. Student ratings resulted in a reading self-efficacy score that indicated their confidence in their ability to succeed.

The same LSA instrument was used for both the pretest and the posttest. It was given as a homework assignment that was collected from each student during the last week of the semester. Again, the students were instructed to honestly evaluate their current level of confidence in their ability to perform regarding each item and to rate themselves accordingly. After Professor Carter recorded the students' posttest LSA scores, she showed both the pretest and posttest scores to the students with the total number of gains or losses on the LSA. If the students' scores went up, a congratulatory

note was added. If the score went down, a brief discussion was held with these students to try to determine possible causes. Occasionally the students would admit being overconfident or unrealistic in the beginning or too hard on themselves at the end. No credit was given for completing either the pretest or the posttest LSA. If students failed to complete either of Literacy Skills Assessments, their data were excluded from this study.

The pretest for the DRP was taken prior to beginning the CTRS 1170 class. It was administered by trained Testing Services personnel in the UVSC Assessment Center. The in-coming CTRS 1170 students had already taken the DRP before entering the course. The DRP test score is considered viable in the Student Information System (SIS) for two years following the date of taking the test, but, as stated previously, only DRP tests taken within eight weeks of the course were used in this study. Different forms of the DRP are used each semester. The form that the students took as a pretest is recorded by computer so that an alternate form will be given as a posttest. Professor Carter had no knowledge of the content or the forms being administered, so teaching to the test would have been impossible. The posttest DRP was a homework assignment taken in the Assessment Center during one of the final days of the semester. The posttest DRP printouts were obtained by Professor Carter to show proof that the students had completed it. No credit was given for the DRP as a regular part of the course assignments.

Data Analysis

The data for all three dependent variables were entered into an *Excel* spreadsheet. This program generated a table that displayed the mean and standard deviation of the

pretest and posttest data for comparison of the means. Variances and effect sizes were also computed.

Analysis of data for research questions 1 and 2. A dependent sample *t*-test was computed to ascertain whether mean differences between the groups on the first two dependent variables were statistically significant.

Analysis of data for research question 3. The third dependent variable was analyzed using the independent sample *t*-test with the *Excel* spreadsheet. This program generated a table that displays the mean and standard deviation, the variance ratio, and the effect size of the difference in English 1010 grades for comparison of the means on the students from the CTRS 1170 treatment group and the non-treatment group whose data was gathered from the UVSC Student Information System (SIS) for the various semesters following the treatment.

CHAPTER 4

RESULTS

The primary purpose of this study was to determine the effectiveness of metacognitive reading instruction with CTRS 1170 students. Specifically, the following discussion reports an investigation of the effects of course participation on two dependent variables, reading self-efficacy and reading comprehension. The report also includes the data analysis of a third dependent variable comparing the mean and standard deviations of the final English 1010 grades of the former CTRS 1170 students with the final English 1010 grades of a comparison group of students who were not required and therefore did not choose to complete the CTRS 1170 class prior to taking the English 1010 writing course.

Research Question 1

To what extent does the metacognitive comprehension training received in CTRS 1170 Advanced Critical Thinking and Reading Strategies impact the students' perceived level of metacognitive reading self-efficacy?

The means and standard deviations for performance on the LSA by treatment students each year of the eight years studied (1996-2004) are reported in Table 3. The pretest means ranged from a low of 62.96 to a high of 70.65, while the posttest means ranged from 79.52 to 87.18. The overall mean of the pretest, averaged across all eight years, was 67.31 compared to the overall posttest mean of 84.66. The difference between the overall pretest and posttest means was statistically significant at the .01 level.

Table 3

Means and Standard Deviations for the Self-Efficacy Measure by Year and Testing Condition

Year	n	Pretest		Posttest		Effect Size	Pre-to-Post Change in Variance
		Mean	s.d.	Mean	s.d.		
1996-1997	53	69.00	11.76	85.67	10.44	1.42	-21.2%
1997-1998	93	70.65	12.77	87.18	9.74	1.29	-41.8%
1998-1999	80	62.96	12.07	79.52	9.02	1.37	-44.2%
1999-2000	49	68.21	11.51	83.35	9.92	1.32	-25.7%
2000-2001	35	68.53	15.75	86.18	15.04	1.12	- 8.8%
2001-2002	52	64.22	14.02	83.53	11.83	1.38	-33.5%
2002-2003	31	68.39	14.02	85.64	10.81	1.23	-40.5%
2003-2004	38	63.61	11.98	82.05	10.43	1.54	-24.2%
Total/Average	431	67.31	13.36	84.66	10.33	1.34	-32.0%

