2007

Effects of Self-Regulated Learning Strategy Training on Learners' Achievement, Motivation and Strategy Use in a Web-Enhanced Instructional Environment

Haihong Hu
THE FLORIDA STATE UNIVERSITY
COLLEGE OF EDUCATION

EFFECTS OF SELF-REGULATED LEARNING STRATEGY TRAINING ON
LEARNERS’ ACHIEVEMENT, MOTIVATION AND STRATEGY
USE IN A WEB-ENHANCED INSTRUCTIONAL ENVIRONMENT

BY
HAIHONG HU

A Dissertation submitted to the
Department of Educational Psychology and Learning Systems
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

Degree Awarded:
Fall Semester, 2007
The members of the committee approved the dissertation of Haihong Hu defended on July 27th, 2007.

________________________ (signed)
Marcy P. Driscoll
Professor Directing Dissertation

________________________ (signed)
Michelle Kazmer
Outside Committee Member

________________________ (signed)
Akihito Kamata
Committee Member

________________________ (signed)
Allan Jeong
Committee Member

Approved:

________________________
Akihito Kamata, Chairperson, Department of Educational Psychology & Learning Systems

The Office of Graduate Studies has verified and approved the above named committee members.
This work is lovingly dedicated to...

My parents, Dingfu Hu and Jiadi Chen,
Whose love I did not understand until I became a mother myself, and my debt to them will never be fully paid …

My American “Mum and Pop”, Mr. Don Pierce and Dr. Norma Faye Pierce,
Whose love has inspired this journey and made this dream come true…
Acknowledgements

It is impossible to list all the individuals who assisted me on this journey of developing and completing my dissertation. My appreciation therefore extends to all those who helped me achieve this academic milestone, and I will always remember with gratitude the contributions of these wonderful people.

First, I would like to acknowledge my committee members.

To Dr. Marcy Driscoll, my dissertation chair and advisor throughout my years at FSU, I thank you not only for helping me conceptualize, implement, and successfully conclude this study, but also for helping me whenever I needed help, guiding me at the appropriate times, having confidence in me all the time, and for being such a wonderful academic “parent” during my study at FSU. Thank you, Dr. Marcy!

To Dr. Michelle Kazmer, I thank you for serving on my committee as my distinguished outside member. I was thrilled when you agreed to do so. The favor you have done me is substantial.

I wish to thank Dr. Akihito Kamata for the great advice he provided for my data analysis. I also would like to thank Dr. Allan Jeong for the insightful questions that he asked and led me to think about my findings in a different way.

Moving beyond my committee members, I would also like to extend my thanks to a few other individuals in the academic community.

My thanks go to Dr. Robert Reiser, who taught me not only about education research, but also how to be a serious professor, scholar and parent, and still provide diligent service to the program.

Special thanks to Dr. Sally Search, who provided me with much needed support when I was looking for subjects to participate in this study, and who spent so much of her precious time helping me reorganize her course to prepare for the study. This study would not be possible without your support!

Thanks also go to Riyadh Al-Hassan for sharing his literature collection; Jeeheon Ryu for teaching me how to use Endnote and friendship in the program; Yoon Oh for assistance in the design of interface for web tutorial; E Shen & Hong Gao for friendship in the program; and Ying Zhang for answering my statistics questions at any time…

Last, but not the least, I wish to express my appreciation to my family and personal friends …

I am always indebted to my parents for giving me a solid foundation of education, their constant love and support, and the freedom for me to pursue my academic career while they have to suffer from the emptiness of missing their only child…
I will always be grateful to Mum and Pop for their financial support, faith in me, never-ending encouragement, cooking meals for us every Wednesday night, many warm memories of holidays, being wonderful parents and grandparents to us while our own are thousands of miles away, their time, effort and patience in trying to understand, get along with and take care of their Chinese children and grand child…

Thanks to our family and friends in Shanghai, China and the U.S. for their moral support and caring to us, taking the time to take care of my mother when she was sick in the hospital and to visit my father after my mother passed away, sending parcels to cheer us up, offering practical advice on how to care for a baby and helping us anytime we were in need…

Special thanks go to, our friends in Tallahassee, Florida and Mobile, Alabama, Paula Grimes for numerous prayers and communication, listening to me and helping us all the time, and coming all the way from Tallahassee to Mobile to help us after the birth of my baby Jimmy; Joan Reed for teaching me a very important skill in life, driving, and having faith in me all the time; Cui Chi (Cissy) and a bunch of others for being such wonderful friends to us when I lost my mother and when I was pregnant, and for helping us whenever we were in need; my boss at ODDL in FSU, Jennifer Gramling, for letting me keep working on my graduate assistant job while I was away from Tallahassee for the birth of my baby…

To my husband, Jianbo Xin, I thank you for your love and support, helping me with the technical issues on data collection and analysis, assuming the major responsibility for taking care of our baby boy Jimmy, and making the decision for us to move back to Tallahassee so that I could finish … Without your constant, patient assistance, it would be impossible for me to complete my endeavors in this study.

To my baby boy, Jimmy, I thank you for being such a joy in mommy’s life and for patiently waiting for mommy to finish her work on the dissertation so that you could play with mommy a little more…

Above all,

To our Heavenly Father, I thank you for giving me the strength and wisdom to bring this study to a successful conclusion… Please continue to guide me on the path forward…
# TABLE OF CONTENTS

LIST OF TABLES ......................................................................................................................... X

ABSTRACT .................................................................................................................................... XIII

CHAPTER I .................................................................................................................................. 14

INTRODUCTION ........................................................................................................................ 14
                      Context of the Problem .................................................................................................. 14
                      Purpose of the Study ....................................................................................................... 17
                      Research Questions ........................................................................................................ 18
                      Significance of the Study ............................................................................................... 18

CHAPTER II ................................................................................................................................. 20

REVIEW OF LITERATURE ......................................................................................................... 20
                      Community College Student Success .............................................................................. 20
                      Issues in Community College Student Success ............................................................ 20
                      Need for College Success Courses and Study ............................................................. 26
                      Theoretical Framework about Self-Regulated Learning .................................................. 26
                      What is Self-Regulated Learning? .................................................................................. 27
                      Self-Regulated Learners .................................................................................................. 28
                      Development of Self-Regulated Learning ........................................................................ 28
                      Research on Self-Regulated Learning ............................................................................. 29
                      Effects of Self-Regulated Learning Strategies .................................................................. 30
                      Motivational Beliefs Related with Use of Self-Regulated Learning Strategies ............... 38
                      Research on Development of Self-Regulated Learning .................................................... 43
                      Summary of Literature Review ....................................................................................... 55
                      Hypotheses and Rationales .............................................................................................. 57

CHAPTER III ............................................................................................................................... 61

METHOD ..................................................................................................................................... 61
                      Research Design .............................................................................................................. 61
Variables ................................................................................................................................... 61
Independent Variable ............................................................................................................. 61
Dependent Variables ............................................................................................................... 62
Participants ................................................................................................................................ 64
Validity Threats ....................................................................................................................... 65
Web-Assisted Course Delivery System .................................................................................... 68
Course Content ....................................................................................................................... 68
Course Approach or Methodology ......................................................................................... 68
Evaluation of Learning ........................................................................................................... 69
Intervention ............................................................................................................................... 70
Design and Development Rationale ....................................................................................... 70
Self-Regulated Learning Tutorial .......................................................................................... 77
Strategy Application Practice ............................................................................................... 78
Data Collection Instruments ................................................................................................. 79
Measurement of Motivation for Learning Questionnaire (MMLQ) ....................................... 79
Self-Satisfaction Scale (SSS) ................................................................................................. 80
Self-Regulated Learning Strategies Questionnaire (SRLSQ) ................................................ 80
Open-Ended Questions ........................................................................................................... 81
Additional Student Data ......................................................................................................... 82
Pilot Testing/Formative Evaluation of the Intervention ......................................................... 82
Test for Reliability of Survey Instruments ........................................................................... 83
Procedure .................................................................................................................................. 84
Stage I ................................................................................................................................... 85
Stage II .................................................................................................................................. 86
Stage III .................................................................................................................................. 86
Stage IV ................................................................................................................................. 87
Data Management and Analysis ......................................................................................... 87
Quantitative Data Analysis ................................................................................................... 87
Qualitative Data Analysis ..................................................................................................... 89
CHAPTER IV ............................................................................................................................... 92
RESULTS ..................................................................................................................................... 92
## Quantitative Results

- Students’ Pre-Intervention Motivation and Experience with Learning Strategies ........................................... 93
- Effects of Treatment on Student Achievement ........................................................................................................ 94
- Effects of Treatment on Motivation .......................................................................................................................... 95
- Effects of Treatment on Reported Use of Strategies ............................................................................................... 99
- Incidental Findings .................................................................................................................................................... 104

## Qualitative Findings

- Evidence Related with Student Achievement ........................................................................................................... 111
- Evidence Related with Motivational Beliefs ................................................................................................................ 112
- Evidence on Reported Use of Strategies ..................................................................................................................... 123
- Incidental findings .................................................................................................................................................... 136
- Summary of Findings ................................................................................................................................................ 142

## Chapter V

### Discussion

- Interpretation of Results ............................................................................................................................................ 151
- Effects on Achievements .......................................................................................................................................... 151
- Effects on Motivation ............................................................................................................................................... 154
- Effect on Strategy Use .............................................................................................................................................. 159
- Incidental Findings................................................................................................................................................... 159
- Implications ............................................................................................................................................................... 164
- Limitations of the Current Study .............................................................................................................................. 166
- Suggestions for Future Studies .................................................................................................................................. 168
- Conclusion ................................................................................................................................................................. 170

Appendix A: HUMAN SUBJECTS COMMITTEE APPROVAL ................................................................. 174
Appendix B: PERMISSION TO USE THE MSLQ QUESTIONNAIRE ......................................................... 177
Appendix C: BASELINE INFORMATION FOR PHASE I ................................................................................. 179
Appendix D: PHASE II & IV STUDY PLAN ................................................................................................. 183
Appendix E: PHASE III & V SELF-EVALUATION ......................................................................................... 186
Appendix F: FINAL OUTCOME EVALUATION FOR PHASE VI ................................................................. 190
LIST OF TABLES

Table 3.1: Design of Study ........................................................................................................... 61

Table 3.2: Comparison between dropouts vs. completer within the Experimental group on pre-intervention data ............................................................................................................................ 66

Table 3.3: Comparison between dropouts vs. completer within the Experimental group on achievement data ........................................................................................................................... 67

Table 3.4: Number of Experimental participants in various stages .............................................. 68

Table 3.5: Grading Scale for SLS 1501 College Success ................................................................ 70

Table 3.6: Instructional design of the web-based training on SRL ............................................... 76

Table 3.7: Strategies Taught in Web-Based Tutorial .................................................................... 77

Table 3.8: Cronbach’s Alpha Coefficients for Survey Scales ...................................................... 84

Table 3.9: Summary of procedure ................................................................................................ 84

Table 3.10: Summary of data analysis method ............................................................................. 90

Table 4.1: Group comparison on students’ pre-intervention motivation and experience with learning strategies ......................................................................................................................... 93

Table 4.2: Descriptive statistics for achievement ......................................................................... 94

Table 4.3: Wilcoxon-Mann-Whitney U Test results for student achievement ......................... 95

Table 4.4: Descriptive statistics for post-intervention motivation reported in MMLQ ............. 95

Table 4.5: Wilcoxon-Mann-Whitney U Test results for student post-intervention motivation .... 96

Table 4.6: Descriptive statistics for motivation reported by Experimental participants in MMLQ ....................................................................................................................................................... 97

Table 4.7: Wilcoxon Signed Ranks Test results for motivation reported by the experimental group students ......................................................................................................................................... 97

Table 4.8: Descriptive statistics for motivation reported by control participants in MMLQ ....... 98

Table 4.9: Wilcoxon Signed Ranks Test results for motivation reported by the control group students ................................................................................................................................................... 99
Table 4.28: Means, SD and Mdn for metacognitive strategies references mentioned by Control participants ................................................................. 127

Table 4.29: Means, SD and Mdn for cognitive strategy references mentioned by participants in Phase VI ........................................................................................................ 129

Table 4.30: Means, SD and Mdn for cognitive strategies mentioned by Experimental participants ........................................................................................................................... 129

Table 4.31: Means, SD and Mdn for cognitive strategies references mentioned by Control participants ........................................................................................................................... 129

Table 4.32: Means, SD and Mdn for resource management strategy references mentioned by participants in Phase VI ........................................................................................................ 132

Table 4.33: Means, SD and Mdn for resource management strategies mentioned by Experimental participants ........................................................................................................................... 132

Table 4.34: Means, SD and Mdn for resource management strategies references mentioned by Control participants ........................................................................................................................... 132

Table 4.35: Time management by work-for-pay hours ............................................................................. 136

Table 4.36: Levels of description about understanding (in unit of cases) ......................................... 139

Table 4.37: Summary of Findings ........................................................................................................... 142
This quasi-experimental mixed-methods study investigated the effects of Self-Regulated Learning strategy training on learner achievement, motivation and self-reported use of strategies. An online tutorial and a web-based interactive practice system were used to implement the training, which consisted of 4 stages, and lasted for 14 weeks. The participants in this study were 21 (8 experimental vs. 13 control) undergraduate students enrolled in 2 sections of a web-enhanced College Success course at a community college in Southeast U. S.

A significant difference was found between students who received the training and who did not receive the training on overall performance, and scores on 3 of the course assignments, which were Test 3, Career Exploration Paper, and Final exam.

Regarding the effect of the strategy training on student motivation, a significant difference was found between the experimental and the control group on self-satisfaction. However, a significant difference was not found between the experimental and the control conditions on task value, self-efficacy, intrinsic and extrinsic goal orientation. In addition, students who received the training reported significantly lower task value and lower extrinsic goal orientation at the end versus at the beginning of the study.

Concerning the effects of the strategy training on students’ reported use of strategies, even though the experimental group did report higher scores on use of metacognitive, cognitive, resource management and the total strategies than the control group, but the differences did not reach statistical significance. Besides, the experimental students reported significantly lower use of resource management strategies at the end versus at the beginning of the study.

The qualitative data were used to triangulate with quantitative ones. It was also found that even though participants were still at their primitive stage of self-regulated learning, there were anecdotal evidences for the effect of the training on learners’ improvement in metacognitive awareness. Additionally, the findings of this study suggested that the training were helpful to learners on their persistence.

Results from this research study are discussed. Implications of the study for educational research and practice are presented. Limitations of the research study are identified. Finally, suggestions for future research are presented.
INTRODUCTION

Context of the Problem

With an enrollment of about 40% of all undergraduates (7.6 million students) in the whole country (Horn & Nevill, 2006), community college is considered as an essential provider of postsecondary education in the United States. Yet, student retention in community colleges is a big concern for many educational researchers or administrators because the problem of a high attrition rates has come together with the affordable expense and open-access policies at community colleges. Data from various sources (Bradburn & Carroll, 2002; Cofer & Somers, 2000; Hoachlander, Sikora, & Horn, 2003) consistently attest to existence of the problem with community college student success. Student persistence is bothersome to educators and policymakers because a large number, ranging from 35 to 50 percent, of students who started their postsecondary education in community colleges never complete it (Bradburn & Carroll, 2002; Cofer & Somers, 2000; Hoachlander et al., 2003; Horn & Nevill, 2006).

Various interrelated causes are documented for students’ early departure from community colleges. In addition to the demographic characteristics (Cofer & Somers, 2000; Horn & Nevill, 2006; Schmid & Abell, 2003), including older age, family responsibilities, working full-time, part-time enrollment, which inherently make it more difficult for community college students to succeed in their academic career, many of them are identified with poor educational preparation (Wirt, Choy, Rooney, Provasnik, Sen,, & Tobin, 2004)), low first-year achievement (Bradburn & Carroll, 2002; Cofer & Somers, 2000; Horn & Nevill, 2006; Hoyt, 1999) and lack of learning strategies (Byrd & MacDonald, 2005; Ley & Young, 1998; Schmid & Abell, 2003).

Due to their nontraditional demographic characteristics and educational preparation, it is more likely for community college students to leave without a credential after they begin their postsecondary education. What can we do to help solve this serious problem with student retention? It was found that remedial or study skills courses could provide underprepared students with math, reading, English, and study skills to succeed in college (Byrd & MacDonald, 2005), to enhance achievement (Stovall, 2000; Tuckman, 2002, 2003a, 2003b), and to improve
retention (Cofer & Somers, 2000; Derby & Smith, 2004; Stovall, 2000; Tuckman, 2003b). Therefore, researchers (Byrd & MacDonald, 2005; Hoyt, 1999; Schmid & Abell, 2003) pointed out the need for interventions that concentrate on the academic needs of students, and proposed the use of remedial education and study skills courses. More specifically, it was suggested that these interventions can be implemented to help students understand learning strategies and realize the importance of consistent studying instead of cramming (Schmid & Abell, 2003), and to support colleges in teaching students skills for time-management, focusing on goals, and self-advocacy in their first year of college (Byrd & MacDonald, 2005). Numerous remedial or study skills interventions are designed and developed using the research on academic self-regulation (Shafer, Lahner, Calderone, Davis, & Petrie, 2002; Tuckman, 2003a) as a theoretical framework.

Over the last decade, learners’ self-regulation of their cognition, motivation, and behaviors to promote academic achievement has been a topic receiving increasing attention in the field of education (Zimmerman, 1989, 1990, 1998). Driscoll (2000) refers to self-regulation as skills that learners use to “set their own goals and manage their own learning and performance” (p. 304). Learners who reported more extensive use of self-regulated learning strategies, such as goal setting and self-evaluation, demonstrated higher academic achievement than learners who used the same strategies less often (Zimmerman & Martinez-Pons, 1986). It seemed that self-regulated learning strategies did play an important role in students’ academic achievement (Zimmerman, 1990).

Zimmerman (2000) defines self-regulation as “the self-generated thoughts, feelings, and actions that are planned and adapted cyclically to the attainment of personal goals” (p. 14). He describes this concept as cyclical because learners use the feedback from prior performance to make adjustments during their current efforts. He considers these adjustments necessary due to the constant changes in personal, behavioral, and environmental factors during the course of learning and performance, and learners must try to observe or monitor these changes using the three self-oriented feedback loop (Zimmerman, 2000).

Pintrich (1995) emphasizes the regulation of three general aspects of learning in his interpretation of self-regulated learning. First, learners self-regulate their behavior including the control of various resources, such as time, study environment, and students’ use of others such as peers and faculty members to ask for help (Garcia and Pintrich, 1994; Pintrich, Simth, Garcia, and McKeachie, 1993 as cited in Pintrich, 1995); Second, learners self-regulate motivation and
affect through controlling and modifying motivational beliefs such as efficacy and goal orientation to adapt to the demands of a course. Third, learners self-regulate their use of various cognitive strategies to achieve learning outcomes (Pintrich, 1995).

Published studies that examined the effects of self-regulated learning on achievement and motivation in various learning domains include the work of Albert Bandura, Dale Schunk, Barry Zimmerman and others. The literature supports the notion that learners’ self-regulation is a powerful predictor for their academic achievement (Ley & Young, 1998; Pintrich & Groot, 1990). In addition, self-regulation of learning progress is found to have a positive effect on learners’ motivation (Kitsantas, Reiser, & Doster, 2003; Lan, 1996; Schunk, 1996; Zimmerman & Kitsantas, 1996) and use of learning strategies (Lan, 1996; Schunk & Ertmer, 1999; Schunk & Swartz, 1993).

New learning environments, such as web-based or web-enhanced instruction, require more learner self-control and proactive learning to construct knowledge and acquire skills. According to the 1999 National Study of Postsecondary Faculty, 84 to 85 percent of instructional faculty at 4-year doctoral institutions, and 75 percent of faculty at 2-year institutions used course-specific Web sites (Warburton, Chen, & Bradburn, 2002). More and more universities or colleges are using web-enhanced instruction, and instructors are spending less time on classroom contact with students or office hours if they used email to communicate with students or course-specific websites (Warburton et al., 2002) to post course-related information or materials. As Schunk & Zimmerman (1998) mentioned that “an area that lends itself well to self-regulation is distance learning, where instruction originates at one site and is transmitted to students at distant sites… Self-regulation seems critical due to the high degree of student independence deriving from the instructor’s physical absence” (p. 231-232).

In addition, self-regulated learning is particularly appropriate to the college context. Most college students have more control over their own time and schoolwork and need to decide how they actually carry out studying (Pintrich, 1995), and traditional academic environment rarely encourages the use or development of self-regulatory skills (Orange, 1999). At the same time, many college students have difficulty managing this freedom in terms of the amount of time they spend on learning and the quality of cognitive effort they exert because “they had few opportunities to become self-regulated in their elementary and secondary school years, and as a result, they have few if any self-regulatory skills and strategies” (Orange, 1999, p. 36-37). It may
be hard for busy college students, especially those with job and family responsibilities, to find time to learn to use self-regulation strategies. Not surprisingly, they are less motivated than students with fewer responsibilities. This is why it is suggested (Orange, 1999; Pintrich, 1995) that self-regulation strategies should be taught at all levels of education.

Fortunately, Pintrich (1995) pointed out that “self-regulated learning is teachable” (p.7). Teachers can teach students to become self-regulated learners, while students can learn to be more self-regulated. Students learn self-regulated learning strategies through experience and self-reflection. Pintrich claimed that students could improve their academic learning and performance through controlling their behavior, motivation and affect, and cognition. He believed that students should take responsibility for their own learning and understand that they have the capability to manage it (Pintrich, 1995).

Self-regulation has been identified as one of the important mechanisms that may promote learner achievement, motivation and use of learning strategies, which are the major determinants to completion rate in community college education. But few studies have empirically examined the role of self-regulated learning strategy training in community college student success. In relation to the large number of freshmen, minority, and first generation students who are entering community colleges, little research has been conducted about this population (Wild & Ebbers, 2002). Compared with the large percent of faculty members using web-enhanced instruction, the theoretical relationship between academic self-regulation and educational outcomes in web-based or web-enhanced instructional environment has not been extensively explored. This deficiency of empirical studies might have been caused by the fact that these formats of instruction are comparatively a new phenomenon, and some technical competencies are required to design, develop and implement experimental treatments in the online environment.

**Purpose of the Study**

The primary purpose of this study was to examine the effects of self-regulated learning strategy training on students’ learning achievement, motivation and strategy use in a web-enhanced College Success course at a Community College.

This was a quasi-experimental study with self-regulated learning strategy training (present vs. absent), a manipulated, active intervention, as the independent variable. The dependent variables were 1) achievement measured with individual assignment scores and final
score for the course, 2) motivation in terms of task value, self-efficacy, goal orientation and self-satisfaction, and 3) learners’ reported use of strategies. The researcher assigned intact groups of participants to the experimental and control conditions at the beginning of the intervention. An online tutorial on Self-Regulated Learning Strategies and a web-based interactive practice system were used to implement the training. Questionnaires adapted from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991) were used to measure the quantitative part of the motivation and strategy use variables, while thirteen open-ended questions were used to collect qualitative evidence for students’ motivational beliefs and use of learning strategies. Investigation on these variables in a web-enhanced instructional setting is yet to be expanded for the benefit of learners of as well as sponsors for Community College education.

Research Questions

The major research question of this study concerned the effects of self-regulated learning strategy training are on learners’ achievement, motivation and strategy use.

The following specific research questions were explored in this study:

**Question 1.** Will self-regulated learning strategy training in a web-enhanced environment influence learning achievement/performance?

**Question 2.** Will self-regulated learning strategy training in a web-enhanced environment influence learner motivation (in terms of task value, self-efficacy, goal orientation and self-satisfaction)?

**Question 3.** Will self-regulated learning strategy training in a web-enhanced environment influence students’ reported use of strategies?

Significance of the Study

Abundant studies in the field of e-learning have been conducted on outcomes of various instructional media, learner characteristics, learner perceptions and interaction (Simonson, Smaldino, Albright, & Zvacek, 2000), but few have actually examined facilitation on learning strategies.

This study can be significant in several aspects. First, by exploring the role of self-regulated strategy training in a web-enhanced course, this study may help to determine whether theories and research on academic self-regulation are applicable in this kind of learning environment, and whether facilitation on learning strategies using online technologies is feasible.
This study may also contribute to the general understanding about how learners study in a web-enhanced format, and allow investigation on how to prepare students with the necessary knowledge and skills to learn successfully in a more independent instructional setting. Results from the study on this aspect may provide a better foundation for student advisement or new student orientation (Clow, 1998).

Another contribution of this study is that it may provide some implications for designing and developing more effective web-enhanced courses. As the use of web-based or web-enhanced courses continues to spread throughout academic institutions, it has become more and more important to understand the capabilities and limitations of this kind of instructional environment. When the most effective strategies for working in a web-enhanced environment are identified, instructional designers may integrate appropriate cognitive tools to encourage students’ implementation of learning strategies and instructors may start to teach students how to use these tools effectively while working in this new instructional format (Sweany, 1999). By identifying guidelines for using the online strategy training tools more effectively to achieve the best instructional outcomes, such as performance, motivation and completion rate in College Success courses, and considering how to apply the online tools to instructional contents other than College Success courses, this study may expand our knowledge about the appropriate use of the blended instructional environment so that the educational objectives are fully realized, learner-friendly web-enhanced courses are created, and quality of teaching and learning in web-enhanced instruction is improved.
CHAPTER II

REVIEW OF LITERATURE

The following literature review presents a background on theories and research in the domains of community college student success and self-regulated learning, as well as other issues pertinent to the study reported in this dissertation. This includes issues in community college student success, self-regulated learning, self-regulated learning strategies, development of self-regulated learning, and a summary of the implications of prior research on the current study.

Community College Student Success

This section reviews theories and research on community college student success. Specifically, this section discusses issues in community college student success, reviews research on community college student success to identify possible causes to the issues and potential solution to the problems.

Issues in Community College Student Success

Community college is an important channel to provide postsecondary education in the United States. It has a large enrollment and is considered an affordable means for educational attainment. According to a National Center for Educational Statistics report, community college students represent about 40% of all undergraduates, or about 7.6 million students in the whole U. S. (Horn & Nevill, 2006). Yet, student retention in community colleges is a big concern for many educational researchers and administrators.

A problem of high attrition rates has come with the lower expense and open-access policies at community colleges. According to a study conducted by the U. S. Department of Education, about 35-44 percent of college students who began at 2-year institutions dropped out without completion within 3 academic years (Bradburn & Carroll, 2002). Most nonpersisters left during the first year of enrollment, with a proportion of 24 percent public 2-year college students versus 6-15 percent students from any other types of postsecondary institution (Bradburn & Carroll, 2002).
In another analysis about success rates for community college students, among a cohort of beginning community colleges freshmen who started in 1995–96, about 50 to 60 percent of them who indicated intentions to earn a degree, certificate or transfer to a 4-year institution, fulfilled their goals 6 years after their first enrollment (Hoachlander et al., 2003). Furthermore, in a study to investigate two-year college students’ persistence using the National Postsecondary Student Aid Survey: 96 data, researchers found 3,226 (43%) within a sample of 7,507 students did not persist from the fall to the spring semester (Cofer & Somers, 2000).