The effect size indices reported in Table 3 provide a measure of the practical significance of the differences between the corresponding pretest and posttest means for each year. The entries in the effect size column were computed by using Cohen's (1977) d index:

$$d = \frac{\bar{X}_{posttest} - \bar{X}_{pretest}}{\sigma_{pretest}}$$

Hence, the d effect size statistic for each year describes the size of the difference between the posttest mean and pretest mean (i.e., the mean gain score) relative to the size of the standard deviation of the pretest. In other words, this statistic describes how much larger the posttest mean is compared to the corresponding pretest mean expressed in standard deviation units. A value of 1.0 for this d index would indicate that the posttest mean was one-and-one-half standard deviations larger than the pretest mean. All of the effect sizes for the means in Table 3 are positive indicating that in every instance the posttest mean was greater than the corresponding pretest mean. A negative value of the d statistic would indicate that the pretest mean was larger than the posttest mean. Cohen (1977) provided general guidelines for interpreting the values of the d statistic. He established standards for interpretation of an observed effect size, a small effect is 0.20, a medium effect size 0.50, a large effect size is 0.80. Based on Cohen's (1977) criteria, all of the effect sizes reported in Table 3 are large. They range in size from 1.12 to 1.54. The

effect size for the overall pretest and posttest means, averaged across all eight years is 1.34, which is well beyond Cohen's minimum value for a large effect.

Comparison of the pretest and posttest standard deviations reported in Table 3 shows that the posttest standard deviation reported for each year is smaller than the corresponding pretest standard deviation. This consistent pattern provides evidence of a variance effect (Brown & Forsythe, 1974; Kohler & Philipov, 2001; O'Brian, 1981), which indicates that the distribution of students' posttest scores for each year were more tightly clustered about the group mean than their pretest scores.

The percent of change in the variances from the pretest to the posttest each year is displayed in the column at the far right of Table 3. To compute the changes reported in this column, the pretest and posttest standard deviations were first squared to convert them to variances. Then, the change in variance was computed by subtracting the posttest variance from the pretest variance and dividing the difference by the pretest variance (the base or starting variance). The resulting proportion was then multiplied by 100 to create a percent as shown in the formula below.

$$\text{Percent Change in Variance} = \left[\frac{\sigma_{\text{pre}}^2 - \sigma_{\text{post}}^2}{\sigma_{\text{pre}}^2} \right] 100.$$

The amount of change in variance ranges from about 9% (2001-02) to 44% (1998-99). The difference is always negative indicating the posttest variance is always smaller than the pretest variance. It appears that exposure to the reading instruction may

have had the effect of increasing the mean while decreasing the variance of the students' scores on the posttest. This consistent variance effect provides additional evidence of the effectiveness of the reading instruction.

Research Question 2

On the average, what effect did exposure to the metacognitive training have on students' reading comprehension as measured by the Degrees of Reading Power (DRP) test?

The means and standard deviations of students' DRP scores for each year are reported in Table 4. Through the eight years of the study, the mean DRP scores ranged from 71.11 to 75.19 on the pretest and from 75.17 to a high of 82.98 on the posttest. The overall mean pretest was 73.09 compared to the overall posttest mean of 78.22. The difference between the overall means was statistically significant at the .01 level. The effect size measure for the DRP scores ranged from .19 in 1996-97 to 1.42 in 2003-04. The effect size for the difference in the overall eight-year averages was 0.63, which represents a medium effect according to Cohen's (1977) criteria. Focusing on the difference in the pretest and posttest means provides evidence about the average effect of the course. However, it is possible that some students learned much more than the average gain in each class while others learned considerably less than the average gain. Note that the posttest standard deviation reported for each year is larger than the corresponding pretest standard deviation. This consistent pattern provides evidence of a variance effect (Brown & Forsythe, 1974; Kohler & Philipov, 2001; O'Brian, 1981), which indicates that exposure to the metacognitive reading instruction may have had the

Table 4

*Means and Standard Deviations for the Treatment Students DRP Reading
Comprehension Measure By Year and Testing Condition*

Year	n	Pretest		Posttest		Effect Size	Pretest-to- Posttest Variance
		Mean	s. d.	Mean	s. d.		
1996-1997	53	74.17	10.08	76.10	10.80	.19	14.8%
1997-1998	93	71.20	7.90	75.17	8.84	.50	25.2%
1998-1999	80	75.19	7.17	79.12	8.69	.55	46.9%
1999-2000	49	72.49	9.06	78.00	11.57	.61	63.1%
2000-2001	35	72.85	6.94	82.98	8.83	1.46	61.9%
2001-2002	52	74.81	8.44	79.78	10.18	.59	45.5%
2002-2003	31	72.31	7.33	82.72	8.16	1.42	23.9%
2003-2004	38	71.11	7.96	76.79	10.04	.71	59.1%
Total/Average	431	73.09	8.38	78.22	10.33	.63	48.1%

effect of increasing the variability in the comprehension test scores of the students each year. In this instance, the students' posttest scores for each year were spread further from the group mean than their pretest scores. This indicates that the instruction may have helped some students more than others. The percent of change in the variances from the pretest to the posttest for each year is displayed in the column at the far right of Table 4.

Research Question 3

How do the average English 1010 grades of under-prepared students who were required to take CTRS 1170 as a prerequisite compare with the average English 1010 grades of better-prepared students who were not required to first complete CTRS 1170 *Advanced Critical Thinking and Reading Strategies*?