Data from various sources consistently verify existence of the problem with community college student success. Student persistence is worrisome to educators and policymakers because a large number of students who start their postsecondary career in community colleges never conclude it (Horn & Nevill, 2006).

Factors Related to Student Persistence

Numerous reasons are closely correlated with students’ drop-out of community colleges, such as: students’ demographic characteristics, including age, family responsibilities, working full-time, part-time enrollment, prior educational preparation, prior achievement and lack of learning strategies.

Demographic characteristics. Community college students are more likely to be older (Cofer & Somers, 2000; Horn & Nevill, 2006), married (Cofer & Somers, 2000; Horn & Nevill, 2006), financially independent (Cofer & Somers, 2000), and they tend to come from lower socio-economic backgrounds (Cofer & Somers, 2000; Horn & Nevill, 2006) and have more family responsibilities (Horn & Nevill, 2006).

According to the National Center for Education Statistics (2005), forty-five percent of the public community college population in 2003 consisted of first-generation college students, who were more likely to be female, older than conventional college age, full-time employees, and providers for dependents at home (Nomi, 2005). These first-generation community college students often took fewer courses each semester and coped with greater financial issues and family responsibilities (Nomi, 2005).

Community college students are very likely to enroll part time and be employed full time. (Horn & Nevill, 2006) found that more than 66 percent attended classes part time in 2003–04, and almost all (79 percent) community college students worked while enrolled, with 41 percent of them being full-time employees. When community college students enroll on a part-time
basis, it usually take them much longer to complete a degree or certificate, with about 3 1/2 years for an associate’s degree, and about 2 1/2 years for a certificate (Hoachlander et al., 2003).

With these demographic characteristics, more students from public community colleges than from 4-year institutions were categorized as nontraditional students (Bradburn & Carroll, 2002). Furthermore, in a report by the National Center for Educational Statistics, (Horn & Nevill, 2006) found that nontraditional community college students who began during 1995–96 were more likely than students with traditional characteristics to drop out without a credential within 3 academic years. More specifically, there is a higher possibility for older, financially independent (59%) students, or students who were married (60%) or who had dependents (55%) when they started college, or students who worked full time while enrolled in their first year to depart without achieving their academic goals (Horn & Nevill, 2006).

Some other studies also found these demographic characteristics, such as age (Cofer & Somers, 2000), working full time (Schmid & Abell, 2003), financial independency, and part-time enrollment (Cofer & Somers, 2000; Schmid & Abell, 2003); negatively affect community college students’ persistence.

*Educational preparation.* Besides the demographic characteristics, which inherently make it much harder for community college students to persist or thrive in their academic career, many of them suffer from poor educational preparation.

Many 2-year institution students enter postsecondary education without proper preparation for college-level study. In *The Condition of Education 2004,* the U. S. Department of Education (Wirt et al., 2004) reported that, in fall 2000, public community colleges provided remedial coursework for 42 percent of their beginning students. According to their transcripts, among students who enrolled in college between 1992 and 2000, 61 percent of those who began at a public 2-year institution completed at least one remedial course at the college level (Wirt et al., 2004). In a more recent study conducted by the National Center for Educational Statistics, it was found (Horn & Nevill, 2006) that 17% of all community college students were currently taking remedial courses, including 22% of the more committed students who were pursuing a general associate degree. Additionally, proficiency tests scores revealed that many community college students who participated in the National Education Longitudinal Study entered their postsecondary education with comparatively low achievement levels in mathematics and reading (Hoachlander et al., 2003)
Hoachlander et al. (2003) also found that college students who were better prepared academically were more likely to complete a certificate or degree or transfer to a 4-year institution than those who were less prepared. Even though remedial education provides assistance to students who are in need of the academic skills to do well in postsecondary education (Wirt et al., 2004), those who completed any remedial courses actually received a degree or certificate at lower rates than students who did not have any remediation. For example, Wirt et al. (2004) found that of 12th-graders in 1992, 69% of those who did not take any college remedial courses had earned a degree or certificate by 2000, while only 30 to 57 percent of those who attended one or more remedial courses had received a credential.

**Achievement.** Students’ academic performance during the freshman year was negatively related with attrition rate at postsecondary institutions (Bradburn & Carroll, 2002). In a Profile of Undergraduates in U.S. Postsecondary Education Institutions: 2003–04, the U. S. Department of Education (Horn & Nevill, 2006) reported that first-year GPA was associated with drop-outs among students who began their college education at public 2-year institutions.

In a study that examined within-year persistence of students at two-year colleges, Cofer & Somers (2000) noticed that five college experience variables were significantly related to persistence. More specifically, the researchers found that sophomores were 14.97% more persistent than freshman and students with a GPA of 2.5 to 3.0 were respectively 9.56% and 30.71% more persistent than students with low or no GPA scores (Cofer & Somers, 2000).

Furthermore, a study conducted at Utah Valley State College (UVSC) during the fall of 1998 discovered a relationship between first-term performance, remedial education, and attrition rate (Hoyt, 1999). Hoyt investigated the fall 1993, 1994, and 1995 freshmen cohorts to identify the number of students who graduated, transferred, were still enrolled, or dropped out of the institution by fall 1998. The findings of the study suggest that students’ first-term performance had the strongest relationship with student persistence, and the large number of students receiving remediation significantly increased the college’s drop-out rates (with 64-72% of student who took remedial courses in three areas eventually left the college), and affected the overall student GPA (with an average first-term GPA of 2.8 for non-remedial students, and 2.54 for remedial education students) (Hoyt, 1999).
Being underprepared makes it much harder for a community college student to succeed because it limits his or her ability to perform academically (Hoyt, 1999), and therefore increases the chance for him or her to leave the institution without a credential.

**Study skills/learning strategies.** Students’ use of self-regulated learning strategy may in part be an explanation for the low achievements of developmental/remedial students. Ley & Young (1998) found that deployment of self-regulation strategies was a strong predictor for students’ developmental or regular admission status.

Ley & Young (1998) used a structured interview with fifty-nine students, “from an urban community college and a rural residential university in the southeastern United States” (p.48) to investigate the differences between the self regulatory processes reported by regular admission students and by remedial students. A discriminant function analysis revealed that remedial and regular admission students were significantly different in their self regulatory strategy deployment (Ley & Young, 1998). Specifically, these researchers found that remedial students employed fewer types of strategies, much less total number of strategies, and used strategies less consistently than regular admission students. The best predictor for students’ remedial or regular admission status was the number of strategies by categories. The 15 categories of strategies in this study included “self evaluation, organizing and transforming, goal setting and planning, seeking information, keeping records and monitoring, environmental structuring, self consequences, rehearsing and memorization, seeking social assistance from teachers, experts, or peers, reviewing records, and other” (Ley & Young, 1998, p. 50).

In another qualitative study, Byrd & MacDonald (2005) used an in-depth phenomenological interview methodology to look at college readiness from the view of successful first-generation nontraditional college students. The researchers claimed that self-regulation may be an indicator for college readiness since postsecondary education lays responsibility for success on the student. Eight volunteers “from an upper division, undergraduate liberal arts program of a small urban university located in the Pacific Northwest” (Byrd & MacDonald, 2005, p. 25), who had transferred to a 4-year institution from a community college, were over the age of 25, and were the first ones in their families to attend college, participated in semi-structured, 30- to 60-minute individual interviews to collect data about their backgrounds and college experiences. Besides the usually accepted academic skills, such as reading, writing, math, technology, communication and study skills, participants in this study
pointed out that (a) time-management skills, (b) goal-setting and focusing, and (c) self-advocating (including help seeking) as a learner were critical for college readiness (Byrd & MacDonald, 2005). These skills are considered as an essential part of self-regulatory learning strategies.

One other area associated with student persistence is students' study patterns (Schmid & Abell, 2003), which refers to how often and when students study, and it is also an important part of the self-regulatory learning strategies. Schmid & Abell (2003) conducted a study to examine the relationship between persistence, demographic risk factors, study patterns, and campus involvement among three different student cohorts, non-returning students, current students and graduated students at Guilford Technical Community College (GTCC). The researchers mainly used three surveys to identify factors influencing student success and to explore student involvement in extracurricular activities at GTCC in addition to study patterns. These surveys are the 2001 Non-Returning Student Survey, required by the North Carolina Community College System (NCCCS) Office; the 2001 Faces of the Future Survey, generated by the ACT Evaluation/Survey Service; and the 2002 Graduate Exit Survey, generated by the GTCC Office of Institutional Research and Planning (Schmid & Abell, 2003). From the results of the study, Schmid & Abell (2003) concluded that the two most prevalent study patterns were “1) weekly study with reviews before exams” and 2) “cramming before exams and some study during the week” (p. 8-9). Schmid & Abell (2003) also found that besides hard effort at courses, consistent study works much better than cramming in bringing about program completion from GTCC. For example, among the three groups, more than 33% of GTCC graduates studied 11 hours or more every week, and these GTCC graduates reported the highest probability (43%) to study consistently during the week and to review before exams, and they also reported a higher possibility to use other resources like study groups (37%) and faculty assistance outside class (52%) (Schmid & Abell, 2003).

The above studies demonstrate the difference between successful and unsuccessful community college students in their use of learning strategies and thus illustrate the importance of learning strategy deployment in student persistence. This also helps to explain why improvement in learning strategies might help community college students enhance their academic performance, motivation and consequently their persistence.
Need for College Success Courses and Study

Because of their nontraditional demographic characteristics and educational preparation, there is a higher tendency for community college students to leave without a credential after they begin their postsecondary education. Since community colleges are having this serious problem with student retention, what can be done to help solve this issue? Compared with the large number of freshmen, minority, and first generation students who are entering community colleges, not enough research has been conducted to understand and help this population (Wild & Ebbers, 2002).

Remedial or study skills courses can assist in providing underprepared students with math, reading, English, and study skills to succeed in college (Byrd & MacDonald, 2005), to enhance achievement (Stovall, 2000; Tuckman, 2002, 2003a, 2003b), and to improve retention (Cofer & Somers, 2000; Derby & Smith, 2004; Stovall, 2000; Tuckman, 2003b). As a result, several researchers (Byrd & MacDonald, 2005; Hoyt, 1999; Schmid & Abell, 2003) emphasize the need for interventions that concentrate on the academic needs of students and call for the use of remedial education and study skills courses to help students understand learning strategies, to appreciate the importance of consistent studying rather than cramming (Schmid & Abell, 2003), and to assist colleges in teaching students skills for time-management, focusing on goals, and self-advocacy explicitly in their first year of college (Byrd & MacDonald, 2005).

Many of these remedial or study skills interventions are designed and developed on the basis of the theories and research on academic self-regulation (Shafer et al., 2002; Tuckman, 2003a), yet how to make these courses more effective and efficient at community colleges is an area awaits/worth investigation. This study attempted to test the effectiveness of a web-based self-regulated learning strategy training on learners’ achievement, motivation and strategy use in a blended format College Success course at a Community College in Southeast U.S. This coincides with Young & Ley (2003)’s recommendation for research on the function of self-regulated learning support in remedial education, using either qualitative or quantitative methods.

Theoretical Framework about Self-Regulated Learning

The core of college success courses is the theory and research results about self-regulated learning. This following section introduces concepts about what self-regulated learning is and

**What is Self-Regulated Learning?**

Zimmerman (1990) defines self-regulated learning (SRL) with three distinctive features: learners’ application of self-regulated learning strategies, their sensitivity to self-evaluative feedback about learning effectiveness, and their self-generated motivational processes. He differentiates academic self-regulation from mental ability, such as intelligence, or an academic skill, such as reading proficiency. He suggests that it is a “self-directive process through which learners transform their mental abilities into academic skills” (Zimmerman, 1998, p. 2).

From a social cognitive point of view, self-regulatory processes and beliefs consist of three cyclical phases as described in Figure 2.1: forethought, performance or volitional control, and self-reflection (Zimmerman, 1998, 2000) in Appendix R. According to Zimmerman (1998), the forethought phase happens before efforts to learn and sets the stage for learning. Performance or volitional control processes occur during learning efforts and concerns concentration and performance. Self-reflection processes take place after learning efforts and affect learners’ reactions to that experience. As a result, these self-reactions complete the self-regulatory cycle by influencing forethought of subsequent learning efforts (Zimmerman, 1998).

Zimmerman (2000) claims there are two distinctive but closely related categories of forethought: task analysis, which includes goal setting and strategic planning, and self-motivational beliefs. Self-motivation beliefs that exist under the forethought processes of goal setting and strategic planning consist of “self-efficacy, outcome expectations, intrinsic interest or valuing and goal orientation” (Zimmerman, 2000, p. 17).

Two major forms of performance or volitional control processes that have been studied are self-control, including self-instruction, attention focusing, which helps learners to concentrate on the task and exert their effort (Zimmerman, 2000) and self-observation, which refers to a person’s tracking of specific aspects of their own performance and the effects of the performance (Zimmerman & Paulsen, 1995).

The two self-reflective processes that are closely related with self-observation are self-judgment and self-reaction (Bandura, 1986). Self-judgment concerns evaluating one’s own performance and making causal attribution (Zimmerman, 2000). Self-evaluative and attributional self-judgments are closely linked to two forms of self-reaction: self-satisfaction and adaptive or
defensive inferences. Favorable self-reactions sequentially produce positive forethought about oneself as a learner such as greater self-efficacy, a stronger learning goal orientation (Dweck, 1988) and greater intrinsic interest in the task (Zimmerman & Kitsantas, 1997). These connections between self-reflection and forethought processes complete the cycle of academic self-regulation (Zimmerman, 1998).

**Self-Regulated Learners**

“All learners try to self-regulate their academic learning and performance in some way” (Zimmerman, 1998, p. 6), but there are remarkable differences among students. Zimmerman (1998) classified learners into the naïve and skillful categories from the perspective of self-regulatory phase processes.

Ertmer & Newby (1996) found that expert learners are strategic, self-regulated, and reflective. They demonstrate planfulness, control, and reflection; they are aware of the knowledge and skills they have, or are missing, and use appropriate strategies to actively apply or acquire them (Ertmer & Newby, 1996).

Pintrich (1995) maintained that less effective learners often have trouble monitoring and regulating their cognition. They are not aware of their loss of attention and comprehension, and they do not self-evaluate their comprehension. They often set distal and global goals, which can interfere with their learning. They sometimes have problems regulating their motivation and affect for learning. They may doubt their ability to succeed in studying, and they may have high test-anxiety. Their high level of anxiety may cause them to use simple cognitive strategies, such as memorization, rather than deeper processing strategies for learning. They often compare with other students instead of with their own previous performance.

Therefore, students’ level of self-regulation may eventually decide whether their learning experiences will become destructive or fulfilling. Awareness of the importance of self-regulation is the foundation for students to assume responsibility for their own academic achievement (Zimmerman, 1998). All learners are self-regulated to some degree, but systematic deployment of metacognitive, motivational, cognitive and resource management strategies is a key feature of most self-regulated learners.

**Development of Self-Regulated Learning**

It is possible to develop self-regulated learning by personal discovery (Zimmerman, 2000). However, it is often monotonous, frustrating, and less effective. Fortunately, Zimmerman
(2000) pointed out that self-regulatory processes could be learned from and maintained by social as well as self-sources of influence. The acquisition of a wide range of task competencies, including academic learning strategies, evolves in a series of regulatory skill levels.

According to Zimmerman (2000), an observational level of skill occurs when learners can generate the major features of the skill or strategy from observing a model learn or perform. An emulation level of self-regulatory skill is reached when a learner’s behavioral performance moves closer toward the general strategic form of the model. Self-controlled level of self-regulatory skill happens when learners are proficient in performing a skill in structured settings without the models. A self-regulated level of task skill is attained when learners can systematically modify their performance to changing personal and contextual conditions with little to no dependence on the model, and learners are motivated by their perception of self-efficacy to maintain this level of skill. The source of learning of regulatory skill is primarily social for the first two levels, but the locus shifts to self-sources at more advanced levels (Zimmerman, 2000). The speed and quality of learners’ self-regulatory development can be facilitated significantly if learners proceed according to this multilevel developmental hierarchy (Zimmerman, 2000).

To promote self-regulated learning, it is not sufficient to simply inform students what expert learners know or even to demonstrate the procedures that expert learners use (Ertmer & Newby, 1996). Even if a student completely comprehends the expert learning process in a declarative sense, extensive practice is still needed for him to be able to automatically and effectively implement expert learning strategies. As a result, extensive long-term practice and feedback are considered critical for the development of expert learning (Ertmer & Newby, 1996).

To sum up the previous section, self-regulated learning is a multidimensional construct, which involves theories and research on motivation, cognition, and metacognition (Alexander, 1995). Every learner is, to some extent, self-regulated for their academic learning (Zimmerman, 1998), but there are significant differences among students. Self-regulated learning can be developed through personal discovery or training (Zimmerman, 2000).

Research on Self-Regulated Learning

Research conducted over the last decade has consistently found a positive relationship between academic achievement (Lan, 1996; Schunk, 1982, 1996; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996), motivation (Schunk, 1982, 1996; Schunk & Ertmer, 1999;

**Effects of Self-Regulated Learning Strategies**

Self-regulated learning strategies refer to learners’ actions and processes, which are directed at acquisition of information or skills (Zimmerman, 1990). Students’ use of self-regulated learning strategies is found to be positively related with high achievement (Lan, 1996; Schunk, 1982, 1996; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996), motivation (Schunk, 1982, 1996; Schunk & Ertmer, 1999; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996, 1999) and persistence (Lan, 1996).

The self-regulated learning process consists of execution of several major strategies, including (1) metacognitive strategies such as planning, goal setting, monitoring and self-evaluation, (2) motivational strategies, such as self-efficacy, attribution and self-satisfaction, (3) cognitive strategies for learning and comprehending the materials such as rehearsal, elaboration and organization, and (4) resource-management strategies including time management and help seeking.

**Effects of Metacognitive Strategies**

Metacognition is defined as “the awareness, knowledge, and control of cognition” (Pintrich et al., 1991, p.23). Metacognitive strategies used most frequently by self-regulated learners include goal setting, strategic planning, self-monitoring and self-evaluation,

**Goal setting.** Goal setting refers to determining target results of learning (Locke & Latham, 1990 as cited in Zimmerman, 1998). Goal-setting is essential to learning because it sets the standards for students’ to evaluate their performance (Bandura, 1986), and students are motivated to keep exerting efforts or to adjust their behaviors to achieve optimal outcomes because they want to reach their goals (King, Harner, & Brown, 2000). Latham (1991) explains how goals regulate performance by referring to three causal mechanisms. First, a goal directs people’s activity toward actions, which are goal-relevant at the cost of actions, which are goal-irrelevant. Second, a specific goal regulates energy expenditure by having people adjust their effort to the difficulty level of the task. Third, goals have an effect on people’s persistence on tasks when there are no time limits (Latham & Locke, 1991).
According to goal setting theory (Locke & Latham, 1990), the effects of goals rely on goal property. Goals that denote specific performance standards, are temporally close at hand, or are viewed as difficult but attainable, enhance performance better than goals that are general, temporally distant, or perceived as very easy or very difficult (Schunk, 1990). Goals are usually classified into two different categories: process and product goals. Product goals focus on the characteristics, such as rate or quantity, of tasks to be completed or learning to be acquired (e.g., “create a three-page website that includes tables, pictures, links and a color background”). Contrarily, process goals emphasize techniques and strategies students use to learn or acquire knowledge or skills (e.g., “Create a background for a web page using the background color pallet”). Researchers have used various names to identify these goals (Schunk & Ertmer, 1999). Even though their definitions may differ to some extent, process goals are similar to learning, task, and mastery goals, whereas product goals are close to outcome, performance, and ego ability goals.

Several studies (Zimmerman & Kitsantas, 1996, 1999) have examined the effects of goal setting under the condition of providing learners with process or product goals (See P. 12 for definition of these goals). In general, these studies indicate that process goals are more likely to result in higher learning achievement and more positive self-efficacy percepts. For example, Zimmerman & Kitsantas (1996) found from their study in learning a motor skill of dart throwing that participants within process goal setting outperformed those with product goals on dart throwing proficiency, and were more self-efficacious. Participants who self-recorded (a form of self-monitoring) attained better skills and displayed higher self-efficacy than those who did not self-record. This study indicates an additive effect of goal setting and self-monitoring, in which each self-regulatory technique contributes separate effects to the overall mastery of dart throwing. An additional advantage of using process goals during skill acquisition was noted in this study. The researchers suggested that process goals prompt an individual to attribute poor performance to improper strategy use instead of a lack of ability or insufficient effort. These strategy attributions are advantageous in sustaining individuals’ percepts of self-satisfaction and sense of self-efficacy to eventually master the skill (Zimmerman & Martinez-Pons, 1992).

In another study (Zimmerman & Kitsantas, 1999) that eighty-four high school girls practiced combining a series of kernel sentences into a single nonredundant sentence, the relationship between goal setting and several self-regulated learning activities were examined.
There were two types of goals in this study. The outcome goal emphasized minimizing the number of words in the combined sentence, while process goal stressed a 3-step method for combining kernel sentences. Girls who shifted goals sequentially from process to outcome goals were found to outperform classmates who adopted only process goals who, in turn, surpassed classmates using only outcome goals in measures for posttest writing revision skill, self-reactions, self-efficacy perceptions, and intrinsic interest in this skill. The measure of Self-reaction evaluated the girls’ satisfaction with their rewriting skill proficiency. It was found, regarding self-reaction, there was a significant main effect for the goal setting and self-monitoring respectively, but no significant interaction between the goal setting and self-monitoring. Post hoc tests revealed that process goal participants expressed greater satisfaction with their writing skill than outcome goal ones. Girls who self-recorded (a form of self-monitoring) reported higher degree of satisfaction than those who did not self-record.

**Strategic planning.** Zimmerman (1998) refers to strategic planning as “the selection of learning strategies or methods designed to attain the desired goals” (p. 3).

Hofer, Yu, & Pintrich (1998) mentioned that “setting goals for studying, skimming a text before reading, generating questions before reading a text, and doing a task analysis of the problem”(p. 67) are strategic planning activities. They (Hofer et al., 1998) claimed that these activities not only seem to assist learners to plan their use of cognitive strategies but also seem to activate their relevant prior knowledge, making it much easier for learners to organize and comprehend the material.

Ertmer & Newby (1996) describes the planning activities of expert learners in a qualitative study. She explains that expert learners think about three things: 1) the task demands; 2) their own personal resources; and 3) potential match between the two, before they begin a task. More specifically, they involve in the following activities to fulfill these purposes: defining a clear goal, selecting and sequencing a series of strategies for achieving the goal, and recognizing potential difficulty to the successful achievement of the goal (Ertmer & Newby, 1996). Additionally, Ertmer & Newby (1996) thinks that the strategies selected by expert learners include not only the appropriate cognitive strategies, but also the motivational and environmental strategies.

Kitsantas & Zimmerman (2002) conducted a study, on the topic of overhand serving skill during a practice episode, to investigate the differences in self-regulatory processes of 30 college
women who were volleyball Experts, Non-experts, or Novices. It was found (Kitsantas & Zimmerman, 2002) that Experts would demonstrate better goals, planning, strategy use, self-monitoring, self-evaluation, attributions, and adaptation than either Non-Experts or Novices. In this study, planning refers to selection of strategies to achieve a particular goal, including warming up during practice. The participants were asked to describe whether they had followed a regular routine when they practiced by themselves and how it was structured. Significant differences were discovered in students’ planning of their practice routines. Experts (frequency = 10) followed a completely structured routine (involving warm ups, pepper drills, and specific skills training) while most Non-Experts (frequency = 8) followed a partially structured routine (involving only one of the above components). The remainder of Non-Experts and all Novices did not pursue any structure in their practice routine.

**Self-monitoring.** Monitoring one’s thinking and behavior is an integral part of self-regulated learning, and it is a type of self-reflective practice. Students must monitor and evaluate their learning so as to regulate it (Hofer et al., 1998). Some examples of monitoring activities include “tracking attention while reading a text or listening to a lecture, self-testing through the use of questions about the text material to check for understanding, monitoring comprehension of a lecture, and the use of test-taking strategies (e.g., monitoring speed and adjusting to time available) in an exam situation” (Hofer et al., 1998, p. 68). These monitoring strategies notify the learner of failures in attention or comprehension and remind them to make up for these failures by using regulatory strategies.

Ertmer & Newby (1996) describes the monitoring process through summarizing the behaviors of expert learners in a qualitative study. During the implementation of a learning plan, expert learners mentally check what they are doing to make sure that they are progressing toward the defined goals. The focus of this stage is on actually executing the steps in the plan, while examining the effects of selected cognitive, motivational, and environmental strategies. When expert learners complete each step in the learning plan they must judge how accurately and effectively it was achieved and determine whether or not it is appropriate to move on to the next step. They need to watch out for feedback concerning the effectiveness of their selected cognitive, motivational, and environmental strategies and make modifications along the way (Ertmer & Newby, 1996).
One study conducted by Schunk (1982) has examined the effects of self-monitoring without examining the type of goals involved. This study investigated the effects of progress self-monitoring on children’s achievement and percepts of self-efficacy in the context of mathematical competency development. The findings from this experiment revealed that progress monitoring in the context of competency development is highly effective in promoting achievement and percepts of efficacy. Furthermore, the monitoring process, instead of the monitoring agent, was more important.

Lan (1996) conducted an experiment with a statistics class to examine the effects of self-monitoring on students’ learning strategies, motivation, knowledge representation, self-judgment ability, and course performance. In this experiment, 72 graduate students were assigned to a self-monitoring group, an instructor-monitoring group, or a control group. During the course of the experiment, the self-monitoring group logged the frequency and intensity of their learning activities, the instructor-monitoring group assessed the instructor’s teaching, and the control group were not administered any treatment. This experiment used a monitoring protocol (Lan, Bradley & Parr, 1994 as cited in Lan, 1996) including a list of the main statistical concepts covered in the text and lectures and a list of studying activities (lecture, text assignments, discussion, and tutoring) for students to master the material. For each activity of studying, students in the self-monitoring group recorded the number of times they engaged in it, the amount of time they spent on it, and their perceived ability of using it for each statistical concept. The self-monitoring group outperformed the other two groups on course test, employed more self-regulated learning strategies, and created better knowledge representation of the course content (Lan, 1996).

**Self-evaluation.** The process of self-evaluation of capabilities and progress is of critical importance for learners’ self-regulation during skill acquisition (Schunk, 1995). Zimmerman (1998) suggests that self-evaluation involves comparing feedback information from self-monitoring with certain kind of standard or goal.

Explicit self-evaluation includes a type of self-monitoring because students are invited to deliberately attend to their present performance and compare it with their goals and prior performance to self-judge if they are making progress. Self-judgment brings about self-reactions such as considering performance noteworthy or unacceptable. Positive self-evaluations let students feel efficacious about learning and motivated to continue to work diligently because
they believe they are capable of making further progress (Schunk, 1991). Low self-judgment of progress and negative self-reactions will not necessarily reduce self-efficacy and motivation if students are confident that they are capable of succeeding but that their present approach is ineffective (Bandura, 1986).