The means and standard deviations for both groups in each year are reported in Table 5. The treatment group means ranged from a low of 3.01 to a high of 3.51. The non-treatment group means ranged from a low of 2.47 to a high of 3.09. The overall mean English 1010 grade of the former CTRS1170 student treatment group was 3.33 compared to the overall mean English 1010 grade of the non-treatment group of 2.71. The difference between the overall means was statistically significant at the .01 level.

The effect size measures in Table 5 are all positive. They range in size from .24 to .98, indicating that the mean grade subsequently earned in English 1010 by students who completed Professor Carter's CTRS 1170 course was consistently higher, at least one-fourth of a standard deviation larger, than the mean grade of students who did not complete this developmental course.

According to their initial ACT scores, the students in the non-treatment group did not need to take this developmental reading course. The difference in the ACT scores and other demographic variables for the two groups was reported previously in Table 2.

When interpreting the differences shown in the means in Table 5, the reader should note the differences in the size of the two groups. As expected, each year the non-treatment group was much larger in size than the number of students enrolled in Professor Carter's course. There are two reasons for the difference in the size of the two groups. First, only a small proportion of the UVSC student body each year is required to take the CTRS 1170 developmental course.

Second, Professor Carter was only one of many instructors who taught the CTRS 1170 course, during the treatment period. In addition, each year, the non-treatment group consisted of a broader cross section of the UVSC student body. This greater diversity is reflected in the standard deviations for the two groups as reported in Table 5. The greater variability of the English 1010 grades probably also reflects the fact that this course was taught by many different instructors who may have employed a range of different grading standards.

Because of the heterogeneous variances between the treatment and non-treatment groups coupled with the large differences in the group sizes, the pooled variance was used to compute the standard deviation used in the denominator of the effect size statistics reported in Table 5 (O'Brian, 1981). The pretest standard deviation was used to compute the effect size measures in Tables 4 and 5 (Cohen, 1977).

Table 5

Means and Standard Deviations for the English 1010 Grades by Year

Year	CTRS 1170			non CTRS 1170			Effect Size
	n	Mean	s.d.	n	Mean	s.d.	
1996-1997	53	3.44	.74	1699	2.85	1.12	.51
1997-1998	93	3.27	.67	1797	2.48	1.15	.98
1998-1999	80	3.11	.62	1806	2.59	1.11	.40
1999-2000	49	3.47	.66	1878	3.09	1.31	.31
2000-2001	35	3.38	.63	2048	2.47	1.19	.62
2001-2002	52	3.34	.67	2189	3.07	1.18	.28
2002-2003	31	3.51	.65	2318	2.86	1.16	.54
2003-2004	38	3.01	.71	2567	2.77	1.28	.24
Total/Average	431	3.33	.67	14682	2.71	1.19	.75

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study evaluated the effectiveness of Advanced Critical Thinking and Reading Strategies (CTRS 1170), a developmental reading course taught by Professor Elaine C. Carter. The analysis of the data for the three dependent variables included in this study showed two recurring patterns. The first pattern emerged within the duration of the class and became evident when the data on the variables of reading self-efficacy and comprehension were analyzed. A comparison of the pretest and posttest means showed that students who completed the course made significant gains. As a result of further analysis of the self-efficacy data, variance effects were discovered indicating that students' scores on the posttest were less variable (i.e., more tightly clustered about the mean) than on the pretest. Similar effect sizes, though not as large, were found for the reading comprehension variable. The pattern of gains made by the developmental students in both reading self-efficacy and in reading comprehension was consistent for all 27 sections taught during the eight years studied. The second pattern emerged during the comparison analysis of the grades earned in English 1010 during students' second semester at UVSC. In each of the eight years studied, developmental students who successfully completed CTRS 1170 earned higher grades than the students who did not have to take the reading course.

The findings of this eight-year study show that these developmental students appear to have improved their abilities in at least two ways during the course:

(a) reading self-efficacy and (b) reading comprehension. Though caution needs to be

exercised in drawing causal conclusions from a non-experimental design, the consistency of these findings across multiple sections over eight years suggests that students' reading self-efficacy and reading comprehension improved as a result of completing this course. It is highly improbable that students in 27 sections would make consistently significant gains by chance on the three different variables studied for a period of 16 semesters or eight years.

Comparison of the pretest and posttest means on the expository text-based DRP found a significant increase in the students' reading comprehension means in every section for the eight years studied. One of the reasons for this increase may be that expository text comprehension seems to be positively impacted by metacognitive instruction. Despite the limitations of testing reading comprehension, the features of the DRP provided one means of assessing the academic gains of students' reading comprehension in the CTRS 1170 course. Students' reading comprehension was measured repeatedly throughout the course using text selections and exams. According to Professor Carter, class comprehension scores almost always paralleled the progress shown by students on the DRP (E.C. Carter, personal communication, July 18, 2005).

During the comparison analysis of the grades earned in English 1010 during the students' second semester at UVSC, the second pattern, mentioned earlier, emerged. In each of the eight years studied, developmental students who successfully completed CTRS 1170 earned higher grades than the students who did not have to take the reading course. The pattern that emerged from the comparison of English 1010 grades is perhaps the most compelling aspect of the study. The fact that each section of student grades

analyzed showed consistent results may make this study's report of developmental student success in a subsequent course an important one for developmental studies research.

Non-treatment students' test scores on the college entrance exams permitted them to enroll directly into English 1010, and because they scored high enough to bypass the developmental reading course, suggested that they were better prepared for college. Since it was inferred that these students starting English 1010 were more capable than their under-prepared peers, who were required to take the CTRS 1170 as an English 1010 prerequisite, the researcher expected the students who scored higher on the entrance exams to earn as high or higher grades in English 1010. Again, for every semester reported in this study, that was not the case. Under-prepared students taking CTRS 1170, as a group, are likely to not only perform as well as but also better than students deemed to be better prepared for college work upon entering UVSC because they consistently received higher grades than their peers who initially seemed to be ahead of them academically. If developmental students can do as well as or better than regular entry students, this study provides support for providing and/or continuing effective developmental programs. According to the results of the analysis, Professor Carter's former students consistently outperformed their initially better-prepared peers. This repeated pattern for eight years clearly suggests that the treatment was effective for these students. Based on the findings of this study, further research is merited to determine why these effects have repeatedly occurred.

The findings of this study support those previously found by Britton and Pettes (1998) and Swinton (1996) who reported that stand-alone reading courses have demonstrated their effectiveness in preparing students for college-level English. Boylan, et al. (1992) also reported that developmental reading instruction can be effective in preparing students for subsequent courses. Indeed, the findings of the UVSC study are similar to Cox et al. (2003) who found that the success of under-prepared readers in college "is directly and significantly related to taking and passing a reading skills course" (p. 170). The results showed that Carter's developmental students apparently succeeded at a higher level in English 1010 than their better-prepared peers; this implies that a connection does exist between completing a reading and study skills course and being successful in subsequent classes. Because of the lack of definitive research, which conclusively demonstrates the effectiveness of stand-alone developmental reading courses, the findings of this study can contribute meaningful information to the discussion found in the literature regarding this compelling issue.

The findings also suggest that CTRS 1170 effectively fulfilled, during the years studied, the second purpose stated in the course syllabus, *to prepare students to succeed in the English 1010 Basic Writing course*. This course, therefore, responded to an authentic social need in Utah Valley when it provided under-prepared students with the learning assistance instruction they needed to meet their educational goals. Literacy development is a life-long pursuit. Meeting students where they are in their literacy and critical thinking development, and empowering them with the essential knowledge and strategies they need to become self-regulated learners, at a crucial point in their CTRS

1170 developmental literacy trajectory, is the essence of this developmental experience. Furthermore, the findings of this study clearly suggest that students who are otherwise designated *prepared* for higher education might also benefit from courses similar to CTRS 1170 in that it would most likely impact their literacy development in a positive manner as well (Alexander, 2004). Finally, professors in their disciplines would likely enhance their students' learning by including elements of metacognition and/or reading strategy instruction in their courses.

Implications

Although this study does not conform to *evidence-based* policy research (Whitehurst, 2003), it is consistent with the *ethics of inquiry* developed by scholars such as Hutchings (2002) and Shulman (2002). The study used archival data, which are descriptive in nature and not as substantive as experimental data. Since no study is free of researcher bias, conclusions need to be cautiously interpreted. However, the fact that repeatedly for eight years students experienced positive growth with each of the three variables adds considerable credibility to these conclusions. Furthermore, the fact that developmental students did as well as they did in the English Course, and they earned grades higher than their better-prepared peers is definitely commendable.

Developmental literacy education such as that taught in CTRS 1170 appears to be needed now as much as it has ever been in the American experience, and it supports the findings of Boylan and White, 1988 and Stahl and King, 1999. National and state educational and legislative leaders as policy-makers and decision-makers need accurate information regarding these programs. Their decisions need to be informed by evidence

that developmental programs and courses are effectively helping students succeed. Then they can more confidently justify that continued support be provided for students who need these courses to meet their educational goals. The findings of this eight-year study show that developmental students appear capable of achieving success in college-level classes. That being the case, students may also be more likely to graduate from college, get higher-paying jobs, and add more revenue to the tax base in their communities and states. Since legislators will have empirical evidence demonstrating that developmental education can be cost-effective and can provide taxpayers a valuable return on their investment, a more literate society, they should help the public understand the need to accept continued financial support for developmental education.