Ertmer & Newby (1996) defines self-evaluation as expert learners’ assessment of both the process implemented and the product accomplished after completing the entire learning task. Beyer (1987 as cited in Ertmer & Newby, 1996) claims that this includes addressing a variety of details: 1) the rationality and accuracy of any learning product to determine how much of the goal has been achieved; 2) the complete process, together with its supporting steps, to decide how effective they were in achieving the goal; 3) the hindrances met to determine how well they were predicted, prevented and/or managed; and 4) the overall plan to establish its relative effectiveness and efficiency and to modify it for the purpose of future use with similar tasks (Ertmer & Newby, 1996).

The effects of self-evaluation on learning can be illustrated with the results from the following several studies. Schunk & Swartz (1993) found from their studies on how goal setting and progress feedback affect writing achievement and self-efficacy of fifth graders that the process goal with progress feedback treatment had the greatest impact on achievement outcomes, and self-efficacy was highly predictive of writing skill and strategy use. In their studies, children received writing strategy instruction and were given a process goal of learning the strategy, a product goal of writing paragraphs, or a general goal of working productively. Half of the process goal participants periodically received feedback on their progress in learning the strategy.

Schunk (1996) conducted two other studies to investigate how goal and self-evaluation affect motivation and achievement outcomes. In both studies, fourth-graders received instruction and practice on mathematical fractions. Students worked under conditions involving either a goal of learning how to solve problems (learning goal) or a goal of merely solving them (performance goals). The results of these two studies indicate that providing students with a goal of learning to solve problems enhances their self-efficacy, and skill achievement, and allowing students to evaluate their capabilities or progress in skill acquisition has promoted these outcomes.

In another experiment, Schunk & Ertmer (1999) examined the effects of self-evaluation on computer skill acquisition. Undergraduate students worked on computer projects through the
use of a program named HyperCard for over 3 sessions. Students either were given a process goal, to learn various functions of the computer application, or a product goal, to complete assignments by using the computer application. In Experiment 1, half of the student in each goal condition evaluated their progress in learning the applications after the second session. It was found that the opportunity for self-evaluation promoted self-efficacy, and the process goal brought about higher self-efficacy, self-judged learning progress, and self-regulatory competence and strategy use; In Experiment 2, self-evaluation students gauged their progress after each session. The results show that frequent self-evaluation, together with a process or product goal, resulted in similar results. In this experiment, self-evaluation was operationalized as students’ assessment of their progress in attaining HyperCard skills. Students estimated the amount of progress they had made in learning by judging each of the 12 tasks on a 7-point scale ranging from 1 (none) to 7 (Quite a lot) in private (Schunk & Ertmer, 1999).

Generally speaking, metacognitive strategies, applied either separately or in combination, can bring about better learning achievement (Lan, 1996; Schunk, 1982, 1996; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996), more positive motivation (Schunk, 1982, 1996; Schunk & Ertmer, 1999; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996, 1999), and more frequent use of learning strategies (Lan, 1996).

Effects of Cognitive Strategies

In this study, cognitive strategies refer to behaviors that are used to rehearse, organize, and transform learning materials for the purpose of memorizing or retaining knowledge. Three types of cognitive strategies, rehearsal, organization and elaboration, are most frequently involved in students’ learning, and they work in cooperation with the other self-regulatory strategies to make learning effective and efficient. These strategies can be used for basic as well as more complex learning.

Rehearsal strategies “are used to select and encode information in a verbatim manner” (Weinstein, Husman, & Dierking, 2000, p. 731-732). Rehearsal strategies for basic learning tasks contain recitation, repetition of information or saying words aloud when reading a text. Rehearsal strategies for complex or content learning tasks include copying material, taking notes, and underlining or marking texts in a passive and unreflective manner (Hofer et al., 1998; Weinstein et al., 2000). It is assumed (Hofer et al., 1998) that these rehearsal strategies will help
learners pay attention to and identify important information from lists or texts and hold this information active in working memory.

Organizational strategies are used to “construct internal connections among the pieces of information given in the learning material” (Weinstein et al., 2000, p. 731-732). Organizational strategies for basic learning tasks consist of sorting, selecting the main idea from text, or clustering related information according to common characteristics or relationships. Organizational strategies for complex learning tasks involve outlining or diagramming the information and creating spatial relationships using strategies such as networking (e.g., to sketch a map of the important ideas, the prose or expository structures of texts) (Hofer et al., 1998; Weinstein et al., 2000). These strategies usually bring about a deeper understanding of the material to be learned than rehearsal strategies (Hofer et al., 1998).

Elaboration strategies are used to “make information meaningful and to build connections between information given in the learning material and a learner’s existing knowledge” (Weinstein et al., 2000, p. 731-731). Elaboration strategies for basic learning tasks involve creating mental imagery and using mnemonic techniques to relate random information to personally meaningful knowledge. Elaboration strategies for complex learning tasks comprise strategies that process the information by paraphrasing, summarizing, creating analogies, relating the new information to prior knowledge, questioning, trying to teach the information to another person (Weinstein et al., 2000), generative note taking (where the student actively rearrange and connects ideas in their notes in contrast to passive, linear note taking) (Weinstein & Mayer, 1986 as cited in Hofer et al., 1998).

Effects of Resource-Management Strategies

Resource management strategies involve strategies that students use to manage their environment, for example their time, their study environment, and other participants including teachers and peers (cf. Corno, 1986; Zimmerman & Martinez-Pons, 1986 as cited in Hofer et al., 1998). It is assumed (Hofer et al., 1998) that these resource management strategies help students modify their environment to fit their goals and needs. It was found that many college students need support in planning on time management and help seeking (Orange, 1999).

Time management. Time management concerns “scheduling, planning, and managing one’s study time” (Pintrich et al., 1991, p. 27). According to Pintrich (1991), this involves reserving blocks of time to study, using study time more effectively and setting realistic goals;
and it ranges in levels, from making schedules for one time/day of studying to creating weekly and monthly study plans.

Help-seeking. Help seeking is a unique self-regulated learning strategy because students must carry it out through social interaction with others. Students regulate their own learning by securing assistance from others to cope with academic difficulty (Newman, 2002)

When students monitor their academic performance, and become aware of the difficulty that they cannot overcome on their own, they usually display the ability and self-determination to resolve that difficulty by requesting assistance from a more knowledgeable individual. This behavior is mature and strategic. Help seeking can prevent possible failure, sustain engagement, result in task success, and improve the probability of long-term mastery and autonomous learning (Newman, 2002). Adaptive help seeking, which means asking for the help needed in order to learn independently, in contract to simply request the correct answer, is an important strategy of self-regulated learning (Newman, 2002).

Resource management strategies also include Study environment management, Effort Regulation and Peer Learning. Study environment management concerns the setting where the student does her course work. It refers to a learner’s behaviors to arrange or adjust study environment to make it “organized, quiet, and relatively free of visual and auditory distractions” (Pintrich et al., 1991, p. 27). Effort Regulation describes students’ ability to control their effort and attention in spite of distractions and uninteresting tasks. It not only reflects a commitment to completing one’s study goals, even when there are difficulties or distraction, but also indicates a student’s regulation in continued use of learning strategies (Pintrich et al., 1991). Peer Learning refers to collaborating with peers, or using dialogue with peers to help a learner clarify understanding of course materials and achieve insights he or she may not have attained on his or her own (Pintrich et al., 1991).

Motivational Beliefs Related with Use of Self-Regulated Learning Strategies

Another focus of research about self-regulated learning is on some of the motivational learner characteristics, which might influence the use of self-regulated learning strategies. This section discusses the motivational beliefs that might have some effects on learners’ use of self-regulated learning strategies. Self-regulated learning entails proactive efforts to search for and benefit from learning activities. Learners need to be not only self-directed metacognitively but
also self-motivated as well (Zimmerman, 1990), and they can also adjust the following aspects to achieve or maintain high motivation for learning.

**Goal Orientation**

Goal orientation “refers to the student’s perception of the reasons why she is engaging in a learning task” (Pintrich et al., 1991, P. 13). Goal orientation has a general distinction between mastery or learning goals and performance or extrinsic goals (Hofer et al., 1998). Mastery goals refer to an orientation where students focus on learning and understanding the material and pursuing self-improvement. On the contrary, a performance orientation stands for the situation when the students emphasize grades, approval from others, rewards, or besting others. Generally speaking, the research suggests that adopting a mastery goal orientation has a positive effect on both motivational and cognitive outcomes (Ames, 1992; Pintrich & Schunk, 1996 as cited in Hofer et al., 1998).

Goal orientation may have an interactive effect with learners’ motivation. Hagen & Weinstein (1995) believe that students with performance goals can perform effectively if they have high self-efficacy. They think it is only when students begin to doubt their ability that their performance goals will act negatively. On the other hand, they comments that mastery goal students have been observed to consistently select challenging tasks, regardless of their level of self-efficacy. They are mastery oriented and highly persistent even when encountering difficulty.

As a result, it is suggested (Hofer et al., 1998) we should encourage students to adopt a mastery orientation for their college work. However, from a realistic perspective, it is also proposed (Hofer et al., 1998) that we should not encourage students to ignore grades. Instead, we should try to help students see the function of grades in context and to avoid an overreliance on grades as their only goal for college courses. Similarly, Hagen & Weinstein (1995) comments that many college student have both mastery and performance goals. They suggest it may be especially helpful for college students to have both goals, since it is both important for them to value learning the material and to achieve certain levels of performance (Hagen & Weinstein, 1995).

Goal orientation is related to use of self-regulated learning strategies. A study conducted by Ames & Archer (1988) can be a demonstration for the interaction between goal orientation and learners’ motivation. One hundred seventy-six junior high academically advanced students were randomly selected, and they responded to a questionnaire on their perceptions of the
classroom goal orientation, use of effective learning strategies, task choices, attitudes, and causal attributions. Students with mainly mastery goals reported using more effective strategies, preferred challenging tasks, had a more positive attitude toward the class, and had a stronger belief that success follows one’s effort. Students with mainly performance goals were more likely to focus on their ability, evaluating their ability negatively and attributing failure to lack of ability. These findings suggest that classroom goal orientation may assist formulation of adaptive motivation patterns when students adopt mastery goals.

Greene & Miller (1996) examined the relationships among college students’ self-reported goal orientation, perceived ability, cognitive engagement while studying, and course achievement with 108 participants from a teacher education program. Both perceived ability and learning goal scores were found to be positively correlated with meaningful cognitive engagement (self-regulation and deep strategy use, such as planning, self-questioning or summarizing). Furthermore, learning goals and perceived ability were positively correlated with each other. Performance goals were found to be positively correlated with shallow cognitive engagement, “such as rote memory and word-by-word note taking”. A path analysis verified a causal model in which achievement is positively influenced by perceived ability and learning goals, but meaningful cognitive engagement activities is the mediator between the effects of these variables.

Self-Efficacy

Social cognitive approaches to self-regulated learning (Bandura, 1986; Schunk & Swartz, 1993; Zimmerman & Martinez-Pons, 1992) have concentrated on self-efficacy as the critical source of students’ motivation. Self-efficacy acts as a precedent as well as a consequence of self-regulated learning.

Bandura (1986; 1988) proposed that the effects of goals depend on self-efficacy. Self-efficacy refers to personal beliefs about one’s capabilities to learn or perform skills at a designated level (Bandura, 1986). Self-efficacy is postulated to affect choice of activities, effort, and persistence (Schunk & Swartz, 1993). Research shows that when students define a goal they experience a sense of efficacy for attaining it (Schunk, 1990). Performance, observational experiences, and forms of persuasion provide individuals with information on efficacy.

Self-efficacy theory suggests that goal progress feedback can act as a persuasive form of information to raise self-efficacy by implying that individuals are competent and can continue to
learn (Bandura, 1986). In addition, Locke (1990) pointed out that goal progress feedback motivates individuals to work on the task by informing them about the progress that they are making toward their goals and conveying that goals are attainable. If goal attainments match standards, learners obtain feelings of self-satisfaction and perceptions of competence. Otherwise, if there is a perceived negative discrepancy between attainments and desired performance level, learners motivate themselves to strive toward improvement (Schunk, 1982). Therefore, self-evaluation of goal progress, during which learners compare their level of attainment against desired performance standard (the goals) (Schunk, 1982), has become a critical process to affect learning outcomes and self-efficacy during the implementation of self-regulated learning strategies.

In line with the social-cognitive model, Hofer et al. (1998) assume that self-efficacy can be changed and regulated. They try to convince students that they can change their self-efficacy beliefs and that their capabilities are not fixed, but can be improved gradually. They suggest it is critical for students to have accurate perceptions of their competence. If students are relatively accurate about what they can and cannot do, they are more likely to be able to use this perception to make reasonable adjustments in their use of learning strategies. On the contrary, if students are excessively confident about their capabilities, they may be too content to make any improvement to their current learning strategies and study habits (Hofer et al., 1998).

Self-efficacy also influences the use of academic self-regulation. A study (Bouffard-Bouchard, Parent, & Larivee, 1991) was conducted to examine the influence of self-efficacy on self-regulation during a verbal concept formation task of average or above average cognitive ability students, at two different grade levels. Students were observed while they tried to solve four problems of varying difficulty after the assessment of self-efficacy. The primary findings were that despite differences in school grade and in cognitive ability, self-efficacy had significant influence on various aspects of self-regulation, including monitoring of time-on-task, task persistence, and performance. High self-efficacy students displayed a more active control of their working time and were more persistent on the task than low self-efficacy ones. When students have the necessary cognitive skills to solve the problems, similar levels of self-efficacy are likely to lead to similar effects on self-regulation and performance, regardless of the school grade (Bouffard-Bouchard et al., 1991).
Another study conducted by Zimmerman & Martinez-Pons (1990) also investigated the relationship between self-efficacy and use of SRL strategies. Forty-five male and 45 female 5th, 8th, and 11th graders from an academically gifted school and an identical number from regular schools were invited to describe their use of 14 self-regulated learning strategies and to evaluate their verbal and mathematical efficacy. Gifted students are significantly higher than regular students on verbal efficacy, mathematical efficacy, and strategy use. Students’ assessment of both verbal and mathematical efficacy were correlated with their use of self-regulated strategies.

**Interest and Value**

Interest refers to “students’ personal interest in the course content, not just their situational interest that is aroused by features of the class or the course content” (Hidi, 1990; Schiefele, 1991 as cited in Hofer et al., 1998, p. 71). Interest represents motivation that arises from the perceived value of undertaking a task. Value is students’ perceptions of the pleasure, importance and utility of the course content (Garcia & Pintrich, 1994 as cited in Hofer et al., 1998, p. 71). Intrinsic valuing denotes learners’ perceived internal feelings towards a task, for example, Helen found working with language enjoyable. Extrinsic valuing indicates learners’ perceived importance and utility of a task, for instance, James thinks being able to use calculus will help him professionally in the future. Both interest and value are important elements of learner motivation in self-regulated learning.

Hofer et al. (1998) suggests that, from a realistic perspective, students will have to take some required courses for which they do not have much personal interest and value. In addition, they point out that in these cases the need for self-regulated learning may be higher compared with those cases where personal interest and value are high (Pintrich & Schrauben, 1992; Sasone, Weir, Harpster, & Morgan, 1992 as cited in Hofer et al., 1998). Having some knowledge of their own interests and values, on top of the relations between interest and value and their learning, hopefully the students will realize that they need to be more strategic and self-regulated in different courses (Hofer et al., 1998).

Learner interest is another construct that affects the use of self-regulated learning strategies. Miller, Behrens, Greene, & Newman (1993) examined the motivational patterns and self-regulatory behaviors of 119 students in an introductory statistics course. Toward the end of the course subjects were given a questionnaire to measure their perceived ability, goal orientation (learning and performance), valuing of statistics (intrinsic and extrinsic), and the degree to which
subjects used self-regulatory strategies such as goal setting, self-monitoring, and task-appropriate cognitive strategies. It was found that both forms of valuing were positively correlated with perceived ability, the measures of self-regulation, persistence and learning goal but not with performance goals. In line with the prediction, subjects’ learning goal parameters were positively correlated with the measure of persistence, while performance goal scores were not. It was out of expectation that the correlation between perceived ability and the measure of persistence was not significant. These findings suggest that persistence may be affected more by students’ goal orientation and valuing than by efficacy in certain learning situations, such as college classes (Miller et al., 1993).

The previous researcher’s assumption was verified by another study (McWhaw & Abrami, 2001), which examined how goal orientation and interest together influenced students’ use of learning strategies in locating main ideas in text. Ninety-three Grade 11 graders participated in this study. This was a 2X2 post-test only control group design study. Goal orientation and Interest were the two independent variables; while Total Main ideas, Use of Other Cognitive Strategies, and Metacognition were the three dependent variables in the study. There were significant main effects for interest and goal orientation on the main-idea selection measure, which explains the phenomenon that high-interest students selected more main ideas than low-interest students, and rewarded (i.e. performance goal-oriented) students outperformed learning goal-oriented students. There was a main effect for Interest on Metacognition, which explains the fact that high-interest students reported using more metacognitive strategies (e.g., planning, monitoring, and regulating) than low-interest students while reading the text.

From the review in this previous section, we can summarize that even though self-regulated learning strategies are very helpful for students to achieve better learning and motivational results, the use of self-regulated learning strategies might be mediated by some motivational characteristics, such as goal orientation (Ames & Archer, 1988; Greene & Miller, 1996), self-efficacy (Bouffard-Bouchard et al., 1991; Zimmerman & Martinez-Pons, 1990), and interest and valuing (McWhaw & Abrami, 2001; Miller et al., 1993). Some of these characteristics, such as self-efficacy and goal orientation, might even affect persistence (Miller et al., 1993).

Research on Development of Self-Regulated Learning

Traditional Learning Strategy Interventions
Clark (1997) proposed that a person could either be trained directly or compensated for by environmental replacement if there is a deficit in metacognitive skills. The theories and research results about self-regulated learning have been used extensively in learning strategy interventions to help students improve performance and motivation. This following section is a review of some of these interventions.

Hughes, Ruhl, Schumaker, & Deshler (2002) conducted a study, which used a multiple-probe across-students design, to evaluate the effects of instruction in a comprehensive, independent assignment completion strategy with regard to homework completion rates and the quality of products completed in general education classrooms. Eight of the nine students with learning disabilities mastered use of the strategy, and their homework completion rates and the quality of their homework products improved. Along with these improvements came increases in participants’ quarterly grades and teacher ratings of the quality of the assignments. It is concluded that direct instruction in a comprehensive strategy consist of organizational behaviors can bring about independent completion of more homework by students with learning disabilities.

An assignment completion strategy, the PROJECT Strategy, was taught to the students in this study (Hughes et al., 2002). The strategy steps stress the entire sequence of overt and cognitive behaviors involved in assignment completion, such as recording assignments, analyzing assignments in terms of amount of time/effort needed, devising a plan for assignment completion, working on the assignment, and turning it in. In addition, the strategy also includes metacognitive behaviors such as self-monitoring, self-instruction, and self-evaluation. As students work through the steps of the strategy, they fill in three forms. The Monthly Planner is a month calendar that students can use for longer-term planning. The Weekly Study Schedule is a calendar that students can use to plan exactly when they will do each assignment during each week. The Assignment Sheet is a form on which students record the assignments, and this form was specially designed for students who have difficulty writing. These three forms act as the major vehicles for students to learn and implement the time management strategies that are necessary for them to complete their homework on time. This study also demonstrates the effects of training in time management strategies on students’ homework completion rate and achievement in general.
In Strategic Content Learning (SCL) approach (Butler, 1998), instructors assist students as the students flexibly and repeatedly take on each of the cognitive activities central to self-regulation (including analyzing a task and setting goals; selecting, adapting, or formulating strategic approaches; and monitoring progress).

Participants in the studies (Butler, 1998) were first aided to prioritize tasks with which they needed assistance (e.g., reading, studying, writing, math problem solving) and to spot assignments where those targeted tasks were required. Next, students’ existing approaches to self-regulating learning were carefully observed while they are completing first assignments without any support. Information about knowledge and beliefs that influenced students’ approaches to tasks was collected using pre-intervention interviews, questionnaires, and online observations. Then, students were assisted to analyze an assignment, identify task requirements, and talk about performance criteria. Next students were supported to make decisions about learning activities based on task performance criteria. After deciding upon their approaches, students were assisted to implement, monitor, and evaluate current strategies and to maintain, discard, or modify strategies according to the internal feedback generated from monitoring.

Within each session, SCL instruction was provided through interactive discussions focused alternately on completing the targeted task (e.g., reading a text) and on the process of learning (e.g., goal setting). Instructors guide students’ shifts between these cognitive and metacognitive levels of reflection. Between sessions, SCL participants were encouraged to test emerging strategies as they completed actual coursework and to self-evaluate strategy effectiveness. Then, during the subsequent session, students reported on the achievement of their efforts and any strategy adjustments that they made. These procedures supported students both to transfer task-specific strategies across learning contexts and to manage their learning independently (Butler, 1998).

From four studies (Butler, 1998) conducted to examine the effects of SCL as a model for supporting students with learning disabilities in postsecondary settings, it was found that there is consistent improvements in students’ metacognitive understandings about tasks and strategies and perceptions of task-specific self-efficacy. Improvements in students’ ability to describe strategic activities can be tied to participating in SCL interventions. Across SCL studies, some consistent changes in attributional patterns have also been observed: at posttest students were
less likely to ascribe failure to a lack of ability, but were more willing to credit ability for success.

Across the four studies (Butler, 1998), task performance data, which were measured with two grades on in-class quizzes or exams and samples of task performance, including copies of written assignments, written or oral summaries of reading passages, and/or math worksheets, completed before, during, and after the intervention, showed that 89 percent of students increased performance by 5% to 49%. In addition, improvement in performance was detected both on instructed and independently completed tasks (Butler, 1998). These analyses suggested (Butler, 1998) that students’ strategy development could be directly associated with observed task performance increase. Consistency in students’ involvement in independent strategy development and transfer also indicate that most of students modified their strategic approaches across a variety of academic tasks. Therefore, they are self-regulating more effectively across tasks.

Learning to Learn is an undergraduate course offered through the Department of Psychology at the University of Michigan (Hofer et al., 1998). This course had two instructional goals. The first was to teach students basic concepts of cognitive and motivational psychology; while the second was to have students apply these concepts to their own study at the university.

This course (Hofer et al., 1998) was intended for first- and second-year students who have experienced difficulty in their first semester or year of university coursework. This course (Hofer et al., 1998) involves 4 hours of class time each week, 2 in lecture and 2 in laboratory/discussion section format. The entire class, of 75-100 students, meets for two 1-hour lectures led by the professor of the course. The professor presents the principles, concepts, and research findings in cognitive psychology during the lectures. Besides, groups of 20-25 students meet once a week for a laboratory section led by a graduate instructor. The laboratories provide the connection between the concepts presented in lectures and the students’ own learning, with demonstrations, group work, and activities designed to enhance application of self-reflective and self-regulated learning.

The Learning to Learn class (Hofer et al., 1998) provided students with exposure to theories of learning and motivation, a broad range of strategies and the context for their use, practice in applying these strategies, and opportunities for reflection on this practice. A few of the specific areas of attention were: (1) Information processing, (2) Note taking, (3) Goal Setting,
and (4) Time management. Other course topics, such as cooperative learning, motivational strategies, were handled in similar manner, with the lecture and textbook offering theoretical frameworks for the self-reflective activities that occurred in the laboratory section and homework assignment. Topics were revisited whenever possible to allow for continued monitoring and reflection on practice. Motivational strategies are discussed throughout the class.

Two textbooks were used in the course (Hofer et al., 1998): a cognitive psychology textbook (Matlin, 1994 as cited in Hofer et al., 1998), supplemented by a practical study skills book (Pauk, 1993 as cited in Hofer et al., 1998). Students’ comprehension of material in the textbooks, lectures, and labs are usually assessed with two short quizzes, two midterm examinations, and a final examination in the course. Multiple-choice, short answer, and essay questions with increasing difficulty and demands are usually the format for these tests. Grades on these assessments and other course requirements are not norm-referenced. Students are required to keep a journal throughout the semester. They were provided with weekly guiding questions that stimulate them to reflect on the readings, lecture, and lab and to incorporate this course material with their own learning experience. Students were also encouraged to write about any thoughts they may have about themselves as learners, such as adjustments they made in their learning strategies during a particular week. These assignments were planned to promote habits of self-reflective practice in learning. The journal acted as a form of communication between the student and the graduate student instructor to support students’ metacognitive thinking and self-regulation.

Earlier research showed that the course had some effects on students’ grade point average (GPA) and reduced the level of test anxiety and increased efficacy (McKeachie et al., 1985 as cited in Hofer et al., 1998). Recently, when a fuller range of motivational and cognitive variables were assessed (Hofer et al., 1997 as cited in Hofer et al., 1998), it was found that student grew in their master orientation to learning, self-efficacy, and value and interest for the course, and declined in test anxiety. Furthermore, they improved in their self-reported strategy use. More importantly, correlational analyses have shown that students’ motivational beliefs, such as mastery goals, efficacy, and interest and value, were positively correlated with their use of cognitive and self-regulatory strategies (Hofer et al., 1997 as cited in Hofer et al., 1998). This further proves the significance of both motivational and cognitive constituents in self-regulated learning (Hofer et al., 1998).
Weinstein (2000) described another learning-to-learn course offered at the University of Texas at Austin. This course instructed students on how to review a learning situation and pinpoint strategies or techniques, which would most likely generate the desired outcome within the personal and contextual constraints and resources of that given situation. One focus of this course was Weinstein’s Model of Strategic Learning (Weinstein et al., in press as cited in Weinstein et al., 2000), whose critical underlying concept is that learners need to know about all four major components of the model: skill, will, self-regulation, and the academic environment to perform well (Weinstein et al., 2000).

This course began with an overview of the model. During the course the students were taught not only specific strategies, but also how the strategies interact with the other components in the model. Before the introduction of the model, the students were assessed with instruments including a reading battery and the Learning and Study Strategies Inventory (Weinstein, Schulte, & Palmer, 1987).

Students in this learning-to-learn course (Weinstein et al., 2000) were taught declarative, procedural, and conditional knowledge about three general types of cognitive strategies: rehearsal, elaboration, and organization, based on the information processing theory. During the semester, approximately 14 weeks with 3 hours of class per week, students were required to apply these strategies to specific course content in their other classes. Equipped with comprehension of both information processing theory and how knowledge of strategies play a part in the model of strategic learning, the students were better able to transfer what they learn in the this course to other learning situations (Weinstein et al., 2000).

Knowledge about strategies and knowledge of the contexts for using the strategies are critical, however, not enough. The students must also have the desire to use the strategy. Before strategy instruction began, students must first check their goals and their motivation for education (Weinstein et al., 2000). This course assisted students to formulate and evaluate their goals in the first few weeks through both direct instruction and completion of a class project. The process of regulating motivation and strategy use connects naturally to the self-regulation component of the model (Weinstein et al., 2000).