As McCabe and Day (1998) point out, the difference between having a work force of former community college students who can read, write, and calculate, and those who cannot, has immeasurable economic consequences for the nation as well as for those becoming or remaining socially disadvantaged. Furthermore, whether these students were socially or economically disadvantaged, whatever their origin, is not the essential component of a postsecondary educational opportunity. As Lavin and Hyllegard (1996) note, the opportunity for these underprepared students, many of whom are also socially or economically disadvantaged to receive a college degree, represents the promise that has historically been a part of American life. Without this promise and without the opportunities represented through developmental education programs, the longstanding social contract between the United States and one of the least powerful groups, the least literate of citizens, is violated. There are, unfortunately, varieties of educational outcomes

that are not adequately examined or measured by scholars on all levels (Boylan, 2002). The compelling social promise expressed in developmental courses like CTRS 1170, however, may well be one of the most important outcomes to examine.

Recommendations

Two kinds of recommendations are made as a result of this study: recommendations for developmental reading educational practice and recommendations for future research.

Recommendations for practice. Following is a list of the recommendations for utilizing the principles and practices of the treatment course described in this study.

1. The most important recommendation for practice is that the results of this research should be reported to policymakers so that funding for developmental critical thinking and reading courses like CTRS 1170 will be continued. Findings of this study have features and possible benefits for the literacy development of students.

2. The repeated findings from this study suggest that the metacognitive reading strategy instruction in Carter's class may have increased the reading self-efficacy and reading comprehension of under-prepared students, therefore developmental instructors may want to consider implementing the kinds of instructional practices described in this study.

3. Based on the CTRS 1170 pedagogy of scaffolding students' to success by helping them develop their thinking and reading in a variety of expository text chapters, and testing them in several disciplines, it is concluded that an instructor, in any discipline, could increase the likelihood of students achieving success in their course by providing

students with a framework that will assist them before, during, and after completing discipline-specific reading-related assignments.

Recommendations for future research. Although the repeated findings of this retrospective study appear to confirm the effectiveness of the CTRS 1170 course, its findings should still be viewed as exploratory and as a stimulus for future research. Further studies need to be conducted within the field of developmental education and within the UVSC developmental reading program. A general recommendation for future research is to employ an experimental design that could add to the findings obtained from this evaluative study. Additionally, longitudinal and qualitative data-based studies should be initiated to find out the effects of the treatment over longer periods of time. The following is a list of more specific recommendations for future research.

1. One recommended longitudinal study could be to interview a sample of the students from Professor Carter's 1996-2004 classes about the long-term impact of their CTRS 1170 course instruction. Students could be questioned about aspects of the course that were most beneficial over time and elements that could be adjusted to make it better. The key would be to gather a rich tapestry of information about the students so that the insights they have gained from the metacognitive instruction can be shared with other instructors and students in future teaching situations.

2. A longitudinal study of Professor Carter's former CTRS 1170 students' college grades, retention, graduation, and eventual employment could also be conducted and compared to national averages of other developmental students. This could follow a more

qualitative format where a set of interview questions are derived and tested to determine where the students compare in terms of national statistics.

3. Another recommendation for future research would be to investigate possible explanations for the transfer of learning in CTRS 1170 to the English 1010 class. One possibility for this transfer could be the Critical Thinking Application journals employed in the course. These journals were designed to facilitate the transfer of the critical thinking, reading, and learning strategies from the CTRS 1170 class into other courses students were concurrently taking.

Research should be conducted on the effectiveness of the CTA journals. This could include the creation of student-application portfolios as a place for students to compile these transfer assignments.

4. Based on the apparent effectiveness of the treatment, further research could be conducted with interested professors and adjunct instructors from other disciplines to determine the key critical thinking and reading requirements in those content areas.

Limitations

Confounding variables abound in classroom-based research. There are limitations to the study and the conclusions that may be made from the findings of this type of research. Caution should be exercised in drawing causal conclusions from the data analysis reported. For example, it is impossible to say that there were not other factors besides the CTRS 1170 course that could have influenced students' success on the posttest reading self-efficacy scores, the DRP reading comprehension scores, or on their final grades in the English 1010. For example, they could have been married during the

semester, or they could have experienced other life-changing circumstances; this list could continue for pages, but the point is made simply to suggest that caution should be used in attributing the students' success to any one aspect of the treatment. However, the fact that the analysis showed a consistent pattern of success in all 27 sections over an eight-year period of time indicates that a treatment effect had occurred. Possible threats to the validity of educational research conclusions were categorized by Shadish, et al. (2002) based on the various designs employed. The *one-group pretest-posttest* design used for the first two variables in this study can have three inherent threats to the validity of the conclusion: history, maturation, and regression.