Within the self-regulation component of the model, the systematic approach to learning (Weinstein et al., 2000) reminds students to think about all aspects of the model in planning for
and executing academic tasks. This systematic approach to learning includes eight steps (Weinstein et al., 2000, p. 742):

1. Setting a goal
2. Reflecting on the task and one’s personal resources
3. Developing a plan
4. Selecting potential strategies
5. Implementing strategies
6. Monitoring and formatively evaluating the strategies and one’s progress
7. Modifying the strategies if necessary
8. Summatively evaluating the outcomes to decide if this is a useful approach for future similar tasks or if it needs to be modified or discarded for future use

Research and evaluation data for this course indicated that the systematic approach to learning plays an essential part in students’ academic success, retention and graduation rates (Weinstein et al., 2000). From semester evaluations of the pre- and post data, it was found that students gained highly significantly on the Nelson Denny Reading Test (Brown, Bennett, and Hanna, 1981 as cited in Weinstein et al., 2000) and LASSI scores. From the fifth-year follow-up statistics, almost 71% of the students who entered in 1990 and successfully completed the strategic learning course graduated after 5 years, despite significantly lower entering SAT scores and significantly lower motivation scores on the LASSI Motivation Scales, while the number for students who did not take the course was 55%. This 16-point difference is considered as a remarkable finding that supports the long-term retention effects of this learning strategies intervention. Additionally, these students had higher cumulative GPAs than the general population. These data present strong support for the value and impact of developmental education with an emphasis on learning strategies for students at risk for academic failure (Weinstein et al., 2000).

Self-regulated strategy development (SRSD) (Graham, Harris, & Troia, 1998) is a theoretically and empirically based instructional approach for developing students’ writing and self-regulation strategies. With SRSD, children are explicitly taught how to use task-specific strategies for composing, such as planning and revising, along with methods for regulating the use of these strategies, the writing processes, and behaviors (such as negative self-talk or impulsivity) that may hinder performance. Students who have been taught writing strategies using SRSD are mostly children with learning disabilities in fourth through eighth grade. The typical participant has a normal score on an intelligence test, faces difficulty with writing on
standardized tests and in the classroom, and achieves 2 or more years below grade level in reading or math, or both (Graham et al., 1998).

The goals of SRSD are achieved through various forms of support (Graham et al., 1998). One form of support is embedded in the writing strategies students are taught since it provides structure that assist an individual to organize and sequence behavior. A second form of support helps children master the self-regulation skills needed to utilize the target writing strategy successfully, direct the writing process, and substitute unproductive behaviors with constructive ones. This involves training students to use self-regulatory procedures such as goal setting, self-instruction and self-assessment. As students initially learn to use these processes, the teacher provides substantial assistance through modeling, explaining, reexplaining, and assisting as needed. This scaffolding is withdrawn step by step, when students become more competent to use these processes independently. Students’ knowledge about themselves, writing, and the writing process are increased to further reinforce their cognitive reservoir. Model compositions are used to teach students about the characteristics of good writing. Self-monitoring, goal setting, and instructor feedback help students obtain knowledge of their capabilities to write and to regulate the composing process (Graham et al., 1998).

Six instructional stages make up the framework for SRSD (Harris & Graham, 1992, 1996 as cited in Graham et al., 1998). These stages include 1) Develop Background Knowledge, 2) Discuss It, 3) Model It, 4) Memorize It, 5) Support It, and 6) Independent Performance. SRSD instruction (Graham et al., 1998) is characterized by interactive learning between instructor and students, individualization, criterion-referenced instruction, and ongoing strategy development. In addition, procedures for facilitating maintenance and generalization, including the use of self-reflection, are incorporated into the SRSD model.

According to studies using SRSD to teach writing strategies, SRSD has led to enhancement in four aspects of students’ performance: “quality of writing, knowledge of writing, approach to writing, and self-efficacy” (cf. Graham et al., 1991; Harris & Graham, 1996 as cited in Graham et al., 1998). Empirical evidence for the effects of SRSD can also be found from a more recent study (Paz, 1999) on writing expository essay with middle school students with and without learning disabilities (LD). It was found (Paz, 1999) the SRSD approach had brought positive outcomes for students with LD and low-, average-, and high-achieving writers. Students wrote longer, more complete and better quality papers, and sustained improvements in both
writing performance and behavior were also observed (Paz, 1999). The effects of SRSD can also be proved by another recent study (Johnson, Graham, & Harris, 1997), which investigated the assistance of instruction in goal setting and self-instruction, separately and combined, on the attainment, continuation, and generalization of a reading comprehension strategy by fourth- through sixth-graders with learning disabilities. Results (Johnson et al., 1997) showed that instruction in the reading strategy produced enduring and generalizable effects on students’ story comprehension skills. Furthermore, after strategy instruction, the comprehension performance of the students with learning disabilities was the same as that of a comparison group of students with normal achievement (Johnson et al., 1997). However, explicit instruction in goal setting and self-instruction did not enhance the comprehension achievement of students with learning disabilities (Johnson et al., 1997).

Ching (2002) conducted a study on Self-Regulated Learning training in an ESL program. A classroom implementation of strategy and self-regulation instruction was executed to examine whether instruction would facilitate students to plan and revise their essays and whether self-regulation would improve students’ attribution, self-efficacy and self-determination if they had the skills and ability to regulate their writing. Findings indicate that strategy and self-regulation instruction has prepared students with the knowledge on how to plan and revise their essays. This improvement is mainly ascribed to the deployment of four self-regulation procedures: “self-evaluation, organizing and transforming, seeking information and seeking social assistance” (p. 261). Additionally, strategy and self-regulation has enhanced students’ self-efficacy. After instruction, they reacted more positively to negative feedback. Strategy and self-regulation instruction also promoted students’ self-determination. Students became aware that writing more would not improve their writing except that they were able to detect the errors. As a result, more students turned to peer help after instruction. Strategy and self-regulation instruction did not have a clear effect on attribution, since students probably already had good attribution (Ching, 2002).

By and large, providing comprehensive training on self-regulated learning strategies to students in various traditional classroom settings can lead to improved task performance (Butler, 1998; Graham et al., 1998; Hofer et al., 1998; Johnson et al., 1997; Paz, 1999; Weinstein et al., 2000) and metacognitive understandings (Butler, 1998; Ching, 2002), more positive motivation (Butler, 1998; Ching, 2002; Graham et al., 1998; Hofer et al., 1998; Weinstein et al., 2000), more
strategy use (Butler, 1998; Hofer et al., 1998; Weinstein et al., 2000), and even a better retention rate (Weinstein et al., 2000).

Interventions Using e-Learning Technology

As early as in 1985, (Hythecker et al., 1985) pointed out the strengths and weakness of computer-assisted/managed instruction for learning strategy training. Computer-assisted/managed instruction has several essential strengths regarding learning strategy training. In particular, it can: 1) provide an inexpensive (compared with human experts) source of expertise in both subject matter and process, 2) direct, monitor, and support learning activities in an objective and effective manner, 3) record subject responses for future analysis, and 4) customize training activities based on pretraining individual difference data and on responses to tasks within the training process. One weakness mentioned by the researcher was that computers could not provide a realistic model for students to imitate and to use as a standard for self-evaluation of their strengths and weaknesses. Yet, with the development of technology, it has become possible to provide social modeling using streamed video. This can work as one of the powerful methods of imparting learning strategies.

A learning strategies training module was created (Hythecker et al., 1985) to merge the strengths of computer-assisted instruction and cooperative learning. Evaluation of this computer-assisted cooperative learning (CACL) training module revealed that strategy training enhanced performance on free recall tests in comparison with studying without an imposed strategy. Analysis of a post-experimental questionnaire confirmed the notion that the CACL module presented the most effective environment for learning.

Cardinale & Smith (1994) conducted a study to examine the effects of comprehension-directed and memory-directed computer-based learning-strategy training on the achievement of learning objectives. The participants were sixty undergraduate students registered in an introductory computing course. On the first day of the study, learners completed a tutorial about microcomputer components. Two experimental groups completed a strategy-training tutorial emphasizing comprehension or memory. The control group was given extra time on the microcomputer-components tutorial and did not receive any strategy training. After one week, all participants completed two tests for cued recall and recognition, which were administered separately. The strategy training had a significant effect on the fifty-item cued recall test, even though group mean scores were lower than 50 percent. Group average scores on a recognition
text indicated that comprehension-directed training was the most effective. All treatment groups achieved significantly higher mean scores than the control group. The findings of this study establish a foundation for further research into the design of computer-based learning-strategy training.

More recently, Hartley (2001) commented that some features of hypermedia, such as the use of multimedia and the greater control over sequence available to the learner, may make learning harder for less strategic students. The researchers (Hartley, 2001) conducted a study to investigate the potential of integrating learning strategy instruction into hypermedia learning materials. In this study, an intact high school computer class was used, and a six-week intervention was carried out. The experimental group received learning strategy training together with hypermedia computer networking lessons. Pre and post measures of metacognitive awareness and achievement were assessed. Findings revealed that strategy training had a positive effect on student’s regulation of their own cognition, however, students’ knowledge of cognition and achievement was almost the same as those of the control group.

In this study (Hartley, 2001), the learning strategy instruction was presented to students via computer in a hypertext format. The strategy instruction lessons each showed up on one page. Each strategy instruction page was related to a computer network lesson. The strategy instruction pages illustrated a learning strategy, supplied an example and assigned a task related to each particular lesson. A task journal template was provided for each week’s lessons. Students were required to record the results of the assigned task in the designated area of the task journal.

The students in the strategy instruction group (Hartley, 2001) were provided learning strategy instruction and fulfilled a related journal task four days out of each week. Each day, students in the experimental group began class by participating in a 5-10 minute independent learning activity. As the lessons were self-paced, students completed at different times no matter whether they were in the experimental or control group. A new skill was trained during the first day of each week and elaborated on during the next three days. The strategy lessons included the following components adapted from Graham and Harris (1993 as cited in Hartley, 2001): 1) initial presentation, which discusses current strategies and benefits of new ones; 2) explaining how and when to use strategy; 3) providing an example of the strategy used; 4) memorizing the strategy; and 5) performing independently. Topics covered in Learning Strategy Lessons include:
Tuckman at Ohio State University conducted a series of studies (Tuckman, 2002, 2003a, 2003c) to evaluate the effectiveness of a blended instructional model, named ADAPT (Active Discovery and Participation thru Technology) that integrates the features of traditional classroom instruction (classroom, instructor, textbook) with those of computer-mediated instruction (learning by performing, frequent assessment and feedback). Both the ADAPT model and the traditional face-to-face approach were used to teach a 10-week college success course designed to improve students’ academic performance measured by grade point averages. During the course, students in the ADAPT condition participated in 200 computer-mediated performance activities relating to the specific subject-matter being taught, the study strategies and skills for college success. Using the performance activities, students were required to understand, appreciate and apply the strategies that were presented to them in the course. These performance activities also served as tools for assessment. Students in the traditional condition completed these activities as regular classroom homework requirements. And, the control group, made up of participants found using matched information from student records, did not receive any formal instruction in study skills.

It has been consistently found that there was an overall significant difference and significant differences between each condition. Compared with their past performance, students in the ADAPT condition achieved the highest GPAs, while those in the control condition achieved the lowest, with students in the traditional condition in the middle. The hybrid features of the ADAPT model afforded students both organization and opportunities for involvement during the learning process.

Shafer et al. (2002) also conducted a study at University of North Texas to evaluate the effectiveness of a web-based instructional supplement in a college success program. In this study, the researchers investigated learners’ use of website resources, such as test banks, review materials, email to instructor, and the association between the use of these resources and performance, with 743 students in a semester long Psychology of Learning and Success course based on models of self-regulated learning.

CyberClass is a web-based platform that was used as an instructional supplement for the course. Instructors posted all class-related materials, except lesson plans, on the website.
Students had 24-hour access to the syllabus, assignments, quizzes, links to other relevant/instructional websites, and other information (e.g., late policy, student services on campus). Using the site, learners could also contact their instructors or classmates, and instructors could lead discussion or hold office hours online. In addition, students could reach the online learning resources, such as Practice Tests, Flash Cards, and CyberChalleng (a Jeopardy-like game), for each chapter of their textbook any time. These resource tools provided students with a means to assess their mastery of course content.

Students reported using the CyberClass website mainly to check assignments, complete the practice tests, and send/receive messages. It was found that students who used the resource tools of CyberChallege and Flashcards achieved higher class grades (Shafer et al., 2002).

Even though numerous studies, on training in self-regulated learning strategies, have been conducted on various learning domains in traditional classroom settings, the process and outcome of using these strategies in the e-Learning context is virtually unexplored. Empirical studies on the topic of self-regulated learning in e-Learning or online instruction are still in the stage of establishing primitive theories.

Summary of Literature Review

This previous section first reviewed theories and research on community college student success. A problem of high attrition rates has been discovered along with the lower expense and open-access policies at community colleges (Bradburn & Carroll, 2002; Cofer & Somers, 2000; Hoachlander et al., 2003). Students’ drop-out of community colleges have close correlation with numerous reasons, such as: students’ demographic characteristics (Cofer & Somers, 2000; Horn & Nevill, 2006; Nomi, 2005; Schmid & Abell, 2003), including age, family responsibilities, working full-time, part-time enrollment, their insufficient prior educational preparation (Hoachlander et al., 2003; Horn & Nevill, 2006; Wirt et al., 2004), unsatisfactory prior achievement colleges (Bradburn & Carroll, 2002; Cofer & Somers, 2000; Hoyt, 1999) and lack of learning strategies (Byrd & MacDonald, 2005; Ley & Young, 1998; Schmid & Abell, 2003).

Remedial or study skills courses, designed and developed on the basis of the theories and research on academic self-regulation (Shafer et al., 2002; Tuckman, 2003a), has been found effective in providing underprepared students with study skills to succeed in college (Byrd & MacDonald, 2005), to enhance achievement (Stovall, 2000; Tuckman, 2002, 2003a, 2003b), and to improve retention (Cofer & Somers, 2000; Derby & Smith, 2004; Stovall, 2000; Tuckman,
Therefore, researchers (Byrd & MacDonald, 2005; Hoyt, 1999; Schmid & Abell, 2003) call for the use of remedial education and study skills courses to help students understand learning strategies and improve achievement and retention (Byrd & MacDonald, 2005; Schmid & Abell, 2003).

Then, this literature review covered theory and research about self-regulated learning. Generally speaking, self-regulated learning is a multidimensional construct, which involves students’ self-generated application or adjustment of motivation, cognition, and metacognition (Alexander, 1995) for achieving optimal performance outcome. Every learner is self-regulated for their academic learning to some degree (Zimmerman, 1998), but there are significant differences among students. Self-regulated learning can be developed through personal discovery or training (Ertmer & Newby, 1996; Zimmerman, 2000).

Research conducted over the last decade, in controlled settings, has consistently found a positive correlation between academic achievement (Lan, 1996; Schunk, 1982, 1996; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996), motivation (Schunk, 1982, 1996; Schunk & Ertmer, 1999; Schunk & Swartz, 1993; Zimmerman & Kitsantas, 1996, 1999) and self-regulated learning. However, we can summarize, from the previous review, that even though the use of self-regulated learning strategies is very helpful for students to achieve better learning and motivational results, it might be intervened by some motivational characteristics, such as goal orientation (Ames & Archer, 1988; Greene & Miller, 1996), self-efficacy (Bouffard-Bouchard et al., 1991; Zimmerman & Martinez-Pons, 1990), and interest and valuing (McWhaw & Abrami, 2001; Miller et al., 1993). Some of these characteristics, such as self-efficacy and goal orientation, might even affect persistence (Miller et al., 1993).

Field tests of comprehensive training on self-regulated learning strategies to students in traditional classroom settings have found effects on improved task performance (Butler, 1998; Graham et al., 1998; Hofer et al., 1998; Johnson et al., 1997; Paz, 1999; Weinstein et al., 2000) and metacognitive understandings (Butler, 1998; Ching, 2002), more positive motivation (Butler, 1998; Ching, 2002; Graham et al., 1998; Hofer et al., 1998; Weinstein et al., 2000), more strategy use (Butler, 1998; Hofer et al., 1998; Weinstein et al., 2000), and even a better retention rate (Weinstein et al., 2000).

A number of studies that measured the effectiveness of SRL strategy training using the e-learning environment were also described in this literature review. In these seven studies that
reported empirical evaluation of this kind of training in a field setting, five of them (McKeachie, Pintrich, & Lin, 1985; Shafer et al., 2002; Tuckman, 2002, 2003a, 2003c) have been found effective to promote learning achievement, three of them found positive effects on use of strategies (Hartley, 2001; Hofer & Yu, 2003; McKeachie et al., 1985), 1 found positive effects on motivation (Hofer & Yu, 2003) and one found benefit for student retention (Tuckman, 2003b). Even though numerous studies, on training in self-regulated learning strategies, have been conducted on various learning domains in traditional classroom settings, research on the process and outcome of using these strategies in the e-Learning context is still in primitive stage.

So far the literature on theories and research in the domains of community college student success and self-regulated learning, including issues in community college student success, self-regulated learning, self-regulated learning strategies, development of self-regulated learning, has been reviewed and discussed. The review of the literature and an analytical discussion of relevant research contribute to the hypotheses of the study and the rationale for these hypotheses, which will be the focus for discussion next.

Hypotheses and Rationales

This study was conducted to examine the effect of web-based self-regulated learning strategy training on learners’ achievement, motivation and strategy use. The two conditions in this experiment were: 1) presence of self-regulated learning strategy training (ST), and 2) absence of self-regulated learning strategy training (NST). The following specific research questions and hypotheses will be explored in the study.

**Question 1.** Will self-regulated learning strategy training in a web-based environment influence learning achievement/ performance?

**Hypothesis 1.** There will be a significant difference in course percentage grades and grades for each of the major course activities between students in the self-regulated learning strategy training condition and those in the non-training condition. Students are expected to perform better in the course with the training than the non-training condition.

Achievement is one of the major outcomes from academic study, and it is one of the major elements leading to students’ motivation indicators, such as self-efficacy and self-satisfaction. Achievement is also one of the primary causes to the high impletion rate in community college. Improving learning achievement creates the possibility for promoting
learners’ self-efficacy and satisfaction, and eventually reducing drop out rate and increasing cost effectiveness of education provided at community colleges.

Self-regulated learning strategy training has been found effective to promote learning achievement from numerous studies, either in lab-controlled experiments (Lan, 1996; Schunk, 1996; Zimmerman & Kitsantas, 1996) or comprehensive field interventions (e.g., Butler, 1998; Graham et al., 1998; Weinstein et al., 2000). Thus, it was predicted that students in the self-regulated learning strategy training condition would achieve significantly higher average course percentage score and average scores for each of the major course activities than students in the non-training condition.

**Question 2.** Will self-regulated learning strategy training in a web-based environment influence learner motivation (in terms of task value, self-efficacy goal orientation and self-satisfaction)?

**Hypothesis 2.** There will be a significant difference in learner motivation (in terms of task value, self-efficacy goal orientation and self-satisfaction) between students in the self-regulated learning strategy training condition and those in the non-training condition. Students are expected to have more positive motivation, defined as higher task value, self-efficacy, self-satisfaction and intrinsic goal orientation, and lower extrinsic goal orientation, with the training than the non-training condition at the end of study.

**Hypothesis 3.** There will be a significant difference in learner motivation (in terms of task value, self-efficacy and goal orientation) for students in the self-regulated learning strategy training condition before VS after the treatment. Students in the self-regulated learning strategy training condition are expected to have more positive motivation, defined as higher task value, self-efficacy, self-satisfaction and intrinsic goal orientation, and lower extrinsic goal orientation, at the end than the beginning of study.

**Hypothesis 4.** There will be no significant difference in learner motivation (in terms of task value, self-efficacy, goal orientation, self-satisfaction) before VS after the treatment for students in the non-training condition. It was expected that the control students would have no difference in their motivation, in terms of self-efficacy, task value, self-satisfaction, intrinsic and extrinsic goal orientation, at the end than the beginning of the study.

Previous review of the literature showed that providing comprehensive training on self-regulated learning strategies to students can bring about more positive motivation in terms of
attribution (Butler, 1998), self-efficacy (Ching, 2002; Graham et al., 1998; Hofer et al., 1998; Weinstein et al., 2000), and interest and mastery goal (Hofer et al., 1998). In addition, students’ engagement in self-regulated learning behaviors also seems to bring about self-satisfaction (Zimmerman & Kitsantas, 1999). It was found, from Zimmerman & Kitsantas’ (1999) study on combining a series of kernel sentences into a single nonredundant sentence, that girls who self-recorded (a form of self-monitoring) reported higher degree of satisfaction than those who did not self-record. Therefore, it is reasonable to assume that students’ scores for task value, self-efficacy intrinsic goal and self-satisfaction would be higher, and their scores for extrinsic goal would be lower if/after they participate in the web-based training and self-reflective practice on self-regulated learning strategies of this study.

Since motivational learner characteristics, such as goal orientation, self-efficacy, and interest and valuing, might further influence the future use of self-regulated learning strategies. Some of these characteristics, such as self-efficacy and goal orientation, might even affect persistence. Improving learner motivation, through the use of the web-based training and self-reflective practice on self-regulated learning strategies of this study, makes it possible for promoting students’ future use of learning strategies, and may ultimately lead to a decrease in drop out rate at community colleges.

Question 3. Will self-regulated learning strategy training in a web-based environment influence students’ use of strategies?

Hypothesis 5. There will be a significant difference in learner self-reported use of strategies between students in the self-regulated learning strategy training condition and those in the non-training condition. Students are expected to have higher scores on self-reported use of strategies with the training than the non-training condition at the end of study.

Hypothesis 6. There will be a significant difference in learner self-reported use of strategies for students in the self-regulated learning strategy training condition before VS after the treatment. Students in the self-regulated learning strategy training condition are expected to have higher scores on self-reported use of strategies at the end VS the beginning of study.

Hypothesis 7. There will be no significant difference in learners’ self-reported use of strategies before and after the treatment for students in the non-strategy-training condition. Students in the non training condition are expected to have no significant difference in scores on reported use of strategies at the end than the beginning of the study.
Deficiency in learning strategies has been identified as another major cause for the high incompletion rates in community college education. From the previous sections of literature review, it has been discovered that providing comprehensive training on self-regulated learning strategies to students can lead to more strategy use (Butler, 1998; Hofer et al., 1998; Weinstein et al., 2000), and even a better retention rate (Weinstein et al., 2000). Therefore, it was predicted that students’ average scores for self-reported use of strategies would be significantly higher if/after they participate in the web-based training on self-regulated learning strategies and online self-reflective practice, which was designed and developed especially for the current study. This study intended to improve learners’ strategy use by engaging them in learning and implementing self-regulated learning strategies through the training and self-reflective practice. The potential enhancement in learners’ strategy use might lead to more active participation and increase in completion rate.
CHAPTER III

METHOD

Research Design

This study was conducted to examine the effect of self-regulated learning strategy training on learners’ achievement, motivation and strategy use. This study adopted a quasi-experimental design with self-regulated learning strategy training (present vs. absent), a manipulated, active variable, as the independent variable, and the researcher assigned intact groups of participants to the experimental and control conditions at the beginning of the intervention. The two conditions in this experiment were: 1) presence of self-regulated learning strategy training (ST), and 2) absence of self-regulated learning strategy training (NST). Dependent variables include achievement, motivation in terms of task value, self-efficacy, goal orientation, self-satisfaction, and learners’ reported use of strategies. This design may be depicted in standard notation where O1 refers to the pretest used prior to treatment to make sure the participants in both experimental and control groups were comparable; O2 refers to post-test measurements, including performance, motivation, and reported use of strategies; NR stands for non-random assignment and X represents experiment. Table 3.1 below illustrates the design of this study. The study was conducted in the fall semester of 2005 from the second week to the fifteenth week. To assure comparability between the groups, the researcher located two classes with the same instructor and instructional content.

Table 3.1: Design of Study

<table>
<thead>
<tr>
<th>NR</th>
<th>O1</th>
<th>X</th>
<th>O2</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR</td>
<td>O1</td>
<td></td>
<td>O2</td>
</tr>
</tbody>
</table>

Variables

*Independent Variable*

This study had one independent variable: a web-based training that teaches self-regulated learning strategies.
This independent variable had two levels: presence or absence of the self-regulated learning strategies training. In the self-regulated learning strategies training condition, participants received a web-based tutorial on self-regulated learning strategies and used online forms to practice the strategies for their learning of the actual academic content. In the non-self-regulated learning strategies training condition, students were assessed only on the relevant dependent variables at the beginning and end of the experiment without receiving the above-mentioned treatment.

**Dependent Variables**

This study had three dependent variables: learning achievement, motivation in terms of task value, self-efficacy, goal orientation and self-satisfaction, and learners’ reported use of strategies.

In this study learning achievement was defined as 1) course performance percentage scores: a percentage of the 100 points that each individual student actually earned for performance on all the learning activities (e.g., in-class assignments, homework, and quizzes, 4 in-class tests, self-regulation modules, interview/research paper, group presentation, final exam), and 2) scores for each of the major individual learning activities: points that each individual student actually earned for performance on each of the major learning activities (e.g., 4 in-class tests, interview/research paper, group presentation, final exam). These scores were obtained from the course instructor at the end of the course.

Motivation was defined in terms of four aspects. First, self-efficacy was defined as learners’ personal beliefs about their capabilities to learn or perform skills for completing the course. This was measured using an instrument, the Measurement of Motivation for Learning Questionnaire (MMLQ), adapted by the researcher based on the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991). Sample items read “I’m certain that I can understand the most complex material presented by the instructor in this course,” “I believe I will receive an excellent grade in this course.” For each item, students were asked to rate themselves on a five-point Likert-type scale from “not at all true of me” to “very true of me.” This instrument was accessed by the participants via the World Wide Web at the beginning and end of the study.

The second aspect of motivation, learner self-satisfaction refers to students’ feelings about the fulfillment of their learning goals and enjoyment from taking the course. Learner self-
satisfaction with the course was measured by a questionnaire, Self-Satisfaction Scale (SSS), administered to the students during the last week of the study. This instrument consisted of 4 items, and sample items read “I am feeling pleased with my progress or success in the course”, “I think that I have achieved all the course objectives up to now”, and “I have really enjoyed the course.” For each item, students were asked to rate themselves on a five-point Likert-type scale from “not at all true of me” to “very true of me.” This instrument was accessed by the participants via the World Wide Web.

Third, task value refers to students’ perceptions of a particular course in terms of interest, importance and utility. This is a combination of the traditional definition for both interest (Hidi, 1990; Schiefele, 1991 as cited in Hofer et al., 1998) and task value (Garcia & Pintrich, 1994 as cited in Hofer et al., 1998). In this study, task value was measured using an instrument, the Measurement of Motivation for Learning Questionnaire (MMLQ), adapted by the researcher based on the task value subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991) at the beginning and end of the experiment. Sample items include “It is important for me to learn the course material in this class,” and “I am very interested in the content area of this course”. For each item, students were asked to rate themselves on a five-point Likert-type scale from “not at all true of me” to “very true of me.” This instrument was accessed by the participants via the World Wide Web.

In this study, goal orientation refers to a distinction of students’ tendency between mastery or learning goals, and performance or extrinsic goals (Hofer et al., 1998). Mastery goals refer to students’ concentration on learning, comprehending the material and self-improvement. On the other hand, a performance orientation focuses on grades, approval from others, rewards, or winning.