Validity threats to the one-group pretest-posttest conclusions. A history threat exists when some change-producing factor occurs from outside the course between the pretest and the posttest. Since the time lapse in CTRS 1170 between the pretest-posttest was three months, a history threat may have affected the results of the posttest. However, to be considered a plausible rival hypothesis to the treatment effect, two considerations would have to apply to the threatening event for it to qualify as a history threat (Shadish, et al., 2002). First, it would have to impact most of the students in the study. For example, the terrorist attack on September 11, 2001 occurred during fall semester. Obviously, all of the students knew about the attack so the attack could pose a potential threat, but to credit the gains in reading self-efficacy or reading comprehension to the attack would be implausible because, though tragic, there is no reasonable connection to reading or thinking instruction. The second consideration is that the factor must be closely related to the measure being treated before it could be credited to account for part

or all of the treatment effect being reported. For example, if there were a campus-wide mandate on reading across the curriculum it might be a potential history threat. The most plausible history threat to conclusions of the UVSC study was that most of the CTRS 1170 students received instruction in other classes during the semester that might have improved their reading ability and confidence. Since the study featured a time frame which was the same for both the treatment and non-treatment groups the risk of this type of threat was further reduced.

Since the time between the pretest and posttest was three months, maturation threats also need to be considered. This category covers all of the biological or psychological processes that vary with the passage of time. For example, between the pretest and posttest the students may have become more mature, more motivated, more skilled, etc., and part of the obtained difference may be due to some of these internal changes rather than being due only to their participation in the CTRS 1170 course. However, these factors of maturation also could have occurred partly as a result of taking the course. Again, plausibility is the governing consideration as to whether this type of threat to the conclusions reduces the validity of the claims. There is little chance that a significant maturation threat occurred to be considered a plausible rival hypothesis to the treatment effect enough to offset the impact of the data gathered that answer the first two research questions in this study. Three months of mental growth could explain some of an increase for students who entered the course with limited confidence and/or reading ability, but for them to demonstrate such gains by chance is not plausible.

The final category not controlled for by the one group pretest-posttest design is a regression threat. According to Shadish, et al. (2002) statistical regression toward the mean may result when a group is selected for compensatory treatment due to particularly low scores on a pretest measure. Since most of the students in Carter's CTRS 1170 sections were enrolled in the course because they had not met the ACT or DRP prerequisite scores to enter English 1010, this regression threat might account for part of their growth. However, for a regression effect to be that large and to be repeated so many times is not plausible.

Shadish, et al. (2002) suggests taking the precaution of direct examination of population variances to avoid misinterpretations of data. Responding to that precaution prompted the researcher to conduct a repeated analysis of eight years of data, from research questions one and two, for variance effects and to also determine the effect sizes. Finding effect sizes on the dependent variables reduced the risk of drawing erroneous conclusions that might otherwise have been attributed to a regression fallacy.

Developmental reading educators need to be aware of and particularly cautious about regression toward the mean when attributing causality to treatments. However, the dual nature of studying both self-efficacy and reading comprehension using the one group pretest-posttest design used to study the two dependent variables and the repeated administration over the eight years of the study provide two lines of evidence upon which to base tentative conclusions about the CTRS 1170 course.

Validity threat to the static group posttest conclusions. The only threat which some might associate with the posttest-only design employed to study the third dependent

variable of this study was what Shadish, et al. (2002) categorize as a possible selection threat to conclusions based on results of the analysis of data. Typically, when research in this design has a vulnerability to selection issues it means there was no way to certify that the groups were equal before the treatment began. However, an intentional feature of this study was that the treatment group and the non-treatment group must be unequal in order to determine whether developmental students could do as well as students who entered the study with higher test scores. All students in the study took entrance tests to establish their level of preparation for college work. Then the students who scored below the entry-level for English 1010 enrolled in CTRS 1170 and received the treatment before taking English 1010 during their second semester. The students in the non-treatment group also took English 1010 during their second semester but without taking the reading course. Because of this feature of the study, the selection threat to the posttest-only design does not apply.

Statistical analysis of the pretest/posttest means of the reading self-efficacy instrument, DRP comprehension test, and the grades earned in English 1010 by former CTRS 1170 students compared to the grades earned by non CTRS 1170 students support the conclusion that participation in Professor Carter's metacognitive reading strategy approach for developmental college readers at UVSC was an effective instructional model and positively impacted student achievement. Another possible recommendation from the conclusions made by this study, despite the possible limitations, may be that if the principles and pedagogical practices used by Professor Carter are described and taught to other developmental reading educators, the results described in this study may

be replicated. Without research such as this study, developmental educators would not be able to identify best practices for effective instruction or implications for further research.