This variable was measured using an 8-item instrument in the Measurement of Motivation for Learning Questionnaire (MMLQ), which was adapted by the researcher based on the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991). Sample items read “In a class like this, I prefer course material that really challenges me so I can learn new things”, “Getting a good grade in this class is the most satisfying thing for me right now.” For each item, students were asked to rate themselves on a five-point Likert-type scale from “not at all true of me” to “very true of me.” This instrument was accessed by the participants via the
World Wide Web. Four of the items assessed students’ learning goal orientation and the other four measured students’ performance goal orientation.

The dependent variable of students’ reported use of learning strategies refers to the learning strategies that participants reported employing while going through the instructional units in the course. Three sub-scales in the learning strategies section of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991), which measure students’ use of metacognitive, cognitive and resource management strategies were adapted and used in this study. This 48-item instrument was named Self-Regulated Learning Strategies Questionnaire (SRLSQ), and accessed by the participants via the World Wide Web at the beginning and end of the study.

Participants

The participants in this study were undergraduate students enrolled in 2 sections of a College Success course with the same instructor at a community college in Southeast U. S. Originally, 55 students registered for these 2 sections of the course, and were supposed to participate in the study. However, many of the participants dropped out of the experiment during the process of the study (the actual mortality rate was 68%). Only students who continued until the end of the experiment were included as actual participants for the study.

The final participants in this study were 21 (8 experimental vs. 13 control) undergraduate students, mainly consisting of freshmen (N=18) and sophomore (N=3) students, whose ages range from 17 to 24 (M= 18.9). These participants had a gender composition of 15 females and 6 males, and an ethnic makeup of 7 African-American or Black, 13 Caucasian, 1 Hispanic or Spanish-speaking. Five (62.5%) participants in the experimental condition and seven (53.8%) participants in the control condition were required to take this College Success course according to their scores on the College Placement Test.

Due to the web-assisted nature of the course, the human subject informed consent form for this study was administered in a special way. A letter that offered students an opportunity to participate in the study, together with the informed consent form, was sent to each student by email. Students were provided with a detailed explanation about the purpose of the study and were notified that information obtained during the course of the study would remain confidential, to the extent allowed by law. A web link to the online elements (the intervention and instruments in this study) was included in the same email. Students’ completion of the online questionnaires...
was considered their consent to participate. Only students who completed all the steps of the intervention and all the online questionnaires constituted the research participants in this study.

Validity Threats

This study’s validity was potentially threatened by two issues. First is the small sample size of the study (N = 8 for experimental group, N = 13 for control group). Although data were analyzed with the recommended nonparametric statistical procedures (the Wilcoxon-Mann-Whitney Test and the Wilcoxon Signed Rank Test), this can still be considered as a threat to external validity. Second, the mortality threat affected the study. Because this study required participants to be involved with the treatment intensely for a long period of time (14 weeks), it was very likely for individuals to drop out of the experiment during the process for lack of interest or time.

Measures seeking to alleviate validity threats to the study included ensuring equivalence of instructional content (by selecting two College Success classes taught by the same instructor using one same syllabus and textbook), including the treatment as instructional activities to the course, and offering course credit to participants.

Comparison of Students within the Experimental Condition

Within the experimental condition, 8 students completed and 19 students left the study during the process. Prior to formal implementation of the treatment, all 27 experimental participants completed the Measurement of Motivation for Learning Questionnaire (MMLQ), the Self-Regulated Learning Strategies Questionnaire (SRLSQ) and open-ended questions as a pretest to measure students’ previous level of motivation and experience with learning strategies. An examination of the self-reported pre-intervention data, using a Wilcoxon-Mann-Whitney Test, found that there were no significant difference between the dropouts and the completers on demographic information (age, credit hours attempted in fall 05); motivation in terms of task value, self-efficacy, and intrinsic and extrinsic goal orientations; and 10 of the 11 indicators for use of strategies. However, a significant difference was detected on use of help-seeking strategies (U= 35.50, p<.05, r= .42) between the dropouts and the completers. Table 3.2 below, summarizes the comparison between the dropouts and completers within the experimental group on reported pre-intervention data.
Table 3.2: Comparison between dropouts vs. completer within the Experimental group on pre-intervention data

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Exact Sig. [2*(1-tailed Sig.)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit hours attempted in fall 2005</td>
<td>73.500</td>
<td>109.500</td>
<td>-.140</td>
<td>.888</td>
<td>.897</td>
</tr>
<tr>
<td>Age</td>
<td>69.500</td>
<td>259.500</td>
<td>-.373</td>
<td>.709</td>
<td>.735</td>
</tr>
<tr>
<td>Cognitive before</td>
<td>56.500</td>
<td>92.500</td>
<td>-1.040</td>
<td>.298</td>
<td>.307</td>
</tr>
<tr>
<td>REH_1</td>
<td>48.500</td>
<td>84.500</td>
<td>-1.470</td>
<td>.142</td>
<td>.147</td>
</tr>
<tr>
<td>ORG_1</td>
<td>56.500</td>
<td>92.500</td>
<td>-1.041</td>
<td>.298</td>
<td>.307</td>
</tr>
<tr>
<td>ELA_1</td>
<td>63.000</td>
<td>99.000</td>
<td>-.696</td>
<td>.487</td>
<td>.515</td>
</tr>
<tr>
<td>Metacognitive before</td>
<td>45.500</td>
<td>81.500</td>
<td>-1.622</td>
<td>.105</td>
<td>.106</td>
</tr>
<tr>
<td>Resource Mgt before</td>
<td>71.000</td>
<td>261.000</td>
<td>-.266</td>
<td>.790</td>
<td>.815</td>
</tr>
<tr>
<td>EFF_1</td>
<td>74.000</td>
<td>264.000</td>
<td>-.107</td>
<td>.915</td>
<td>.938</td>
</tr>
<tr>
<td>PEER_1</td>
<td>74.000</td>
<td>264.000</td>
<td>-.107</td>
<td>.915</td>
<td>.938</td>
</tr>
<tr>
<td>T_E_1</td>
<td>68.500</td>
<td>104.500</td>
<td>-.399</td>
<td>.690</td>
<td>.696</td>
</tr>
<tr>
<td>HELP_1</td>
<td><strong>35.500</strong></td>
<td><strong>225.500</strong></td>
<td><strong>-2.191</strong></td>
<td><strong>.028</strong></td>
<td><strong>.029</strong></td>
</tr>
<tr>
<td>Total Strategy before</td>
<td>55.500</td>
<td>91.500</td>
<td>-1.089</td>
<td>.276</td>
<td>.283</td>
</tr>
<tr>
<td>Task value before</td>
<td>72.000</td>
<td>262.000</td>
<td>-.214</td>
<td>.830</td>
<td>.856</td>
</tr>
<tr>
<td>Self-Efficacy before</td>
<td>73.500</td>
<td>263.500</td>
<td>-.134</td>
<td>.893</td>
<td>.897</td>
</tr>
<tr>
<td>Intrinsic G before</td>
<td>67.500</td>
<td>257.500</td>
<td>-.455</td>
<td>.649</td>
<td>.658</td>
</tr>
<tr>
<td>Extrinsic G before</td>
<td>52.500</td>
<td>242.500</td>
<td>-1.259</td>
<td>.208</td>
<td>.217</td>
</tr>
</tbody>
</table>

a  Not corrected for ties.

b  Grouping Variable: Group

Within the 19 dropouts, 3 withdrew from the course, 4 failed the course, 2 received a D, 2 received a C, 6 received a B, and 2 received an A for the course. This is very different from the completers’ group where all students received an A for the course. Within the 8 completers, each of them completed all of the course assignments; while within the 19 dropouts 8 students did not complete 1 to 7 assignments or tests. Even though no significant difference was found between the dropouts and completers from the MMLQ measures on students’ motivation, it is more likely for dropouts to withdraw from the course or to leave assignments incomplete. There might have
been a connection between a student’s general tendency to persevere, which was not detected with the MMLQ, and staying with the study. Table 3.3 below presents the comparison between the dropouts and completers within the experimental group on achievement measures.

Table 3.3: Comparison between dropouts vs. completer within the Experimental group on achievement data

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Exact Sig. [2*(1-tailed Sig.)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall score</td>
<td>5.000</td>
<td>141.000</td>
<td>-3.619</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Term GPA for fall 2005</td>
<td>34.000</td>
<td>224.000</td>
<td>-2.236</td>
<td>.025</td>
<td>.025</td>
</tr>
<tr>
<td>GPA(Sp)</td>
<td>35.000</td>
<td>171.000</td>
<td>-1.802</td>
<td>.072</td>
<td>.081</td>
</tr>
<tr>
<td>Test 1 score</td>
<td>34.500</td>
<td>224.500</td>
<td>-2.205</td>
<td>.027</td>
<td>.025</td>
</tr>
<tr>
<td>Test 2 score</td>
<td>27.000</td>
<td>217.000</td>
<td>-2.614</td>
<td>.009</td>
<td>.008</td>
</tr>
<tr>
<td>Test 3 score</td>
<td>4.000</td>
<td>194.000</td>
<td>-3.847</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Test 4 score</td>
<td>14.000</td>
<td>204.000</td>
<td>-3.326</td>
<td>.001</td>
<td>.000</td>
</tr>
<tr>
<td>Project score</td>
<td>30.000</td>
<td>220.000</td>
<td>-2.482</td>
<td>.013</td>
<td>.013</td>
</tr>
<tr>
<td>Paper score</td>
<td>20.000</td>
<td>210.000</td>
<td>-3.007</td>
<td>.003</td>
<td>.002</td>
</tr>
<tr>
<td>Final exam score</td>
<td>13.000</td>
<td>203.000</td>
<td>-3.378</td>
<td>.001</td>
<td>.000</td>
</tr>
</tbody>
</table>

a  Not corrected for ties.
b  Grouping Variable: Group

When Did the Dropouts Happen?

The dropouts within the Experimental condition happened gradually at various stages of the study. From Table 3.4 below, it is found that the Tutorial Test (N=14), 2nd Self-Evaluation (N=16), and the Final Survey (N=14) had the least participants. Some students might have completed the later steps in the study even though they missed the former ones, but only students who completed every step were counted toward the participants. It takes more time and effort to complete the Tutorial Test than the Tutorial Exercise or even the Pre-Survey, and the word “Test” might have sounded intimidating to students. This could be why there was a drastic decrease in the number of participants during the Tutorial Test step. When the 2nd cycle of the Study Plan and Self-Evaluation was implemented, the students had already gone through the 1st cycle and knew all the questions and knew how much time and effort it might take to complete the questionnaires already. They might have less interest in this or did not want to spend the time and effort on doing this again, even though it was applied to different tasks. Future studies need
to look at the design of the Tutorial Test and the 2nd cycle of the Study Plan and Self-Evaluation to make them less time- and effort-consuming for the students.

Table 3.4: Number of Experimental participants in various stages

<table>
<thead>
<tr>
<th>Number of Experimental Participants</th>
<th>Pre-Survey</th>
<th>Tutorial Exercise</th>
<th>Tutorial Test</th>
<th>1st Study Plan</th>
<th>1st Self-Evaluation</th>
<th>2nd Study Plan</th>
<th>2nd Self-Evaluation</th>
<th>Final Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
<td>20</td>
<td>14</td>
<td>22</td>
<td>20</td>
<td>18</td>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>

Web-Assisted Course Delivery System

Course Content

This course, SLS 1501 College Success, was designed to develop and reinforce skills necessary for college and career success. It covers topics such as motivation, goal setting, learning styles, time management techniques, testing skills, reading textbooks, and memory skills, wellness, interpersonal relationships, employability skills, financial management, choosing a college major and other career planning topics. This course was designated as web-assisted, which means at least materials, such as the syllabus and course schedule, were posted to the course’s Blackboard website and the instructor and students could use the course website for communication purposes.

Course Approach or Methodology

The classes met twice a week with 75 minutes for each session, and this course was categorized as a 3- semester-hour elective credit. However, some of the students (N= 12) were required to take the course because they failed to meet the college’s requirements for regular admission. This course used a book with the title of The Confident Student as the major text for instruction, and the online intervention materials on Self-Regulated Learning were used as a supplement to the course. The course was taught using many methods, including class discussions, lectures, required readings and assignments, student presentations, videos and guest lectures.

The instructor of the course was committed to creating a learning environment which promotes and fosters higher order thinking skills and supports student interaction and participation. She offered many sessions for office hours and gave specific contact information for students to reach her if they met any difficulty outside the class. She was interested in getting
to know students and helping students to be successful. She strived to provide a safe, equitable, accepting environment in which she could facilitate the development of characteristics and skills that promote success in college. She encouraged students to actively seek to develop or enhance those characteristics and skills.

_Evaluation of Learning_

In this course, students were required to complete the following tasks, outlined below.

**Class Participation and Homework Assignments**

Students were expected to participate in class discussions and contribute actively to group exercises and projects. Homework assignments were given throughout the semester to aid the understanding of material presented in the textbook and in the classroom.

**Quizzes**

Quizzes were given throughout the semester. These were short and primarily to assess students’ knowledge and understanding of the assigned reading.

**Tests**

There were four tests during the semester in addition to the final exam. The format included but was not limited to fill-in-the-blank, matching, multiple-choice, true/false, and short answer test items.

**“Please Understand Me” – Personality Test**

This exercise gave the student insight into what personality type he/she has. The Myers Briggs Assessment test was used.

**Self-Regulation Modules**

Students completed 5 online modules on self-regulated learning, which was the intervention material used as a supplement to the instruction.

**Career Exploration Paper**

Each student was required to write a paper about a career or field of interest, interview someone who worked in an occupation of interest and research the field using several sources.

**Group Presentation**

Students were assigned to groups. Each group gave an interactive presentation on a topic from the text or an application of a topic to a specific discipline. The highlights of the group’s findings were addressed during this presentation. Students were encouraged to use visual aids to
enhance the presentation’s effectiveness, and each group was required to have a handout for their classmates with the major points to be discussed.

*Final Exam*

The final exam was comprehensive. All material covered in class and in the text was included. The format included fill-in-the-blank, matching, multiple-choice, true/false, and short answer items.

Students received a final course grade ranging from A to F, based on their cumulative percentage scores for all the requirements. The following Table 3.2 contains a specific grading scale for the course.

**Table 3.2: Grading Scale for SLS 1501 College Success**

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>In class assignments, homework, and quizzes</td>
<td>20</td>
</tr>
<tr>
<td>4 In-class tests</td>
<td>25</td>
</tr>
<tr>
<td>Self-Regulation Modules</td>
<td>10</td>
</tr>
<tr>
<td>Interview/Research paper</td>
<td>10</td>
</tr>
<tr>
<td>Group Presentation</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td>Total Percentage Points</td>
<td>100</td>
</tr>
</tbody>
</table>

*Intervention*

This self-regulated learning strategy training included two sections: a web-based tutorial on self-regulated learning and a strategy application practice using sets of online forms/questionnaires.

*Design and Development Rationale*

This section contains a summery of the instructional strategies, which were derived from instructional design principles in the literature to facilitate the development of SRL. These served as the rationale for the design of the web-based SRL strategies training, which was used in this study.

*Principle 1: Promote Learners’ Metacognitive Awareness of Their Behavior, Motivation, and Cognition*

First, metacognitive awareness is the prerequisite for learners to be able to learn from and utilize the self-regulated learning strategies that interventions are intended to teach. Pintrich
(1995) suggests that for students to become self-regulated learners, it is necessary that they become more aware of their behavior, motivation, and cognition by contemplating on these aspects of their learning. Self-reflection is a fairly hard task for most individuals. Hattie, Biggs, & Purdie (1996) also recommended based on the results of a meta-analysis that training for complex learning strategies should promote a high degree of learner activity and metacognitive awareness. The researchers (Hattie et al., 1996) suggest that students need to know not only what those strategies are, but also the conditional knowledge, the how, when, where, and why of their use, which enables the student to make use of the strategies effectively. It is impossible for learners to observe their own behaviors, detect flaws and modify their learning strategies if they do not have a keen perception of their own motivation and cognition.

It is suggested (Pintrich, 1995) that standardized assessment instruments, such as the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1991) or the Learning and Study Strategies Inventory (Weinstein et al., 1987), can be used to provide students with an overview of their motivational beliefs and learning strategies.

**Principle 2: Provide Strategy Training Using the Methods of Modeling or self-Constructions/Explanations.**

Second, strategy teaching is regarded (Schunk & Zimmerman, 1998) as a major means of promoting self-regulated learning. Only when students have knowledge of a systematic approach for academic study are they able to apply it independently.

Modeling and self-constructions/explanations are the two major methods used to teach self-regulated learning strategies. Social models represent an important channel for conveying skills and strategies (Bandura, 1986; Rosenthal & Zimmerman, 1978; Schunk, 1987 as cited in Schunk & Zimmerman, 1998), and models are commonly utilized in strategy instruction (Kitsantas, Zimmerman, & Cleary, 2000; Orange, 1999). In addition to strategic skill, models transmit related self-regulatory processes, including performance standards, motivation and values (Zimmerman, 2000). In spite of the value of this vicarious information, most learners also need to perform the strategies in person to integrate them into their behavioral repertoires (Zimmerman, 2000). On the other hand, strategy instruction can be less formally formulated, such as in self-construction or self-explanation, so that students play a more important role in mastering strategies while the teacher’s responsibility is to provide support and assistance as needed.
Moreover, Pintrich (1995) proposes that faculty can model self-regulated learning. By modeling their contemplation about subject content knowledge, their strategies for learning, and how they think and reason, faculty can help students become alert to what is entailed in courses and help them become more self-regulated in learning (Pintrich, 1995).

**Principle 3: Provide Ample Opportunities for Learners to Practice Self-Regulated Learning Strategies and Feedback about Strategy Effectiveness.**

Third, two crucial elements are practice of self-regulatory strategies and feedback on strategy effectiveness. These mechanisms facilitate learning and motivation by communicating learning progress, and they also enhance strategy transfer and maintenance (Schunk & Zimmerman, 1998).

Pintrich (1995) pointed out the need for students to practice self-regulatory learning strategies. He commented that developing into a self-regulating learner cannot be accomplished in a short period of time. Students need time and opportunity to cultivate their self-regulatory strategies. Classroom tasks can be adapted as opportunities for student self-regulation. Other tasks that college students deal with should also be arranged to provide them with opportunities for self-regulation.

Ertmer & Newby (1996) echoes this notion by claiming it is not sufficient to simply inform students what expert learners know or even to display the actions that expert learners take because a great deal of what they know and do is not observable nor easily available to the student. Even if a student completely understands the expert learning process declaratively, extensive practice is still needed for him to implement it automatically and effectively. Therefore, extensive long-term practice and feedback are considered vital for the development of expert learning (Ertmer & Newby, 1996).

**Principle 4: Incorporate Motivational Processes, Especially Positive Beliefs, into Instruction.**

Fourth, motivation plays an important role in developing self-regulated learning. To participate in self-regulation requires that students have the motivation or willingness to learn over extensive periods (Schunk & Zimmerman, 1998). Motivation is essential because it plays a mediating role to the effect of self-regulated learning strategies.

It is necessary for students to have positive motivational beliefs (Pintrich, 1995). Having a mastery orientation and focus on learning and understanding the material is much more facilitative for self-regulated learning. Another motivational belief that promotes self-regulated
learning is positive self-efficacy for learning. Self-efficacy beliefs should be neither excessively pessimistic nor overly optimistic. Students should have a reasonably accurate and positive idea that they can learn and master course material (Pintrich, 1995).


Finally, across interventions there is an emphasis on self-reflective practice, which refers to students’ practice of skills and reflection on their performance. Self-reflective practice often is built into the instructional procedure with independent practice or time for self-reflection (Schunk & Zimmerman, 1998).

Schunk & Zimmerman (1998) pointed out that self-reflective practice offers students opportunities to review their learning process and the effectiveness of strategies, modify their approach as needed, and make alterations to environmental and social factors to set up a conducive setting to learning. Graham et al. (1998) also commented that without mindfulness, individuals are less likely to be aware of when to utilize available strategies and the necessary attentive control to overcome well-established habits, even when those habits need improvement. In the SRSD model, self-reflection and mindfulness is activated during instruction because many of the children the researchers (Graham et al., 1998) worked with, especially those having difficulty with writing and learning, are not very mindful when studying independently.

Format of Self-Regulated Learning Strategy Training

Hofer (1998) suggested that for Self-Regulated Learning Strategy training, *multistrategy programs* that teach a range of cognitive, metacognitive, and motivational strategies for students to have both the “skill” and the “will” to use the strategies properly, might be more useful (p. 60). Hattie (1996) also recommended based on the results from a meta-analysis that training for complex strategies should be in context and use tasks within the same domain as the target content. Therefore, the self-regulated learning strategy training in this study was designed to teach a variety of cognitive, metacognitive, and motivational strategies, which were particularly relevant to the context of web-assisted College Success course.

According to Hofer et al. (1998), the *timeframe of an intervention* affects the scope and content of a program. She suggests that a program of a few weeks or a short-term experiment cannot possibly teach the array of cognitive, metacognitive, or motivational strategies for self-regulated learning. Therefore, the researchers believe that a semester-long course can be
facilitative in developing self-regulated learning at the college level (Hofer et al., 1998, p. 60-61).

There are two kinds of intervention programs for training of self-regulated learning strategies (Hofer et al., 1998). *Adjunct interventions* present learning strategy instruction as an individual course separate from disciplinary content at the college level. *Integrated programs* embed strategy instruction in disciplinary courses, and convey to students that general cognitive and self-regulatory strategies can be helpful in many situations other than a study skills course (Hofer et al., 1998).

According to Hofer et al. (1998)’s experience, college faculty’s lack of knowledge about self-regulated learning, their insufficiency of skills in teaching it, the overall departmental curriculum and expectations, and the restricted amount of class time they have with their students (an average of about 3-4 hours per week per course in the United States) made it more problematical to employ integrated programs at the college level. As a result, the researchers (Hofer et al., 1998) used an adjunct course format in their own studies. They (Hofer et al., 1998) concluded from their studies that adjunct courses could improve the likelihood of transfer by persuading students to be metacognitive and reflective about their strategy use in not only the study skill course, but also other disciplinary courses.

Similarly, Osman & Hannafin (1992) discusses detached content-independent strategies (DCIS), which are generic strategies taught independently, without relationship to particular lesson content. DCIS methods focus on diverse contexts and lesson content for applying strategies during training, and support skills that are applicable to various academic subjects and learning tasks. The major purpose of DCIS approaches is to assist students to become independent learners gradually (Osman & Hannafin, 1992). This suits very well for the purpose of the self-regulated learning strategy training in this study, and is the reason why an adjunct strategy course or DCIS was selected to serve the context of the web-assisted College Success course.

Some of the implications for designing DCIS instructions (Osman & Hannafin, 1992) include: 1) ensuring that metacognitive strategies do not demand too much cognitive resources; 2) using more explicit and more implicit strategies for younger versus older learners differently and use higher-order strategies for more mature learners and those with relevant prior knowledge; 3) detaching metacognitive training and using various lesson content when far
transfer is desired; 4) stressing not only knowledge about strategies, but also methods for maintaining and transferring strategies.

Ley and Young (2001) suggested principles for embedding support in instruction to promote regulation in less expert learners. These principles were considered suitable for supporting self-regulation regardless of content, media, or a specific population, and they could be utilized systematically in diverse settings including print-based, instructor-led instruction, and synchronous or asynchronous Web-based instruction. These four principles (Ley & Young, 2001) are based on research on self-regulation components, and can be adapted for adjunct self-regulated learning strategy training: 1) directing learners to arrange an effective learning environment; 2) teaching learners to organize instruction and activities to support cognitive and metacognitive processes; 3) guiding learners to use instructional goals and feedback as opportunities for monitoring; 4) educating learners to seek opportunities for continuous evaluation and chances to self-evaluate.

Summary

In a learner-centered environment, such as web-assisted instruction, learners do not automatically possess the metacognitive skills required to make independent judgments and selections about how to learn (Brown, Hedberg, & Harper, 1994). However, Hofer (1998)’s work suggests that an intervention that targets a range of cognitive and motivational components can benefit college students who need help with metacognitive skills. In addition, Hofer claims that there is a need for adjunct interventions that stress general strategies for at least some college students and a need for research on how to design adjunct courses regarding the tasks and instructional strategies.

Based on the review of instructional design principles in this section, the self-regulated strategy training in this study was made up of two components: 1) an adjunct web-based online tutorial and 2) self-reflective practice using online forms/questionnaires. Motivational issues were addressed throughout the whole intervention, during pre-intervention assessment, web-based tutorial, and self-reflective practice. Learners were assessed on their existing motivational beliefs and self-regulatory approaches, and the tutorial was adapted to facilitate students’ revision of problematic self-regulated learning process. The intervention was a semester-long multistrategy program that teaches a range of cognitive, metacognitive, and motivational strategies for students to have both the “skill” and the “will” to use the strategies properly. The
training tried to utilize the methods of modeling and self-explanation, and to contain ample opportunity for exercise and feedback. Every step of the intervention served the purpose for promoting learners’ metacognitive awareness. Table 3.6 outlines the systematic design of instruction for the web-based intervention on SRL.

Table 3.6: Instructional design of the web-based training on SRL

<table>
<thead>
<tr>
<th>Instructional Events (Gagne, Briggs, &amp; Wager, 1992)</th>
<th>Online Instructional Components</th>
<th>Motivational Components (A=Attention, R= Relevance, C= Confidence, S= Satisfaction) (Keller, 1987)</th>
<th>Instructional Design Principles for Developing SRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Attract attention</td>
<td>Text, graphics, multimedia (video &amp; Flash) illustrations</td>
<td>• Graphics &amp; multimedia illustrations (A) • Prior questions in tutorial (R) • Pintable job aids (R&amp;C)</td>
<td>• Promote metacognitive awareness • Self-explanation</td>
</tr>
<tr>
<td>• Inform objectives</td>
<td>Video illustrations (Links) • Text description</td>
<td>• Video with real student examples (A, R&amp;C)</td>
<td>• Modeling • Self-explanation</td>
</tr>
<tr>
<td>• Illicit prior knowledge</td>
<td>• Interactive case study, with automatically-generated feedback, on knowledge of strategies • Online Study Plan &amp; Self-Evaluation as practice for use of strategies in completing assignments</td>
<td>• Interactive functions of the web tutorial with real-world cases (A, R, C &amp; S) • Application of strategies using the online forms as a scaffold (A, R, C &amp; S)</td>
<td>• Self-explanation • Practice &amp; feedback re SRL strategies • Motivational processes</td>
</tr>
</tbody>
</table>
### Table 3.6 Continued

<table>
<thead>
<tr>
<th>Instructional Events (Gagne, Briggs, &amp; Wager, 1992)</th>
<th>Online Instructional Components</th>
<th>Motivational Components (A=Attention, R= Relevance, C= Confidence, S= Satisfaction) (Keller, 1987)</th>
<th>Instructional Design Principles for Developing SRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assessment of performance (verbal knowledge &amp; actual use of strategies)</td>
<td>• Test with real-world cases in tutorial&lt;br&gt;• Online open-ended questions &amp; questionnaires measuring independent use of strategies&lt;br&gt;• URLs to web pages as resources for further learning</td>
<td>• Interactive functions of the web-based test with real-world cases (A, R, C &amp; S)&lt;br&gt;• Application of strategies using the online open-ended questions (A, R, C &amp; S)&lt;br&gt;• Printable certificate for completion of tutorial (C &amp; S)</td>
<td>• Promote metacognitive awareness&lt;br&gt;• Self-Reflective Practice&lt;br&gt;• Motivational processes</td>
</tr>
<tr>
<td>• Enhancing Transfer of knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Self-Regulated Learning Tutorial**

The purpose of this web-based tutorial is to teach self-regulated learning strategies. The researcher followed the instructional design principles summarized in the previous section for the design and development of this web-based tutorial. It provided students with both the knowledge and practice of self-regulated learning strategies. Participants were encouraged to complete the web-based tutorial at least once. After that, the tutorial was available to the participants online for their reference at any time.