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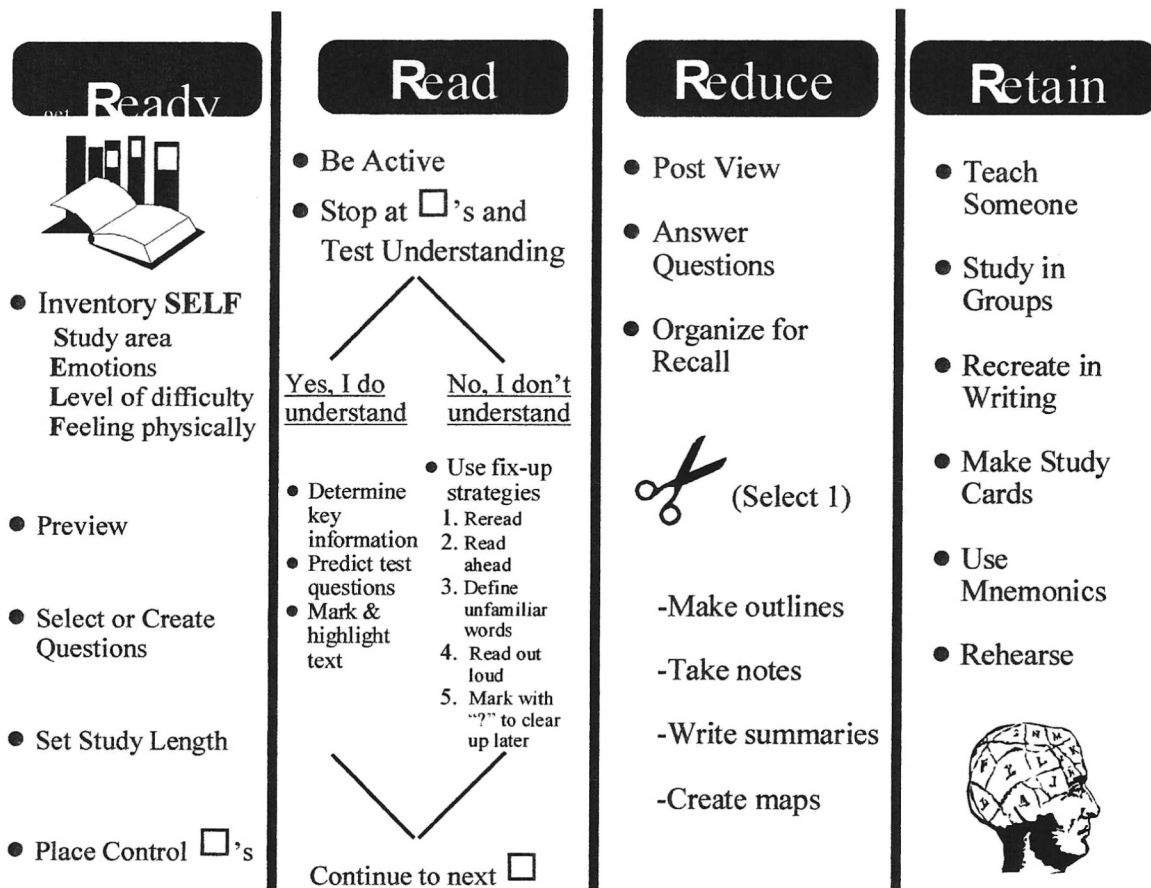
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APPENDIXES

Appendix A

Stages of Reading Bookmark



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Appendix B

Metacognitive Training Activity 3.2

METACOGNITIVE TRAINING ACTIVITY**Using Control □'s****·~ MTA 3.2 ~·****3 DIRECTIONS:**

Preview the next assigned chapter from one of your course texts.

(Ask your instructor for an alternative assignment if you are not taking another college course.)

Complete the SELF inventory to decide how ready you are to learn and how difficult the material seems.

Place Control □'s in the text with a pen or pencil *before* you beginning reading the assignment.

Read the chapter, stopping at your □'s to test your understanding.

If you are able to paraphrase the information, then selectively mark and/or annotate the section you have just read.

If you can't paraphrase what you have read, use one or more of the five fix-up strategies to gain understanding before continuing to read.

After reading the chapter, respond to the following items.

NOTE: For grading purposes your instructor may ask you to provide a copy of the chapter you used for the assignment.

1. List the name of the course, text, and chapter you used for this assignment.
2. Briefly describe what you did when you came to each Control □.
3. Did your concentration improve as a result of using Control □'s? Why or why not?
4. Did you notice an improvement in your understanding of the material from using this technique? Explain.
5. If you use this method again, list any changes you would make to be more effective. If you would not make any changes, explain why.
6. Self grade _____ % and brief justification.

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Appendix C

Visually Enhanced Concept Map Rating Scale

RATING SCALE FOR MAPPING

1. **RELATIONSHIPS** (distinguishes and clusters Main Ideas & Major Supporting Details)

1 2 3 4 5 6 7

Does not cluster MI with their SD's & shows poor distinction between them.

Few MI's are clustered with their Major SD's. Marginal distinction between ideas.

Several MI's are clustered with their major SD's. Reasonably good distinction between them.

Clusters MI's with their supporting details & shows very good distinction between ideas.

2. **FORMAT** (size of letters indicate relationships, use of white space, indentations, clarity)

1 2 3 4 5 6 7

Print size is a poor indicator of importance. Lack of white space & indentations results in a loss of clarity.

Level of importance is marginally indicated by print size. Inadequate white space & indentations diminishes clarity.

Print size somewhat indicates levels of importance. Reasonably good use of white space & indentations.

Print size indicates importance. Very good clarity shown by use of indentations & white space.