The content of this instruction focused on what self-regulated learning strategies are, more specifically, what metacognitive strategies are, what motivational strategies are, what cognitive strategies are, as well as examples of them. In addition to different types of self-regulated learning strategies, this tutorial also discussed when and how to use them. The following Table 3.4 outlines the strategies covered by this tutorial.

**Table 3.7: Strategies Taught in Web-Based Tutorial**

<table>
<thead>
<tr>
<th>Types of Strategy</th>
<th>Specific Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive strategies</td>
<td>Planning, Monitoring, Evaluating</td>
</tr>
<tr>
<td>Cognitive strategies</td>
<td>Rehearsal, Elaboration, Organization</td>
</tr>
<tr>
<td>Motivational strategies</td>
<td>Goal orientation, Self-efficacy, Attribution and Self-satisfaction</td>
</tr>
<tr>
<td>Resource-Management strategies</td>
<td>Time management, Help Seeking</td>
</tr>
</tbody>
</table>
In addition to the knowledge about self-regulated learning strategies, this tutorial also provided participants with opportunities to practice the knowledge they had just learned. Some interactive exercises, such as multiple choice or drag-and-drop (matching), were used by participants to become familiar with the knowledge about self-regulated learning. The researcher used participants’ responses to these exercise and test items to check their completion of this web-based tutorial instead of their actual performance on these items. Participants’ completion of the exercises and the Test were considered as a part of their participation score toward the course grade. Please see Appendix VIII for screen shots of this tutorial.

**Strategy Application Practice**

After they exercised on the knowledge about self-regulated learning, the learners were encouraged to actually apply the strategies to their studying of the academic content of the course. A number of online forms/questionnaires were developed by the researcher to implement this practice. The purpose of this practice was for learners to apply the strategic planning and self-evaluation strategies to specific learning tasks (such as an assignment or project) that they were going to undertake. The researcher mainly used radio buttons and text fields in the online forms/questionnaires to execute these functions, and they were sent to the participants as a link in emails. These online questionnaires were delivered as a set at the beginning (for strategic planning) and end (for self-evaluation) of each learning period of 4 weeks. A total of 2 sets of online questionnaires were used during the process of study for strategy practice. The following is a description of how the strategies were represented in the online forms/questionnaires for learners to apply them.

Goal setting is defined as students’ choice of desired standard for learning or performance. This was administered using open-ended questions. Students were asked “What are your goals (with respect to this class) for this semester?” and they were reminded to make sure their goals were in line with their general system of values. And, more specifically, students were asked to clarify their immediate objective by answering a question “What tasks are you planning to accomplish in the next two weeks to help you achieve your goals for this course?”

Strategic planning refers to students’ identification of strategies and allocation of resources for achieving their goals. Within this study, students were provided with example of strategies, and encouraged to formulate their own cognitive and motivational strategies for
studying. They were asked “What will you do to attain these goals (for the next two weeks)?” They were asked to provide a specific plan of action. Students were also asked to describe how they would allocate their resources. They were asked questions such as “When will you start working toward these goals? On what days? At what times? How often? How much time do you intend to spend on these tasks?”; “Where will you do these?”; “With whom will you do these?” and “What additional information/assistance will you need?” and so on.

Self-evaluation is the opportunity for students to analyze their performance and strategy effectiveness after a period of learning. In this study, it was implemented as an online questionnaire that allowed students to self-judge their performance and the progress that they had made for a particular study period of 4 weeks. Students were presented with their self-defined individual goals and asked questions “How well did your plan work during these past 2 weeks?” and “Did you complete the tasks you had planned during these past 2 weeks?” They were encouraged to give specific examples using a drop-down menu with choices of 1) Improved test scores 2) All homework turned in 3) Assignments completed on time 4) Readings completed 5) Notes taken for chapters assigned 6) Other, please explain. In addition, students’ strategy effectiveness was assessed using an open-ended question “What learning strategies worked well?” and their self-satisfaction was assessed using multiple choice questions, such as “You feel pleased with your progress in the course”, asking them to rate their feelings on a 5 point Likert-type scale, ranging from “Not at all true of me” to “Very true of me”. Please see Appendix VIII for screen shots of Strategy Practice.

Data Collection Instruments

Measuring of Motivation for Learning Questionnaire (MMLQ)

The MMLQ consisted of 22 items adapted from the relevant subscales of the MSLQ, and was used to measure participants’ level of motivation for taking the course. This questionnaire measured aspects such as task value, self-efficacy, and goal orientation for learning and performance. Participants rated on a five point Likert-type scale for each item ranging from A (Not at all true of me) to E (Very true of me), with B and D representing intermediate beliefs and C equaling Moderately true of me. Response for each item was assigned a point value between 1 and 5, and the points for all the items measuring the same variable were added up to make up a cumulative indicator for that variable. The average internal-consistency coefficient alpha of
reliability for motivational strategies of MSLQ was .80. For this study, the Cronbach’s alpha was .93 based on a pilot test in December 2003.

Self-Satisfaction Scale (SSS)

The SSS consisted of 4 items designed by the researcher, and measured aspects such as enjoyment from the course and fulfillment of goals. Participants rated on a five point Likert scale for each item ranging from A (Not at all true of me) to E (Very true of me), with B and D representing intermediate beliefs and C equaling Moderately true of me. Response for each item was assigned a point value between 1 and 5, and the points for all 4 items were added up to make up a cumulative indicator for the variable of self-satisfaction. For this study, the Cronbach’s alpha for self-satisfaction scale was .85 based on a pilot test in December 2003.

Self-Regulated Learning Strategies Questionnaire (SRLSQ)

The Self-Regulated Learning Strategies Questionnaire (SRLSQ) was adapted from three sub-scales in the learning strategies section of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991) to measure students’ reported use of metacognitive, cognitive and recourse management strategies.

The MSLQ originally included 81 items and was a self-report instrument designed to assess motivational orientations and use of learning strategies by college students. The SRLSQ is a modified version of “Part B. Learning Strategies” of the MSLQ. The modification of the questionnaire included changing the scale from a seven point Likert scale to a five point Likert scale, rewriting statements for the nature of courses, and eliminating several items that were not appropriate for the participants and the courses. For this study, the internal-consistency coefficient alpha of the SRLSQ was .91 and the Guttman Split-Half coefficient was .89 based on a pilot study in December 2003.

Participants rated on a five point Likert scale for each item ranging from A (Not at all true of me) to E (Very true of me), with B and D representing intermediate beliefs and C equaling Moderately true of me. Response for each item was assigned a point value between 1 and 5, and the points for all the items measuring the same variable were added up to make up a cumulative indicator for that variable. The following describes the measurement of each subcategory of strategies.

Metacognitive Strategies
There were 11 items used to measure learners’ use of metacognitive strategies. In this questionnaire, the metacognitive strategies included planning, monitoring, and regulating. An example of the items is: “When reading for the course, I make up questions to help focus my reading.” The internal-consistency coefficient alpha of reliability for metacognitive strategies of MSLQ was .79. For this study, the Cronbach’s alpha for metacognitive strategies was .71.

**Cognitive Strategies**

There were 19 items used to measure learners’ use of cognitive strategies. In this questionnaire, the cognitive strategies included rehearsal, elaboration, organization, and critical thinking strategies. An example of the items is: “When I study for this class, I practice saying the material to myself over and over.” The average internal-consistency coefficient alpha of reliability for cognitive strategies of MSLQ was .72. For this study, the Cronbach’s alpha for cognitive strategies was .87.

**Resource-Management Strategies**

There were 18 items used to measure learners’ use of resource-management strategies. In this questionnaire, the resource-management strategies included time and study environment management, effort regulation, help seeking and peer learning strategies. An example of the items includes: “When I study for this course, I often try to explain the material to a classmate or friend.” The average internal-consistency coefficient alpha of reliability for resource-management strategies of MSLQ was .68. For this study, the Cronbach’s alpha for resource-management strategies was .76.

**Open-Ended Questions**

Thirteen open-ended questions were used at the beginning and end of the study to collect additional qualitative evidence regarding students’ use of learning strategies. Some examples for these questions include: “What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?”; “What study strategies do you use that have helped you most to be successful in the past? How will your approaches to studying in this course change as the semester progress? Why?” and “How do you know when you understand something really well? What do you do if you don’t understand something? Or, what do you do when you are trying to understand a new topic?” These open-ended questions were accessed by the participants via the World Wide Web. Answers to these questions were entered verbatim.
into the Nvivo 7 program for qualitative data analysis to identify codes and themes, and to help explain the results from quantitative data analysis.

Additional Student Data

In addition to data obtained by the above-mentioned instruments, students’ demographic data (gender, age, GPA, year in school, weekly study hours, and weekly work-for-pay hours) and information about their current computer skills (e.g., emailing, using Internet, asynchronous and synchronous online discussion) were collected. Students’ GPA’s for the fall 2005 and spring 2006 semester, and credit hours attempted and completed for the fall 2005 and spring 2006 semester, were collected to assess for any differences between the students in persistence.

Pilot Testing/Formative Evaluation of the Intervention

A pilot test/formative evaluation of the intervention was conducted with 12 undergraduate volunteers in an Information Studies major online course in summer semester 2005 to determine the validity of the SRL strategy training intervention (including online tutorial and practice) and open-ended questions.

These volunteers had an average age of 24.58, an average GPA of 2.89, and an average registration for 9 credit hours. Six of these volunteers are seniors, 5 juniors and 1 sophomore. Eight of them are females and 4 males. Five of them are African-Americans, 1 Asian-American, 3 Caucasians, 2 Hispanics, and 1 from other ethnic background. Seven of these volunteers had never taken online courses before, 3 had taken 1, one had taken 2, and one had taken 4. Because the major purpose of the pilot study was to test the validity of experimental materials and procedures, and there were a limited number of (only 12) student volunteers, the researcher assigned all volunteers to the experimental condition at the beginning of the intervention.

During the pilot test, a high attrition rate of participants was identified. The study started with 12 and ended with 5 participants, and therefore, the researcher considered methods to prevent participants from dropping out, including using extra credit and making participation a course requirement for the full experiment. In addition, this pilot test or the high attrition rate from one course made the researcher aware that it is necessary to include another section of the same course to create an equivalent comparison condition. Analyzing data from the pilot study also provided the researcher with an opportunity to explore the nonparametric methods for data analysis in the full study.
The pilot study also gave participants an opportunity to report whether or not any of the materials were unclear. The respondents were also asked to provide any suggestions on how to improve the clarity and appropriateness of language, and clarity of directions. Based on the feedback from the participants the following changes were made to the materials: differentiating the open-ended questions for the pre- and post-test with tense and revising some of the unclear section directions in the online tutorial.

Test for Reliability of Survey Instruments

In order to determine the reliability of the survey instruments, Measurement of Motivation for Learning Questionnaire (MMLQ) and Self-Regulated Learning Strategies Questionnaire (SRLSQ) adapted from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991), another pilot study was completed in December 2003. The reliability of the survey instrument was determined by the calculation of the Cronbach’s alpha coefficient.

The sample of this pilot study consisted of 115 volunteer students in an information studies major online course. These students were given a link to the online survey instruments by their online instructors. Online instructors were contacted via email by the researcher and asked to participate in the study.

Of the 115 participants only one (.9%) was a graduate student, and one (.9%) was a sophomore. The majority of the students were juniors (44.3%) and seniors (53.9%). A larger portion of the participants (52.2%) were female. Only 17.4% of all participants were age 35 and above, with the rest of them ranged in age categories of 30-35 (23.5%), 20-30 (58.3%) and under 20 (.9%). Within all 115 participants, thirty three (28.7%) of them reported that their GPA’s were above 3.5, thirty one (27.0%) said their GPA’s were in the range of 3.0-3.5, forty one (35.7%) said their GPA’s were between 2.5 and 3.0 and only ten (8.7%) reported having GPA’s under 2.5.

Of the 115 participants 49.60% had enrolled in more than 5 online courses before the fall 2003 semester; 20.90% had enrolled in 3-5 online courses before; 19.10% had enrolled in 1-3 online courses before, and 10.40% were enrolled in an online course for the first time.

Reliability refers to the degree of consistency between the scores obtained on a survey instrument and what each section of an instrument is supposed to measure. (Fraenkel & Wallen, 2003). This coefficient is supposed to range between .00 and 1.00, with estimates of .00
indicating an absence of reliability and scores approaching 1.00 indicating the greatest reliability. According to (Fraenkel & Wallen, 2003), the reliability of an instrument should be .70 or higher for research purposes. In this pilot study, Cronbach’s alpha coefficients were calculated for each section of the survey instruments. Reliability estimates are shown in Table 3.5.

Table 3.8: Cronbach’s Alpha Coefficients for Survey Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMLQ</td>
<td>.93</td>
</tr>
<tr>
<td>SSS</td>
<td>.85</td>
</tr>
<tr>
<td>SRLSQ</td>
<td>.91</td>
</tr>
<tr>
<td>o metacognitive strategies</td>
<td>.71.</td>
</tr>
<tr>
<td>o cognitive strategies</td>
<td>.87</td>
</tr>
<tr>
<td>o resource-management strategies</td>
<td>.76</td>
</tr>
</tbody>
</table>

Procedure

This experiment consisted of 4 stages, and lasted for about 14 weeks. The following is a brief sequence of the experiment. Table 3.6 provides a summary of what took place during each stage.

Table 3.9: Summary of procedure

<table>
<thead>
<tr>
<th>Stage</th>
<th>Activity</th>
<th>Data to be Collected</th>
<th>Instruments</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>• Solicit participation</td>
<td>• Demographic info</td>
<td>• Online questionnaires</td>
<td>1 week (8/30-9/9)</td>
</tr>
<tr>
<td>(Phase I for data collection)</td>
<td>• Collect initial data</td>
<td>• Motivation indicators</td>
<td>• Demographic info</td>
<td>mix-up with course reference number for signing in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reported use of Strategy</td>
<td>• MMLQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SRLSQ with Open-ended questions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage II</td>
<td>Web-based SRL Tutorial/Modules</td>
<td>• Participants’ attendance in the web-based SRL tutorial</td>
<td>• Ungraded exercises in SRL tutorial for each section</td>
<td>4 weeks (including 1 week for the SRL strategy test)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Participant’s knowledge of SRL strategies</td>
<td>• Case study items to test knowledge from the SRL tutorial</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Web-based SRL Strategy Tutorial was available throughout the duration of study</td>
</tr>
</tbody>
</table>
Table 3.9 Continued

<table>
<thead>
<tr>
<th>Stage</th>
<th>Activity</th>
<th>Data to be Collected</th>
<th>Instruments</th>
<th>Timeline</th>
</tr>
</thead>
</table>
| Stage III  
(Phase II, III, IV, and V for data collection) | Strategy application practice | • Participants’ textual and multiple choice answers to online questionnaires about strategic planning and self-evaluation | • Study plan and self-evaluation using online questionnaires | Actual duration: 9/6-9/27  
• Difficulty accessing the modules, using inconsistent email account for signing in ID, using wrong course reference number  
• Having problem navigating in tutorial  
Actual duration: 8 weeks  
9/27- 10/23 (4 weeks)  
10/25-11/18 (4 weeks) |

| Stage IV  
(Phase VI for data collection) | Outcome assessment | • Motivation indicators  
• Reported use of Strategy  
• Performance measures of Learning | • Online questionnaires  
○ MMLQ  
○ SSS  
○ SRLSQ w/ Open-ended questions  
• assignment scores and final course scores obtained from instructor | • Planned for 1 week (after learners completed all the Strategy application practice)  
Actual duration: 11/19- 12/1 (1.5 weeks) |

*Stage 1*

At the beginning (2nd week) of the fall semester in 2005, an email together with the informed consent form was sent to students to solicit participation. If students decided that they
were interested in participating, they began by accessing and completing the first set of online questionnaires. Within this first set of online questionnaires, students provided demographic information, such as year in school, age, gender, GPA, etc. At the same time, participants were administered the MMLQ to assess their motivation indicators including task value, self-efficacy, and goal orientation, and the SRLSQ questionnaire to measure their initial use of self-regulated learning strategies. Learners’ demographic information, use of self-regulated learning strategies and motivation measures were stored in a database as phase I data for later analysis. During this stage, the researcher assigned intact groups of participants (participants in 2 sections of one course) to the experimental and control conditions. This stage lasted for about 1 week to allow learners adequate time for participation.

Stage II

About 1 week after the beginning of the 1st stage, students were sent another email to ask them to start their participation in Stage Two. Within this email, participants in the SRL training conditions received specific instructions for their participation. The researcher informed these participants to browse the web tutorial on SRL and to complete the knowledge exercises and test. During this phase, participants in the experimental condition went through the Chapter 1 and 5, Chapter 3, Ch 4 and Ch2 of the tutorial in accordance with the sequence of their instructional content for the course, and they also completed all the exercises and a test within the tutorial. In the mean time, participants in the control condition did not receive any of these treatments. This stage lasted for about 4 weeks to allow learners adequate time for learning and participation.

Stage III

After the participants completed the 2nd stage, students were sent another email to ask them to start their participation in Stage Three. Within Stage III, participants in the experimental conditions were first expected to complete an online study plan (Phase II, IV data). And then, in about 4 weeks, the experimental participants were asked to complete a self-evaluation (Phase III, V data) for the learning period. Study plan forms appeared at the beginning of each 4-week period for learners to set goals and plan for strategies to use for completing tasks within this learning period. Self-evaluation forms appeared at the end of each 4-week period for learners to reflect on their progress and effectiveness of strategies. During the same period of time, participants in the control condition did not receive any of these treatments. This stage lasted for
about 8 weeks (for 2 learning periods) to allow learners adequate time for participation and sufficient opportunities for practice of metacognitive strategies.

Stage IV

After the completion of the last set of online questionnaires for strategy application practice, another email was sent to the participants, in both the experimental and control groups, with a link to the final evaluation questionnaires. Within these final questionnaires, SRLSQ, MMLQ, and SSS were used to measure learners’ reported use of strategies, task value, self-efficacy, goal orientation and self-satisfaction. Open-ended questions were used to collect qualitative information about participants’ use of learning strategies at the conclusion of the study. This stage lasted for about 1 week to allow learners adequate time for participation.

Data Management and Analysis

Data on students’ learning achievement, individual assignments scores and final course scores were obtained from the course instructor. Data on the other two dependent variables, motivation in terms of task value, self-efficacy, goal orientation, and self-satisfaction, and reported use of learning strategies, were collected using participants’ responses to self-reported on-line questionnaires; Descriptive statistics, such as the mean and standard deviation of the dependent variables were calculated to present the initial comparison between the groups. Nonparametric data analysis techniques were used to test hypotheses because the sample size is small.

Quantitative Data Analysis

Learning Achievement

Student achievement scores were analyzed in terms of statistical significance determined by nonparametric statistical analysis. Due to the low sample size for this study (N = 8 for experimental group, N = 13 for control group), the use of a parametric t-test is considered inappropriate by most statistical authorities (Siegel & Castellan, 1988). Therefore, this study analyzed quantitative student achievement data using the Wilcoxon-Mann-Whitney Test. The Wilcoxon-Mann-Whitney Test is the nonparametric equivalent of the parametric t-test (Siegel & Castellan, 1988), which is usually recommended for comparing difference between two groups. The test is suggested for the following situations (Siegel & Castellan, 1988):

1. Two independent groups drawn from the same population
2. At least ordinal data
3. Small sample size
4. No assumptions concerning normal distribution or variance of populations

The current study meets all these criteria, and is therefore a good candidate for this test.

Because of the small sample size of the current study, an alpha level of 0.05 was proposed (i.e., the chance of reaching a false positive was 5%). Although nonparametric tests do not use power, they do make use of relative power efficiency (Siegel & Castellan, 1988). The Wilcoxon-Mann-Whitney Test has a relative power efficiency that can reach 95% for moderate sized samples under certain conditions, including the meeting of assumptions required for the t-test (Siegel & Castellan, 1988).

After collecting all individual assignment scores and final course score, the Wilcoxon-Mann-Whitney Test procedure was performed for each individual assignment score (including test 1, test 2, test 3, test 4, group presentation project, and career exploration paper), as well as for the final course score. Results and all pertinent statistical values are presented in tabular form in Chapter 4.

**Student Motivation**

**Comparison between groups.** Scores from the Measurement of Motivation for Learning Questionnaire (MMLQ) were also analyzed using the Wilcoxon-Mann-Whitney Test nonparametric procedure to compare the difference in post-intervention self-efficacy and self-satisfaction between the experimental and control condition. As in the case of the achievement measures, the $\alpha$ level was set at 0.05. Results were tabulated to show all pertinent statistical information, and are found in Chapter 4. Statistics on each of the 2 individual motivation measures (self-efficacy and self-satisfaction) were individually analyzed.

**Comparison within groups.** Scores from the Measurement of Motivation for Learning Questionnaire (MMLQ) were analyzed using the Wilcoxon Signed Ranks Test nonparametric procedure to compare the difference in pre- and post-intervention self-efficacy of the experimental and control condition. As in the case of the achievement measures, the $\alpha$ level was set at 0.05. Results were tabulated to show all pertinent statistical information, and are presented in Chapter 4.

The Wilcoxon Signed Ranks Test is the nonparametric equivalent of the parametric dependent t-test (Siegel & Castellan, 1988), which is usually recommended for comparing
difference between two situations of the same group. The test is suggested for the following situations (Siegel & Castellan, 1988):

1. The same groups at two different situations (matched pairs).
2. At least ordinal data
3. Small sample size
4. No assumptions concerning normal distribution or variance of populations

The current proposed study meets all these criteria, and is therefore a good candidate for this test. The Wilcoxon Signed Ranks Test has a relative power efficiency that can reach 95% for moderate sized samples under certain conditions, including the meeting of assumptions required for the t-test (Siegel & Castellan, 1988).

Reported Use of Learning Strategies

**Comparison between groups.** Scores from the Self-Regulated Learning Strategies Questionnaire (SRLSQ) were also analyzed using the Wilcoxon-Mann-Whitney Test non-parametric procedure to compare the difference in post-intervention reported use of learning strategies between the experimental and control condition. As in the case of the achievement measures, the \( \alpha \) level was set at 0.05. Results were tabulated to show all pertinent statistical information, and are found in Chapter 4. Statistics on each of the 3 individual strategy measures (metacognitive, cognitive and resource management strategies) were first individually and then cumulatively analyzed.

**Comparison within groups.** Scores from the Self-Regulated Learning Strategies Questionnaire (SRLSQ) were analyzed using the Wilcoxon Signed Ranks Test non-parametric procedure to compare the difference in pre- and post-intervention metacognitive, cognitive and resource management strategies of the experimental and control conditions. As in the case of the achievement measures, the \( \alpha \) level was set at 0.05. Results were tabulated to shows all pertinent statistical information, and are presented in Chapter 4. Statistics on each of the 3 individual strategy measures (metacognitive, cognitive and resource management strategies) were first individually and then cumulatively analyzed.

**Qualitative Data Analysis**

In this study, participants were also asked to answer some open-ended questions about their use of learning strategies both at the beginning and end of the experiment. These open-ended questions were accessed by the participants as an online questionnaire via the World Wide
Web. Answers to these questions were transcribed verbatim into the Nvivo 7 program for analysis, using the within-case and cross-case methods (Patton, 1990). This analysis included the following steps: First, answers to open-ended survey questions were descriptively coded to create cases and attributes by importing the casebook from an SPSS document; importing the transcripts of participants' answers to the questions; and auto coding the transcripts to cases and at headings to topic questions. Second, answers to open-ended questions were topic coded into the following high level categories created as tree nodes such as approach for studying, cognitive strategies, discussion strategies, goal setting, etc. Third, the researchers read through further refined topic nodes, and identified some interesting issues and themes such as “group project was one of the obstacles”. Fourth, further consideration of the coding at tree nodes and the issues in the memos led to further refinement of the categories in tree nodes and exploration using queries to identify relationships between nodes or cases.

This study used these qualitative data to help understand and explain the results from quantitative data analysis. The following Table 3.10 contains a summary of data analysis method used in the current study.

Table 3.10: Summary of data analysis method

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Dependent Variables</th>
<th>Type of Data</th>
<th>Data Analysis Method</th>
</tr>
</thead>
</table>
| Will self-regulated learning strategy training in a web-assisted course influence learning achievement? | • Individual assignment scores  
• final course scores | • Continuous variables                                    | • Wilcoxon-Mann-Whitney Test                                 |
| Will self-regulated learning strategy training in a web-assisted course influence learner motivation? | • task value,  
• self-efficacy  
• goal orientation  
• self-satisfaction | • Difference in end point measures between the experimental & control condition  
• Changes of the experimental condition in measures between the pre- & post-intervention situation (continuous/interval variable: 5-point Likert scales) | • Wilcoxon-Mann-Whitney Test  
• Wilcoxon Signed Ranks Test |
Table 3.10 Continued

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Dependent Variables</th>
<th>Type of Data</th>
<th>Data Analysis Method</th>
</tr>
</thead>
</table>
| Will self-regulated learning strategy training in a web-assisted course influence learners’ strategy use? | • Metacognitive  
  • Cognitive  
  • Resource Management | • Difference in end point measures between the experimental & control condition  
  • Changes of the experimental condition in measures between the pre- & post-intervention situation (continuous/interval variable: 5-point Likert scales)  
  • Participants’ answer to open-ended question about use of learning strategies | • Wilcoxon-Mann-Whitney Test  
  • Wilcoxon Signed Ranks Test  
  • Qualitative content analysis |
CHAPTER IV

RESULTS

This chapter presents the results from data analysis. The dependent variables examined in this study were student performance achievement, student motivation in terms of task value, self-efficacy, goal orientation and self-satisfaction, and students’ reported use of strategies. Prior to treatment, the Measurement of Motivation for Learning Questionnaire (MMLQ), the Self-Regulated Learning Strategies Questionnaire (SRLSQ) and open-ended questions were used as a pretest to determine students’ existing level of motivation and experience with learning strategies. At the end of the treatment period, the same 4 assessment instruments, the MMLQ, the SRLSQ, the SSS and open-ended questions were used as a posttest to measure student’s motivation and reported use of strategies. Students’ final course scores and individual assignment scores, as the measures for achievement, were obtained from the instructor after the semester was over.

The findings from data analysis are reported in the following order. First, the results from preliminary analysis of the data are examined. Second, the results from inferential statistical analysis are presented. Third, findings from analyzing the qualitative data are reported. All of the quantitative data were analyzed using the SPSS (Statistical Package for the Social Sciences) software version 10 for Windows, and all the qualitative data were analyzed using Nvivo software version 7.

Quantitative Results

A preliminary analysis of the collected data was performed to ensure completeness of collected information and to guarantee that the requirements of the statistical procedures were fulfilled. Because the statistical method employed in this study, the Wilcoxon-Mann-Whitney Test and the Wilcoxon Signed Ranks Test, are non-parametric in nature, few of the assumptions required by parametric methods (such as normal distribution of the population) are mandatory.

For comparison between groups, this current study used two independent groups drawn from the same population. Performance, motivation and use of strategy data, being scored on a percentage or cumulative 5-point Likert-type scales, meet the minimum requirements of ordinal data. The sample size for the study, 8 participants in the experimental Group and 13 participants
in the control Group, can be considered a small sample. Thus, this study meets the requirements for the Wilcoxon-Mann-Whitney Test (Siegel & Castellan, 1988). For comparison within groups, this study used the same groups at two different situations (before and after the intervention).

With the motivation and use of strategy scores meeting the requirements for ordinal data and the sample size being small, this study fulfills the requirements for the Wilcoxon Signed Ranks Test (Siegel & N. John Castellan, 1988).

In this study, outliers can be identified by visually examining the histogram or box plots of the data using SPSS. However, due to the use of rank ordering of data, the effect of outliers is greatly reduced in nonparametric tests when compared to their parametric counterparts. Thus, outliers will not be reported in this section.

**Students' Pre-Intervention Motivation and Experience with Learning Strategies**

Prior to formal implementation of the treatment, the Measurement of Motivation for Learning Questionnaire (MMLQ), the Self-Regulated Learning Strategies Questionnaire (SRLSQ) and open-ended questions were used as a pretest to determine students’ previous level of motivation and experience with learning strategies. An examination of the self-reported pre-intervention data, using a Wilcoxon-Mann-Whitney Test, found that there were no significant difference between the experimental group and the control group on demographic information, motivation in terms of task value, self-efficacy, goal orientation and use of strategies. Table 4.1, below, summarizes the comparison between groups on reported pre-intervention data.

**Table 4.1: Comparison on pre-intervention motivation and experience with learning strategies**

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Exact Sig. [2*(1-tailed Sig.)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit hours attempted in fall 2005</td>
<td>34.00</td>
<td>125.000</td>
<td>-1.496</td>
<td>.135</td>
<td>.210</td>
</tr>
<tr>
<td>Age</td>
<td>34.50</td>
<td>125.500</td>
<td>-1.407</td>
<td>.160</td>
<td>.210</td>
</tr>
<tr>
<td>Cognitive before</td>
<td>40.50</td>
<td>76.500</td>
<td>-.837</td>
<td>.402</td>
<td>.414</td>
</tr>
<tr>
<td>Metacognitive before</td>
<td>51.00</td>
<td>142.000</td>
<td>-1.073</td>
<td>.306</td>
<td>.336</td>
</tr>
<tr>
<td>Resource Mgt before</td>
<td>31.50</td>
<td>122.500</td>
<td>-1.487</td>
<td>.137</td>
<td>.140</td>
</tr>
<tr>
<td>Total Strategy before</td>
<td>38.00</td>
<td>129.000</td>
<td>-1.016</td>
<td>.310</td>
<td>.336</td>
</tr>
<tr>
<td>Task value before</td>
<td>31.50</td>
<td>122.500</td>
<td>-1.495</td>
<td>.135</td>
<td>.140</td>
</tr>
<tr>
<td>Self-Efficacy before</td>
<td>34.00</td>
<td>125.000</td>
<td>-1.310</td>
<td>.190</td>
<td>.210</td>
</tr>
<tr>
<td>Intrinsic G before</td>
<td>38.00</td>
<td>129.000</td>
<td>-1.024</td>
<td>.306</td>
<td>.336</td>
</tr>
<tr>
<td>extrinsic G before</td>
<td>26.50</td>
<td>117.500</td>
<td>-1.865</td>
<td>.062</td>
<td>.064</td>
</tr>
</tbody>
</table>

a  Not corrected for ties.

b  Grouping Variable: Group
Effects of Treatment on Student Achievement

In order to determine the effects of the self-regulated strategy training on students’ achievement (Hypothesis 1), data analysis were conducted on students’ final course scores and each of the major assignment scores, which were obtained from the instructor after the semester was over. The descriptive statistics for achievement measures are presented in Table 4.2.

Table 4.2: Descriptive statistics for achievement

<table>
<thead>
<tr>
<th>Achievement measure</th>
<th>Experimental group (N=8)</th>
<th>Control group (N=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Course</td>
<td>M = 93.88, SD = 4.55, Mdn = 95.50</td>
<td>M = 88.77, SD = 9.04, Mdn = 92.00</td>
</tr>
<tr>
<td>Test 1</td>
<td>M = 85.88, SD = 11.33, Mdn = 88.50</td>
<td>M = 90.00, SD = 9.66, Mdn = 92.00</td>
</tr>
<tr>
<td>Test 2</td>
<td>M = 87.88, SD = 7.22, Mdn = 85.50</td>
<td>M = 86.85, SD = 12.55, Mdn = 89.00</td>
</tr>
<tr>
<td>Test 3</td>
<td>M = 91.13, SD = 2.36, Mdn = 92.00</td>
<td>M = 85.92, SD = 10.00, Mdn = 90.00</td>
</tr>
<tr>
<td>Test 4</td>
<td>M = 91.38, SD = 4.81, Mdn = 92.00</td>
<td>M = 90.77, SD = 11.52, Mdn = 94.00</td>
</tr>
<tr>
<td>Project</td>
<td>M = 89.38, SD = 7.60, Mdn = 92.00</td>
<td>M = 68.08, SD = 39.01, Mdn = 87.00</td>
</tr>
<tr>
<td>Paper</td>
<td>M = 87.63, SD = 7.74, Mdn = 88.50</td>
<td>M = 58.38, SD = 41.01, Mdn = 79.00</td>
</tr>
<tr>
<td>Final Exam</td>
<td>M = 89.13, SD = 4.79, Mdn = 91.00</td>
<td>M = 83.77, SD = 8.74, Mdn = 86.00</td>
</tr>
</tbody>
</table>

Regarding hypothesis 1 on the effect of the SR learning strategies training on student achievement, it was predicted that students who were exposed to the training intervention would outperform students who were not exposed to the training on each of the achievement measures. The Wilcoxon-Mann-Whitney U Test revealed that experimental group learners (M = 93.88) performed significantly better on overall performance than the control group learners (M = 88.77), and the hypothesis of a significant effect for overall performance (U=28.50, p<.05, r=.47) was confirmed.

Regarding hypotheses on the effect of the SR learning strategies training on each of the course assignments, the Wilcoxon-Mann-Whitney U Test revealed that experimental group learners (M =91.13, 87.63, 89.13) performed significantly better on Test 3, Career Exploration Paper and Final exam scores than the control group learners (M =85.92, 58.38, 83.77). The hypotheses of a significant effect for performance on each of the course assignments were partially confirmed on Test 3(U=27.00, p<.05, r=.51), Career Exploration Paper (U=28.50, p<.05, r=.48) and Final exam scores (U=28.00, p<.05, r=.48). Statistical findings regarding student achievement are presented in Table 4.3.
Table 4.3: Wilcoxon-Mann-Whitney U Test results for student achievement

<table>
<thead>
<tr>
<th>Achievement measure</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Exact Sig. (1-tailed Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course score</td>
<td>28.50</td>
<td>119.50</td>
<td>-1.71</td>
<td>.04</td>
</tr>
<tr>
<td>Test 1 score</td>
<td>39.00</td>
<td>75.00</td>
<td>-.95</td>
<td>.19</td>
</tr>
<tr>
<td>Test 2 score</td>
<td>50.00</td>
<td>86.00</td>
<td>-.15</td>
<td>.46</td>
</tr>
<tr>
<td>Test 3 score</td>
<td>27.00</td>
<td>118.00</td>
<td>-1.83</td>
<td>.04</td>
</tr>
<tr>
<td>Test 4 score</td>
<td>41.00</td>
<td>77.00</td>
<td>-.80</td>
<td>.23</td>
</tr>
<tr>
<td>Project score</td>
<td>29.50</td>
<td>120.50</td>
<td>-1.64</td>
<td>.05</td>
</tr>
<tr>
<td>Paper score</td>
<td>28.50</td>
<td>119.50</td>
<td>-1.72</td>
<td>.04</td>
</tr>
<tr>
<td>Final exam score</td>
<td>28.00</td>
<td>119.00</td>
<td>-1.74</td>
<td>.04</td>
</tr>
</tbody>
</table>

a  Not corrected for ties.
b  Grouping Variable: Group

Effects of Treatment on Motivation

In order to determine the effects of the self-regulated strategy training on students’ motivation (Hypothesis 2, 3, and 4), a Wilcoxon-Mann-Whitney Test and two Wilcoxon Signed Ranks Tests were performed. The results obtained for the research hypotheses are reported below.

Comparison between Groups

A between-group comparison was conducted on students’ post-intervention measures on task value, self-efficacy, goal orientation and self-satisfaction, which were collected using the Measurement of Motivation for Learning Questionnaire (MMLQ) as an online questionnaire at the end of the study. The descriptive statistics for post-intervention motivation measures are presented in Table 4.4.

Table 4.4: Descriptive statistics for post-intervention motivation reported in MMLQ

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
<th>Control group (N=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Task Value (0-30)</td>
<td>20.63</td>
<td>3.66</td>
</tr>
<tr>
<td>Self-Efficacy (0-40)</td>
<td>30.88</td>
<td>6.58</td>
</tr>
<tr>
<td>Intrinsic Goal</td>
<td>13.44</td>
<td>2.06</td>
</tr>
<tr>
<td>Orientation (0-20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic Goal</td>
<td>13.88</td>
<td>2.64</td>
</tr>
<tr>
<td>Orientation (0-20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Satisfaction (0-20)</td>
<td>17.38</td>
<td>2.26</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

The Wilcoxon-Mann-Whitney Test, a nonparametric statistical method, was used to determine whether significant differences existed between the experimental and the control
group on student post-intervention motivation in terms of task value, self-efficacy, goal orientation and self-satisfaction scores. Statistical significance findings are presented in Table 4.5.

Hypothesis 2 predicted that experimental students would have more positive motivation in terms of higher self-efficacy, task value, self-satisfaction and intrinsic goal orientation and lower extrinsic goal orientation than control learners. The Wilcoxon-Mann-Whitney U Test revealed that the experimental group learners (M = 17.38) did report significantly higher self-satisfaction than the control group learners (M =15.08). However, the Wilcoxon-Mann-Whitney U Test also revealed that the experimental group learners (M = 20.63, 30.88, 13.44) did not report significantly higher task value, self-efficacy and intrinsic goal orientation than the control group learners (M =20.31, 29.08, 12.92). Contrary to the expectation, the former (M =13.88) did report slightly higher extrinsic goal orientation than the latter (M =13.00), yet the result did not reach statistical significance. The hypotheses of a significant effect for motivation was only confirmed on self-satisfaction (U=27.50, p=.04, r=.39), with no significant difference being detected between the experimental and the control group on task value (U=49.00, ns, r=.05), self-efficacy (U=40.50, ns, r=.18), and goal orientations (U=48.00, ns, r=.06 for Intrinsic; and U=45.00, ns, r=.11 for Extrinsic).

Table 4.5: Wilcoxon-Mann-Whitney U Test results for student post-intervention motivation

<table>
<thead>
<tr>
<th>Motivation measure</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Exact Sig. (1-tailed Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Value (0-30)</td>
<td>49.00</td>
<td>140.00</td>
<td>-.22</td>
<td>.43</td>
</tr>
<tr>
<td>Self-Efficacy (0-40)</td>
<td>40.50</td>
<td>131.50</td>
<td>-.834</td>
<td>.21</td>
</tr>
<tr>
<td>Intrinsic Goal Orientation</td>
<td>48.00</td>
<td>139.00</td>
<td>-.30</td>
<td>.40</td>
</tr>
<tr>
<td>Extrinsic Goal Orientation</td>
<td>45.00</td>
<td>136.00</td>
<td>-.52</td>
<td>.32</td>
</tr>
<tr>
<td>Self-Satisfaction (0-20)</td>
<td>27.50</td>
<td>118.50</td>
<td>-1.80</td>
<td><strong>.038</strong></td>
</tr>
</tbody>
</table>

Comparison within Groups

**Experimental group.** The Wilcoxon Signed Ranks Test, a nonparametric statistical method, was used to determine whether significant differences existed between the pre- and post-intervention measures of the experimental group on student motivation. Data analysis was conducted on experimental learners’ pre- and post-intervention measures on task value, self-
efficacy and goal orientation, which were collected using online questionnaires at both the beginning and end of the study. The descriptive statistics for Experimental motivation measures are presented in Table 4.6.

Table 4.6: Descriptive statistics for motivation reported by Experimental participants in MMLQ

<table>
<thead>
<tr>
<th>Motivation measure</th>
<th>Phase I M</th>
<th>SD</th>
<th>Mdn</th>
<th>Phase VI M</th>
<th>SD</th>
<th>Mdn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Value (0-30)</td>
<td>24.13</td>
<td>3.44</td>
<td>24.50</td>
<td>20.63</td>
<td>3.66</td>
<td>19.50</td>
</tr>
<tr>
<td>Self-Efficacy (0-40)</td>
<td>32.50</td>
<td>4.87</td>
<td>32.00</td>
<td>30.88</td>
<td>6.58</td>
<td>32.00</td>
</tr>
<tr>
<td>Intrinsic Goal Orientation (0-20)</td>
<td>14.85</td>
<td>2.68</td>
<td>14.17</td>
<td>13.44</td>
<td>2.06</td>
<td>12.50</td>
</tr>
<tr>
<td>Extrinsic Goal Orientation (0-20)</td>
<td>16.96</td>
<td>3.04</td>
<td>17.00</td>
<td>13.88</td>
<td>2.64</td>
<td>13.50</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

Regarding hypothesis 3 on the effect of the SR learning strategies training on student motivation, it was expected that experimental students would have more positive motivation, defined as higher task value, self-efficacy, intrinsic goal orientation and lower extrinsic goal orientation, at the end VS the beginning of the study. The Wilcoxon Signed Ranks Test revealed that the experimental group learners did not report significantly different self-efficacy and intrinsic goal orientation at the end (M =30.88, 13.44) than at the beginning (M= 32.50, 14.85) of the study. However, data analysis did show that the experimental group learners reported significantly lower task value and extrinsic goal orientation at the end (M =20.63, 13.88) than at the beginning (M = 24.13, 16.96) of the study. The hypotheses of a significant effect on task value (z=-2.21, p<.05, r= .55), self-efficacy (z=-.94, ns, r=.24), intrinsic goal orientation (z=-.73, ns, r=.18) and extrinsic goal orientation (z=-2.21, p<.05, r=.55) were partially confirmed.

Statistical significance findings are presented in Table 4.7.

Table 4.7: Wilcoxon Signed Ranks Test results for motivation reported by the experimental group students

<table>
<thead>
<tr>
<th>Motivation measure</th>
<th>Z</th>
<th>Asymp. Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Value after - Task value before</td>
<td>-2.214</td>
<td>.01</td>
</tr>
<tr>
<td>Self-Efficacy after - Self-Efficacy before</td>
<td>-.944</td>
<td>.17</td>
</tr>
<tr>
<td>Intrinsic G after - Intrinsic G before</td>
<td>-.734</td>
<td>.23</td>
</tr>
<tr>
<td>Extrinsic G after - extrinsic G before</td>
<td>-2.207</td>
<td>.01</td>
</tr>
</tbody>
</table>

a Based on negative ranks.
b Based on positive ranks.
c Wilcoxon Signed Ranks Test

97
The Wilcoxon Signed Ranks Test, a nonparametric statistical method, was used to determine whether significant differences existed between the pre- and post-intervention measures of the control group on student motivation. Data analysis was conducted on control learners’ pre- and post-intervention measures on task value, self-efficacy and goal orientations, which were collected using online questionnaires at both the beginning and end of the study. The descriptive statistics for Control motivation measures are presented in Table 4.8.

Table 4.8: Descriptive statistics for motivation reported by control participants in MMLQ

<table>
<thead>
<tr>
<th>Motivation measure</th>
<th>Control group (N=13)</th>
<th>Phase I</th>
<th>Phase VI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Mdn</td>
</tr>
<tr>
<td>Task Value (0-30)</td>
<td>22.08</td>
<td>2.84</td>
<td>22.00</td>
</tr>
<tr>
<td>Self-Efficacy (0-40)</td>
<td>30.00</td>
<td>4.14</td>
<td>29.00</td>
</tr>
<tr>
<td>Intrinsic Goal Orientation (0-20)</td>
<td>13.31</td>
<td>2.87</td>
<td>13.00</td>
</tr>
<tr>
<td>Extrinsic Goal Orientation (0-20)</td>
<td>14.46</td>
<td>2.50</td>
<td>14.00</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

Regarding hypothesis 4 on the effect of the SR learning strategies training on student motivation, it was expected that control students would have no difference in their motivation, in terms of self-efficacy, task value, intrinsic and extrinsic goal orientation, at the end than the beginning of the study. The Wilcoxon Signed Ranks Test revealed that the control group learners did not report significantly different self-efficacy, intrinsic goal orientation and extrinsic goal orientation at the end (M=29.08, 12.92, 13.00) than at the beginning (M=30.00, 13.31, 14.46) of the study. However, data analysis did show that the control group learners reported significantly lower task value at the end (M=20.31) than at the beginning (M=22.08) of the study, which is similar to the change in the experimental condition. As expected, the null hypothesis was not rejected for self-efficacy (z=-.74, ns, r=.15), intrinsic goal orientation (z=-.62, ns, r=.12) and extrinsic goal orientation (z=-1.91, ns, r=.37). However, contrary to expectation, there was a significant difference for task value (z=-1.96, p=.05, r=.38). Statistical significance findings are presented in Table 4.9.
Table 4.9: *Wilcoxon Signed Ranks Test* results for motivation reported by the control group students

<table>
<thead>
<tr>
<th>Motivation measure</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Value after – Task value before</td>
<td>-1.963</td>
<td>.050</td>
</tr>
<tr>
<td>Self-Efficacy after - Self-Efficacy before</td>
<td>-0.746</td>
<td>.455</td>
</tr>
<tr>
<td>Intrinsic G after - Intrinsic G before</td>
<td>-0.622</td>
<td>.534</td>
</tr>
<tr>
<td>Extrinsic G after - extrinsic G before</td>
<td>-1.910</td>
<td>.056</td>
</tr>
</tbody>
</table>

*a* Based on positive ranks.  
*b* Based on negative ranks.  
*c* Wilcoxon Signed Ranks Test

**Effects of Treatment on Reported Use of Strategies**

In order to determine the effects of the self-regulated strategy training on students’ reported use of strategies (Hypothesis 5, 6, and 7), a *Wilcoxon-Mann-Whitney* Test and two Wilcoxon Signed Ranks Tests were performed. The results obtained for the research hypotheses are presented below.

**Comparison between Groups**

A between-group comparison was conducted on students’ post-intervention measures on their use of metacognitive, cognitive and resource management strategies, which were collected using the Self-Regulated Learning Strategies Questionnaire (SRLSQ) as an online questionnaire at the end of the study. The descriptive statistics for strategy use are presented in Table 4.10.

Table 4.10: Descriptive statistics for post-intervention learning strategy use

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=8)</td>
<td>(N=13)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Metacognitive (0-55)</td>
<td>37.13</td>
<td>3.44</td>
</tr>
<tr>
<td>Cognitive (0-90)</td>
<td>67.19</td>
<td>8.04</td>
</tr>
<tr>
<td>Rehearsal (0-20)</td>
<td>15.06</td>
<td>1.27</td>
</tr>
<tr>
<td>Organization (0-20)</td>
<td>15.19</td>
<td>3.34</td>
</tr>
<tr>
<td>Elaboration (0-30)</td>
<td>21.31</td>
<td>4.23</td>
</tr>
<tr>
<td>Resource Management (0-90)</td>
<td>60.25</td>
<td>4.50</td>
</tr>
<tr>
<td>Time &amp; Study environment management (0-35)</td>
<td>25.75</td>
<td>3.11</td>
</tr>
<tr>
<td>Effort Regulation (0-20)</td>
<td>12.94</td>
<td>2.86</td>
</tr>
<tr>
<td>Peer learning (0-15)</td>
<td>8.56</td>
<td>2.97</td>
</tr>
<tr>
<td>Help-seeking (0-20)</td>
<td>13.00</td>
<td>2.20</td>
</tr>
<tr>
<td>Total strategy (0- 235)</td>
<td>164.56</td>
<td>12.65</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.
The Wilcoxon-Mann-Whitney Test was used to determine whether significant differences existed between the experimental and the control groups in students’ post-intervention metacognitive, cognitive and resource management strategies scores separately, and in a composite score that combines all these three strategies. In addition, data analysis also looked at the differences between the experimental and the control groups in specific indicators, such as rehearsal, organization, and elaboration for cognitive strategy; and time and study environment management, effort Regulation, peer learning, and help-seeking for resource management, within each broad category of strategies. Statistical significance findings are presented in Table 4.11.

Hypothesis 5 predicted that experimental students would have higher scores on reported use of strategies than control learners. Regarding hypothesis 5 on the effects of the SR learning strategies training on student reported use of strategies, the Wilcoxon-Mann-Whitney U Test revealed that even though the experimental group learners (M = 37.13, 67.19, 60.25, 164.56) did report higher scores on use of metacognitive, cognitive and resource management strategies and the total strategies than the control group learners (M = 36.85, 61.46, 59.15, 157.46), however, the differences did not reach statistical significance. The hypotheses of a significant effect on learners’ reported use of metacognitive strategies (U=48.50, ns, r= .06), cognitive strategies (U=40.00, ns, r= .19), resource management strategies (U=36.00, ns, r= .25), and the total strategies (U=40.00, ns, r= .19) were not confirmed. In addition, no significant difference was identified on measures for subcategories of strategies between the experimental and control learners.

Table 4.11: Wilcoxon-Mann-Whitney U Test results for student reported use of strategy

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Exact Sig. (1-tailed Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive after</td>
<td>48.50</td>
<td>84.50</td>
<td>-.255</td>
<td>.40</td>
</tr>
<tr>
<td>Cognitive after</td>
<td>40.00</td>
<td>131.00</td>
<td>-.870</td>
<td>.21</td>
</tr>
<tr>
<td>REH_2</td>
<td>31.00</td>
<td>122.00</td>
<td>-1.531</td>
<td>.07</td>
</tr>
<tr>
<td>ORG_2</td>
<td>34.50</td>
<td>125.50</td>
<td>-1.278</td>
<td>.11</td>
</tr>
<tr>
<td>ELA_2</td>
<td>47.00</td>
<td>138.00</td>
<td>-.365</td>
<td>.38</td>
</tr>
<tr>
<td>Resource Mgt after</td>
<td>36.00</td>
<td>127.00</td>
<td>-1.165</td>
<td>.13</td>
</tr>
<tr>
<td>EFF_2</td>
<td>48.00</td>
<td>84.00</td>
<td>-.292</td>
<td>.40</td>
</tr>
<tr>
<td>PEER_2</td>
<td>45.50</td>
<td>136.50</td>
<td>-.479</td>
<td>.32</td>
</tr>
<tr>
<td>T_E_2</td>
<td>41.50</td>
<td>132.50</td>
<td>-.765</td>
<td>.23</td>
</tr>
<tr>
<td>HELP_2</td>
<td>42.00</td>
<td>133.00</td>
<td>-.734</td>
<td>.25</td>
</tr>
<tr>
<td>Total Strategy after</td>
<td>40.00</td>
<td>131.00</td>
<td>-.870</td>
<td>.21</td>
</tr>
</tbody>
</table>

a Not corrected for ties.
b Grouping Variable: Group
Comparison within Groups

Experimental group. The Wilcoxon Signed Ranks Test, a nonparametric statistical method, was used to determine whether significant differences existed in experimental group students’ reported use of strategies between the pre- and post-intervention measures.

Participants’ measures on their use of metacognitive, cognitive and resource management strategies were collected using online questionnaires at both the beginning and end of the study. In addition, data analysis also looked at the differences in specific indicators, such as rehearsal, organization, and elaboration for cognitive strategy; and time and study environment management, effort regulation, peer learning, and help-seeking for resource management, within each broader category of strategies. The descriptive statistics for Experimental strategy measures are presented in Table 4.12.

Table 4.12: Means, SD and Mdn for learning strategies reported by Experimental participants

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Phase I</th>
<th>Phase VI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Metacognitive (0-55)</td>
<td>35.96</td>
<td>5.40</td>
</tr>
<tr>
<td>Cognitive (0-90)</td>
<td>63.27</td>
<td>7.57</td>
</tr>
<tr>
<td>Rehearsal (0-20)</td>
<td>13.58</td>
<td>1.87</td>
</tr>
<tr>
<td>Organization (0-20)</td>
<td>13.40</td>
<td>1.93</td>
</tr>
<tr>
<td>Elaboration (0-30)</td>
<td>20.90</td>
<td>2.27</td>
</tr>
<tr>
<td>Resource Management (0-90)</td>
<td>64.96</td>
<td>6.27</td>
</tr>
<tr>
<td>Time &amp; Study environment management (0-35)</td>
<td>25.42</td>
<td>3.92</td>
</tr>
<tr>
<td>Effort Regulation (0-20)</td>
<td>15.40</td>
<td>2.78</td>
</tr>
<tr>
<td>Peer learning (0-15)</td>
<td>9.29</td>
<td>1.88</td>
</tr>
<tr>
<td>Help-seeking (0-20)</td>
<td>14.85</td>
<td>1.95</td>
</tr>
<tr>
<td>Total strategy (0-235)</td>
<td>164.19</td>
<td>13.14</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

Regarding hypothesis 6 on the effect of the SR learning strategies training on students’ reported use of strategies, it was expected that experimental students would have significantly higher scores on reported use of strategies at the end VS the beginning of the study. The Wilcoxon Signed Ranks Test revealed that even though the experimental group learners did report higher use of metacognitive, cognitive strategies and total strategies at the end (M=37.13, 67.19, 164.56) than at the beginning (M = 35.96, 63.27, 164.19) of the study, the differences did
not reach statistical significance. However, data analysis did show that the experimental group learners reported significantly lower use of resource management strategies at the end (M = 60.25) than at the beginning (M = 64.96) of the study. The hypothesis of a significant difference on use of strategies was only confirmed with resource management (z = -1.96, p = .05, r = .49) strategies, with no significant difference identified on metacognitive (z = -0.56, ns, r = .14), cognitive (z = -0.84, ns, r = .21), and total (z = -0.42, ns, r = .11) strategies. Additionally, the data analysis revealed that experimental learners did report significantly higher (z = -1.98, p < .05, r = .50) use of rehearsal strategies at the end (M = 15.06) than at the beginning (M = 13.58) of the study, even though there was no significant difference in the broader category of cognitive strategies. Statistical significance findings are presented in Table 4.13.