3. **VISUALS** (icons/pictures/symbols - to represent key concepts)

1 2 3 4 5 6 7

There are few, if any icons, pictures, & symbols to represent key concepts.

Approximately 15% of the key concepts are represented by icons, pictures & symbols.

Approximately 35% of the key concepts are represented by icons, pictures, & symbols.

Icons, pictures & symbols are used to represent at least 50% of the key concepts.

4. **ESSENTIAL INFORMATION/CONDENSED** (key words and phrases, avoid non-essential words)

1 2 3 4 5 6 7

There is a lack of primary information. Many non-essential words included.

Fair amount of primary information included. Moderate number of non-essential words included.

Majority of primary information included. Few non-essential words included.

Primary information is included. Key words & phrases are used to condense. Non-essential words are excluded.

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Appendix D

Homework Self-Report Assignment Sheet

[illegible]

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Appendix E

Critical Thinking Application (CTA)

Critical Thinking Application (CTA) of Concepts and/or Strategies Reading Journal

Instructions for Writing About the Application of Useful Concepts or Strategies: Number the steps and write a paragraph for each one, leaving a space between each of the paragraphs.

Step 1: List or describe the concept(s) or strategy(s) you chose to apply in another academic course.

Step 2: Briefly discuss how and where you used or applied the concept(s) or strategy(s).

Step 3: Evaluate and discuss the effectiveness of using the concept(s) or strategy(s) you chose.

Step 4: Describe any changes you would make if you used these ideas or methods again.
(If you would not make any changes, tell why you would not.)

Step 5: Self grade _____% followed by a clear explanation of why that grade is appropriate.

Authentic or Real Student Example:

Step 1: "I chose to make study cards and use the rehearse technique."

Step 2: "I used these techniques for my third exam in Biology. I was given a study guide for the exam with keywords. I took the keywords and wrote them on note cards. Then I searched for the answers in my Cornell lecture notes. If I couldn't find the information there, I would look in the text book. Then I went through the note cards reading and testing my knowledge. I used the rehearse strategy to review and rehearse the information on my study cards."

Step 3: "As I was taking the exam it was amazing that I could read through the questions and look for my answers instead of just reading through all of the options and trying to figure out exactly which answer looked right. I received a 92% on the exam. On some cards I drew little pictures or diagrams which was also very effective for me. Because of rehearsing the information on my cards, it played into effect at night while I was sleeping."

Step 4: "I didn't write the note cards until after all of my reading was done. I think that if I created note cards along the way this could help me. I could study them or go over them daily which would help to make sure the information would stay in my long term memory."

Step 5: My Self-grade is 97%. I gave myself that high of score because the strategies I chose fit my needs as a learner in Biology and matched the academic task I was assigned. There was a lot of new terminology, on this test and it helped to break the task into smaller chunks by using the note cards. The rehearsal helped fix the new concepts in my mind and these methods worked well for me because my last test score was 82%. If I had studied in a spaced-practice way by rehearsing daily, I would have given myself a score of 100%.

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Appendix F

Literacy Skills Assessment (LSA)

LITERACY SKILLS ASSESSMENT

NAME _____

Directions: Please rate your confidence on each of the statements below.

1= not confident 2= slightly confident 3= confident 4= very confident

5= mostly confident 6= completely confident 7= positive

*Be aware that 1 is the lowest rating and 7 is the highest.**Write the number that best matches your textbook reading confidence.*

- _____ 1. I can readily comprehend the information in college text(s).
1 2 3 4 5 6 7
- _____ 2. I read fluently enough to finish all of the pages I am assigned to read in
1 2 3 4 5 6 7 a timely manner.
- _____ 3. I read instructions well and respond accurately to the tests given in my
1 2 3 4 5 6 7 course(s).
- _____ 4. When I don't understand my college textbook I know why and can
1 2 3 4 5 6 7 solve the problem.
- _____ 5. I can write competently in communicating my message.
1 2 3 4 5 6 7
- _____ 6. I know how to glean the key ideas from my textbooks.
1 2 3 4 5 6 7
- _____ 7. I regularly read textbook assignments, ask meaningful questions and
1 2 3 4 5 6 7 participate in class discussions.
- _____ 8. I can draw logical conclusions and make reasonable inferences.
1 2 3 4 5 6 7
- _____ 9. I can easily distinguish important information from unimportant
1 2 3 4 5 6 7 information as I read.
- _____ 10. I am able to follow authors' trains of thought.
1 2 3 4 5 6 7
- _____ 11. I have a wide range of useful study techniques for long-term retention
1 2 3 4 5 6 7 of course information.
- _____ 12. I come well prepared for exams and can respond well on almost any
1 2 3 4 5 6 7 kind of test question.
- _____ 13. I am academically confident and display "good student" habits and
1 2 3 4 5 6 7 skills.
- _____ 14. I complete assignments on time and come well prepared for class.
1 2 3 4 5 6 7
- _____ 15. I know how to take effective notes.
1 2 3 4 5 6 7

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