Table 4.13: Wilcoxon Signed Ranks Test results for reported use of strategy by the experimental group students

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Z</th>
<th>Asymp. Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive after - Metacognitive before</td>
<td>-.562</td>
<td>.29</td>
</tr>
<tr>
<td>Cognitive after - Cognitive before</td>
<td>-.841</td>
<td>.20</td>
</tr>
<tr>
<td>REH_2 - REH_1</td>
<td>-1.997</td>
<td>.02</td>
</tr>
<tr>
<td>ORG_2 - ORG_1</td>
<td>-1.153</td>
<td>.12</td>
</tr>
<tr>
<td>ELA_2 - ELA_1</td>
<td>-.254</td>
<td>.40</td>
</tr>
<tr>
<td>Resource Mgt after - Resource Mgt before</td>
<td>-1.960</td>
<td>.03</td>
</tr>
<tr>
<td>EFF_2 - EFF_1</td>
<td>-1.051</td>
<td>.15</td>
</tr>
<tr>
<td>PEER_2 - PEER_1</td>
<td>-.071</td>
<td>.47</td>
</tr>
<tr>
<td>T_E_2 - T_E_1</td>
<td>-.169</td>
<td>.43</td>
</tr>
<tr>
<td>HELP_2 - HELP_1</td>
<td>-1.439</td>
<td>.08</td>
</tr>
<tr>
<td>Total Strategy after - Total Strategy before</td>
<td>-.420</td>
<td>.34</td>
</tr>
</tbody>
</table>

a Based on negative ranks.
b Based on positive ranks.
c Wilcoxon Signed Ranks Test

**Control group.** The Wilcoxon Signed Ranks Test, a nonparametric statistical method, was used to determine whether significant differences existed in control group students’ reported use of strategies between the pre- and post-intervention measures. Participants’ measures on their use of metacognitive, cognitive and resource management strategies were collected using online questionnaires at both the beginning and end of the study. In addition, data analysis also looked at the differences in specific indicators, such as rehearsal, organization, and elaboration for
cognitive strategy; and time and study environment management, effort regulation, peer learning, and help-seeking for resource management, within each broader category of strategies. The descriptive statistics for control group strategy measures are presented in Table 4.14.

Table 4.14: Means, SD and Mdn for learning strategies reported by Control participants in SRLSQ

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Control group (N=13)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
<td>Phase VI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Mdn</td>
<td>M</td>
<td>SD</td>
<td>Mdn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metacognitive (0-55)</td>
<td>36.62</td>
<td>3.71</td>
<td>35.00</td>
<td>36.85</td>
<td>8.26</td>
<td>37.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive (0-90)</td>
<td>64.38</td>
<td>5.55</td>
<td>64.00</td>
<td>61.46</td>
<td>14.47</td>
<td>64.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehearsal (0-20)</td>
<td>14.15</td>
<td>1.72</td>
<td>13.00</td>
<td>13.46</td>
<td>3.60</td>
<td>13.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization (0-20)</td>
<td>13.62</td>
<td>1.66</td>
<td>14.00</td>
<td>12.85</td>
<td>3.67</td>
<td>12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaboration (0-30)</td>
<td>20.69</td>
<td>2.53</td>
<td>21.00</td>
<td>19.62</td>
<td>4.89</td>
<td>20.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Management (0-90)</td>
<td>60.23</td>
<td>5.64</td>
<td>60.00</td>
<td>59.15</td>
<td>8.68</td>
<td>56.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time &amp; Study environment management (0-35)</td>
<td>24.54</td>
<td>3.53</td>
<td>24.00</td>
<td>24.61</td>
<td>3.71</td>
<td>24.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effort Regulation (0-20)</td>
<td>13.31</td>
<td>2.59</td>
<td>14.00</td>
<td>13.85</td>
<td>3.41</td>
<td>12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer learning (0-15)</td>
<td>9.00</td>
<td>1.91</td>
<td>9.00</td>
<td>8.38</td>
<td>2.60</td>
<td>8.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help-seeking (0-20)</td>
<td>13.38</td>
<td>1.76</td>
<td>14.00</td>
<td>12.31</td>
<td>1.75</td>
<td>12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total strategy (0-235)</td>
<td>161.23</td>
<td>12.38</td>
<td>158.00</td>
<td>157.46</td>
<td>29.15</td>
<td>159.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

Regarding hypothesis 7 on the effect of the SR learning strategies training on students’ reported use of strategies, it was expected that the control students would have no significant difference in scores on reported use of strategies at the end than the beginning of the study. The Wilcoxon Signed Ranks Test revealed that, the control group learners reported slightly higher use of metacognitive (M = 36.85 vs. 36.62) strategies, and lower use of cognitive (M=61.46 vs. 64.38), resource management (M= 59.15 vs. 60.23), and total strategies (M= 157.46 vs. 161.23) at the end VS at the beginning of the study, but the differences did not reach statistical significance. The hypotheses of no significant effect on reported use of metacognitive (z=-.49, ns, r=.10) cognitive (z=-.74, ns, r=.15), resource management (z=-.63, ns, r=.12) and total (z=-
strategies were not rejected. In addition, no significant difference was identified on subcategories of strategies between the pre- and post-intervention measures reported by the control learners. This result is consistent with the hypothesis. Statistical significance findings are presented in Table 4.15.

Table 4.15: Wilcoxon Signed Ranks Test results for reported use of strategy by the control group students

<table>
<thead>
<tr>
<th>Strategy measure</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive after -</td>
<td>-.490</td>
<td>.624</td>
</tr>
<tr>
<td>Metacognitive before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive after -</td>
<td>-.735</td>
<td>.462</td>
</tr>
<tr>
<td>Cognitive before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REH_2 - REH_1</td>
<td>-.553</td>
<td>.581</td>
</tr>
<tr>
<td>ORG_2 - ORG_1</td>
<td>-.513</td>
<td>.608</td>
</tr>
<tr>
<td>ELA_2 - ELA_1</td>
<td>-.671</td>
<td>.502</td>
</tr>
<tr>
<td>Resource Mgt after -</td>
<td>-.631</td>
<td>.528</td>
</tr>
<tr>
<td>Resource Mgt before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFF_2 - EFF_1</td>
<td>-.552</td>
<td>.581</td>
</tr>
<tr>
<td>PEER_2 - PEER_1</td>
<td>-.984</td>
<td>.325</td>
</tr>
<tr>
<td>T_E_2 - T_E_1</td>
<td>-.197</td>
<td>.844</td>
</tr>
<tr>
<td>HELP_2 - HELP_1</td>
<td>-1.294</td>
<td>.196</td>
</tr>
<tr>
<td>Total Strategy after -</td>
<td>-.454</td>
<td>.650</td>
</tr>
<tr>
<td>Total Strategy before</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a Based on positive ranks.
b Based on negative ranks.
c Wilcoxon Signed Ranks Test

Incidental Findings

These findings are not related to the hypotheses of the study, but they might help clarify and interpret some of the previous findings.

Effects of Treatment on Persistence

In this study, persistence (Stovall, 2000) was assessed in terms of 1) first-term credit hour completion, 2) first-term GPA, 3) percentage of continuing enrollment until the 2nd term, 4) second-term credit hour completion, and 5) second-term GPA. It was thought that the self-regulated learning strategy training might have some positive effects on some measures of learners’ persistence. The descriptive statistics for persistence measures are presented in Table 4.16.
Table 4.16: Descriptive statistics and group comparison results for persistence

<table>
<thead>
<tr>
<th>Persistence measure</th>
<th><strong>Experimental group</strong> (N=8)</th>
<th><strong>Control group</strong> (N=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>M</em></td>
<td><em>SD</em></td>
</tr>
<tr>
<td>first-term credit hour completion (0-15)</td>
<td>11.50</td>
<td>2.78</td>
</tr>
<tr>
<td>first-term GPA (0-4.0)</td>
<td>3.17</td>
<td>.60</td>
</tr>
<tr>
<td>2nd-term credit hour enrollment (0-15)</td>
<td>11.25</td>
<td>3.41</td>
</tr>
<tr>
<td>second-term credit hour completion (0-15)</td>
<td>9.75</td>
<td>4.95</td>
</tr>
<tr>
<td>second-term GPA (0-4.0)</td>
<td>2.75</td>
<td>.53</td>
</tr>
</tbody>
</table>

Ranges of students’ possible scores in each category are given in parentheses.

During the semester for the study, all of the experimental participants completed each of their course assignment, while 4 of the control participants did not complete 1 to 2 of the later assignments (project and paper) in the course. None of the experimental participants dropped out of the course, while one control participant withdrew from the class.

During the 2nd term, A Wilcoxon-Mann-Whitney U Test revealed that the experimental group learners (M = 2.75) have significantly higher GPA (z=1.95, p<.05, r=.43) than the control group learners (M =1.77). In addition, 4 Control participants and 1 Experimental participant did not complete any of the courses they registered, which resulted in a drop out rate of 29% and 12.5% for the Control and Experimental conditions respectively. It looks like that the treatment might have some effects on keeping the experimental participants on task and stay with the course, and it might also have a long-term effect on GPA and persistence. Statistical significance findings related with persistence are presented in Table 4.17.
Table 4.17: Wilcoxon-Mann-Whitney U Test results for persistence

<table>
<thead>
<tr>
<th>Persistence measure</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Exact Sig. (1-tailed Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit hours attempted in fall 2005</td>
<td>34.000</td>
<td>125.000</td>
<td>-1.496</td>
<td>.11</td>
</tr>
<tr>
<td>Credit hours earned in fall 2005</td>
<td>39.500</td>
<td>130.500</td>
<td>-.962</td>
<td>.19</td>
</tr>
<tr>
<td>Term GPA for fall 2005</td>
<td>33.500</td>
<td>124.500</td>
<td>-1.346</td>
<td>.09</td>
</tr>
<tr>
<td>CA (Sp 2006)</td>
<td>51.500</td>
<td>142.500</td>
<td>-.039</td>
<td>.49</td>
</tr>
<tr>
<td>CE(Sp 2006)</td>
<td>43.000</td>
<td>134.000</td>
<td>- .666</td>
<td>.27</td>
</tr>
<tr>
<td>GPA(Sp 2006)</td>
<td>25.500</td>
<td>116.500</td>
<td>-1.945</td>
<td>.03</td>
</tr>
</tbody>
</table>

a  Not corrected for ties.
b  Grouping Variable: Group

**Correlation Analysis**

A correlation analysis was conducted on all the quantitative measures from all the experimental and control participants after possible relationships were noticed from qualitative data analysis. Kendall’s tau for non-parametric correlation was used because this study has a small data set, and it is a more accurate estimate of the correlation in the population (Field, 2005).

*What is related with persistence?* There were significant positive correlations between cumulative course score and the measures for persistence, which are credit earned for fall 2005 (\(\tau=.49, p<.01\)), GPA for fall 2005 (\(\tau=.36, p<.05\)), credit earned for spring 2006 (\(\tau=.50, p<.01\)), and GPA for spring 2006 (\(\tau=.54, p<.01\)). There were also significant positive correlations between satisfaction and 3 of the measures for persistence, which are credit earned for fall 2005 (\(\tau=.41, p<.05\)), credit earned for spring 2006 (\(\tau=.35, p<.05\)), and GPA for spring 2006 (\(\tau=.36, P<.05\)). Moreover, there is a positive correlation (\(\tau=.50, p<.01\)) between self-satisfaction and final cumulative course scores. These correlations are presented in Table 4.18.
Table 4.18: Correlation between persistence, achievement and self-satisfaction

<table>
<thead>
<tr>
<th></th>
<th>score</th>
<th>Credit hours attempted in fall 2005</th>
<th>Credit hours earned in fall 2005</th>
<th>Term GPA for fall 2005</th>
<th>Credit hours attempted (Sp 06)</th>
<th>Credit hours earned (Sp 06)</th>
<th>Term GPA (Sp 06)</th>
<th>self-satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>score</td>
<td>1.000</td>
<td>.488**</td>
<td>.490**</td>
<td>.361*</td>
<td>.339*</td>
<td>.502**</td>
<td>.542**</td>
<td>.499**</td>
</tr>
<tr>
<td>Credit hours attempted in fall 2005</td>
<td>1.000</td>
<td>.751**</td>
<td>.303</td>
<td>.325</td>
<td>.333</td>
<td>.380*</td>
<td>.380*</td>
<td>.353</td>
</tr>
<tr>
<td>Credit hours earned in fall 2005</td>
<td></td>
<td></td>
<td>.471**</td>
<td>.279</td>
<td>.323</td>
<td>.411*</td>
<td>.406*</td>
<td></td>
</tr>
<tr>
<td>Term GPA for fall 2005</td>
<td>1.000</td>
<td>.116</td>
<td>.415*</td>
<td>.428**</td>
<td></td>
<td>.320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit hours attempted (Sp 06)</td>
<td>1.000</td>
<td>.683**</td>
<td>.106</td>
<td></td>
<td>.240</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit hours earned (Sp 06)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.402*</td>
<td>.354*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term GPA (Sp 06) self-satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level (2-tailed).
- Correlation is significant at the .05 level (2-tailed).

Motivation and strategy use. In phase I, it was found that use of resource management strategies is the only strategy measure related with self-efficacy ($\tau=.33$, $p<.05$) and intrinsic goal orientation ($\tau=.34$, $p<.05$) before the intervention. Task value is not significantly related with any measures for strategy use before the intervention. Table 4.19 presents detailed information about correlations in Phase I.
Table 4.19: Correlations between motivation, strategy use, and achievement in Phase I

<table>
<thead>
<tr>
<th></th>
<th>score</th>
<th>Cognitive before</th>
<th>Metacognitive before</th>
<th>Resource Mgt before</th>
<th>Total Strategy before</th>
<th>Task value before</th>
<th>Self-Efficacy before</th>
<th>Intrinsic G before</th>
<th>Extrinsic G before</th>
</tr>
</thead>
<tbody>
<tr>
<td>score</td>
<td>1.000</td>
<td>.025</td>
<td>.076</td>
<td>.319*</td>
<td>.241</td>
<td>-.061</td>
<td>-.085</td>
<td>.066</td>
<td>-.087</td>
</tr>
<tr>
<td>Cognitive before</td>
<td>1.000</td>
<td>.448**</td>
<td>.153</td>
<td>.560**</td>
<td>-.163</td>
<td>-.051</td>
<td>.164</td>
<td>-.232</td>
<td></td>
</tr>
<tr>
<td>Metacognitive before</td>
<td>1.000</td>
<td>.205</td>
<td>.599**</td>
<td>.005</td>
<td>-.015</td>
<td>.031</td>
<td>-.145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Mgt before</td>
<td>1.000</td>
<td>.578**</td>
<td>.215</td>
<td>.327*</td>
<td>.342*</td>
<td>.142</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Strategy before</td>
<td>1.000</td>
<td>.050</td>
<td>.149</td>
<td>.241</td>
<td>-.020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task value before</td>
<td>1.000</td>
<td>.636**</td>
<td>.568**</td>
<td>.618**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy before</td>
<td>1.000</td>
<td>.554**</td>
<td>.706**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic G before</td>
<td>1.000</td>
<td>.414*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic G before</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

In Phase VI, it was found that task value, self-efficacy, intrinsic goal orientation, or self-satisfaction was each significantly related with use of all types of strategies. Table 4.20 presents detailed information about correlations in Phase VI.

There were significant positive correlations between task value and use of resource management strategies ($\tau = .57, p < .01$), cognitive strategies ($\tau = .61, p < .01$), metacognitive strategies ($\tau = .49, p < .01$), and total strategies ($\tau = .58, p < .01$) after the intervention. There were also significant positive correlations between self-satisfaction and use of cognitive ($\tau = .65, p < .01$), metacognitive ($\tau = .40, p < .05$), resource management ($\tau = .69, p < .01$) and total strategies ($\tau = .67, p < .01$) after the intervention. Extrinsic goal orientation was significantly related with use of cognitive strategies ($\tau = .41, p < .05$) and total strategies ($\tau = .33, p < .05$) only.

Significant correlations were also found between final cumulative percentage score and the use of resource management strategy before ($\tau = .32, p < .05$) & after intervention ($\tau = .54, p < .01$), and total strategy after intervention ($\tau = .38, p < .05$).
Table 4.20: Correlations between motivation, strategy use, and achievement in Phase VI

<table>
<thead>
<tr>
<th></th>
<th>Score after</th>
<th>Cognitive after</th>
<th>Metacognitive after</th>
<th>Resource Mgt after</th>
<th>Total Strategy after</th>
<th>Task Value after</th>
<th>Self-Efficacy after</th>
<th>Intrinsic G after</th>
<th>Extrinsic G after</th>
<th>Self-satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>1.000</td>
<td>.256</td>
<td>.296</td>
<td>.540**</td>
<td>.382*</td>
<td>.272</td>
<td>.308</td>
<td>.189</td>
<td>-.016</td>
<td>.499**</td>
</tr>
<tr>
<td>Cognitive after</td>
<td>1.000</td>
<td>.662**</td>
<td>.599**</td>
<td>.830**</td>
<td>.606**</td>
<td>.505**</td>
<td>.431**</td>
<td>.405**</td>
<td>.654**</td>
<td></td>
</tr>
<tr>
<td>Metacognitive after</td>
<td>1.000</td>
<td>.505**</td>
<td>.708**</td>
<td>.491**</td>
<td>.413*</td>
<td>.455**</td>
<td>.228</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Mgt after</td>
<td>1.000</td>
<td>.754**</td>
<td>.573**</td>
<td>.457**</td>
<td>.369*</td>
<td>.321</td>
<td>.690**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Strategy after</td>
<td>1.000</td>
<td>.577**</td>
<td>.523**</td>
<td>.455**</td>
<td>.325*</td>
<td>.671**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task Value after</td>
<td>1.000</td>
<td>.541**</td>
<td>.507**</td>
<td>.468**</td>
<td>.552**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy after</td>
<td>1.000</td>
<td>.186</td>
<td>.431**</td>
<td></td>
<td>.538**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic G after</td>
<td>1.000</td>
<td>.127</td>
<td>.247</td>
<td></td>
<td>.247</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic G after</td>
<td>1.000</td>
<td>.411*</td>
<td></td>
<td></td>
<td>.411*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-satisfaction</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the .01 level (2-tailed).
* Correlation is significant at the .05 level (2-tailed).

Qualitative Findings

In this study, participants were asked to answer thirteen open-ended questions (See Appendix I & IV) accessed as an online questionnaire via the World Wide Web both at the beginning and end of the experiment. These open-ended questions were designed to explore students’ use of learning strategies. These thirteen questions were exactly the same at the beginning and end of the experiment, except for the tense. Present tense was used at the beginning of the experiment to gather information about participants’ general use of strategies in the course, while past tense was used at the end of the experiment to ask about students’ specific use of strategies during the course of study. Data analyzed included responses from 22 participants (8 Experimental, 14 Control), including one more (than in quantitative analysis) Control condition participant, who completed all procedures for the study but withdrew from the course. To insure confidentiality of participants, a series of numbers was used to indicate responses from each subject, for example, R_{001} stands for a response of the first person from the Control condition, R_{112} means a response of the twelfth person from the Experimental condition,
and so on. Responses to these questions were transcribed verbatim into the Nvivo 7 program for analysis.

Analysis of these data followed the guidelines of qualitative content analysis proposed by (Chi, 1997). It began with a search for patterns within the data on each of the students, and then across all students. Specifically, this analysis included the following steps:

1. Answers to open-ended survey questions were descriptively coded to create cases and attributes by importing the casebook from an SPSS document; importing the transcripts of participants' answers to the questions from Word documents into NVIVO; and auto coding the transcripts to cases and at headings to topic questions.

2. Answers to open-ended questions were coded into higher level categories created as tree nodes such as “approach for studying”, “cognitive strategies”, “discussion strategies”, “goal setting”, etc.

3. Some interesting issues and themes such as “group project was one of the obstacles” were identified by reading through all topic nodes.

4. Consideration of the coding at the broader tree nodes and the themes in the memos led to further refinement of the categories and reorganization of tree nodes using a list of 21 coding categories based on the theoretical framework of Pintrich’s general expectancy-value model (Pintrich, 1995) and Zimmerman’s social cognitive model (Zimmerman, 1986, 1996, 2000, 2002) of self-regulation or derived from the data. The categories were goal setting, strategic planning, self-monitoring, self-evaluation, rehearsal, organization, elaboration, task value, self-efficacy, intrinsic goal orientation, extrinsic goal orientation, both goal orientation, self-satisfaction, attribution, time management, study environment management, effort regulation, help seeking, peer learning, “test-taking strategies”, “Just Study” and “No Strategy”.

5. Exploration of coded data using queries to identify relationships between nodes or cases and to create charts for each student indicating number of references for each category of strategies used and motivational beliefs.

6. Supporting and disconfirming evidence in the transcripts was identified to triangulate results from quantitative data analysis.

During the process of coding, each participant’s response was classified using the above-mentioned list of 21 categories. Each coded reference can range from a single word to an entire
response. The categorization continues until a different code is used. Every response was coded independently by the researcher and a trained coder, each of whom had examples and definitions of each category (See Appendix IX) to compare to the exact words in the response. About 10 percent of the total references were discrepant between a first and second coding. The researcher and coder analyzed and resolved every discrepancy through further reading of the raw data and discussion. Within this analysis of the qualitative data, number of references, which was a count of the references a strategy or motivation indicator was mentioned (whether or not it has been mentioned before, it was counted), was used to represent the self-regulated learning behaviors reported by the participants.

In this study, some results from the quantitative analysis can be rationalized by qualitative responses of the participants. The following section contains selected qualitative results from an analysis of the transcribed responses to open-ended questions. The results are presented in the order of the research questions.

Evidence Related with Student Achievement

From participants’ answers to open-ended questions in the Nivivo program, it was found that at the end of the study, 50% (4) Experimental versus 36% (5) Control participants gave positive responses about their achievements. Within all 12 of the references about achievements, 5 were from the Experimental participants and 7 were made by those in the Control condition, which yielded an average of .63 and .50 reference per participant for the Experimental versus the Control condition. Within these 12 references, 10 were made by students who received A’s and 2 were made by a control student who received a B. Respondents generally mentioned that they received good grades, or their grades improved during the course, or their goals included a good grade, and they were accomplishing their goals. The following excerpt illustrates how students described their perception about achievements.

(Note: R001= Response of the first person from the Control condition, R112= Response of the twelfth person from the Experimental condition, and so on)

R107, Phase VI, A student:
Reference 1-
Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: To learn the material, just studying, i’ve done well, completed all to get an A and use skills for other classes
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: I used some things from the book. The approach worked because my grades were better.

R001, Phase VI, B student:
Reference 1 –
Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: This year, I was working towards getting good grades in all my classes and feeling successful at the end of the term. My plan has gone well so far.
Reference 2 –
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: I mainly used all of the study strategies. I could see the change in my grades as the term moved on.

Out of expectation, students from both the experimental and control condition reported improvement in their grades and its relationship with use of learning strategies. Most of these remarks were made by higher achievers, but none of them linked the improvement directly to the intervention. This pattern was confirmed through the significant positive correlation between the final scores, use of strategies and self-satisfaction from quantitative data analysis, but it does not capture any direct evidence for the effects of the treatment. However, the data from final evaluation online questionnaire showed some support to the predicted benefits of the SRL training. Within a total of 8 experimental participants, 25% (2) made a choice of “4” (true) for web-based tutorial being helpful for learning, while 25% (2) selected an answer of “4” (true) for online questionnaires being helpful for learning.

Evidence Related with Motivational Beliefs

Self-Satisfaction

In this study, self-satisfaction refers to students’ feelings about the fulfillment of their learning goals and enjoyment from taking the course. In Phase I, there were fewer (Experimental 5 vs. Control 5) remarks about satisfaction, and participants expressed satisfaction related with their initial evaluation of goal attainment and satisfaction from understanding materials. In Phase VI, respondents made more (Experimental 7 vs. Control 12) references about satisfaction, and
were generally very happy about what they have achieved in the course, and some expressed their satisfaction from successful group experience.

_Treatment promotes self-satisfaction._ From participants’ answers to open-ended questions at the end of the study, it was found that 75% experimental versus 57.14% control participants gave responses to express their self-satisfaction. In addition, the Experimental participants (M=.88) made more references than those in the control condition (M=.86). This is in the same direction as the conclusion from quantitative data analysis about self-satisfaction, which indicates that the experimental learners reported being significantly more satisfied with their learning experience. Here are some examples of the responses from the experimental learners expressing their self-satisfaction.

(Note: $R_{001} =$ Response of the first person from the Control condition, $R_{112} =$ Response of the twelfth person from the Experimental condition, and so on)

**R102:**
_Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?_
_A: Becoming a better college student. **Yes. Very well,** I am passing my class. 90%

**R105:**
_Q: How did you usually work on group projects/assignment?_
_A: **great im a people person**

_Self-satisfaction, achievement and strategy use._ There seems to be a relationship between self-satisfaction, achievement and strategy use. Within all 29 references related with self-satisfaction, 20 were made by A students, 6 were made by B students and 3 were made by C students. This also supports the positive correlation between achievement and self-satisfaction demonstrated in quantitative data.

There were only 2 not-so-happy references with 13% (1) from the Experimental and 7% (1) from the Control condition. The following is an excerpt for one of these references.

**R003:**
_Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?_
_A: My goals were to do better on my quizes .the plan was to study hard. I think Im still not doing to good.
This above reference matches the control respondent’s quantitative score on self-satisfaction, which is 11 on a 20-point scale, with a class average of 15.08. It might also be related to the achievement level, which is a C, of the student. On the other hand, this following reference from an experimental participant showed that her dissatisfaction from group project did not affect her overall evaluation of (satisfaction from) the learning experience because she used some strategies to overcome the obstacle in working with peers and still succeeded in the project. Furthermore, she received an A for the final course grade.

R101:
Q: How did you usually work on group projects/assignment?
A: only worked on it (group project) once. bad experience

Q: Did you meet any obstacles in the course? What were they? When faced with obstacles in the course, what did you do to overcome these obstacles?
A: Yes, working with peers. Did my part and still succeeded

Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: Study Habits , Making good grades and Learning how to balance my time. Try different things and see which is better for me. I have reached my goals 100% and I have completed 100% of the assignments given in the class.

_Satisfaction as a measure for monitoring._ In Phase I, 25% (2) experimental and 14% (2) control participants talked about the emotional/affective aspect of understanding when asked “How do/did you know when you understand/understood something really well?” This looks like those students were using their emotion/satisfaction as a measure for monitoring comprehension, which may not be the most accurate and reliable way for self-monitoring. In Phase VI, only 14% (2) control participants reported doing so. Here are some examples of the responses illustrating this pattern.

Phase I
R103: I enjoy the work that goes along with it.
R005: When I understand something well, I usually get excited. Sometimes when I dont understand it, I get frustrated

Phase IV
R002: i felt good and therefore knew i would have no problem with it
R005: I got excited when U understood something well.
Goal Orientation

Goal orientation generally discusses a student’s reasons for engaging in a learning task (Pintrich et al., 1991). In this study, participants’ statements about goal orientation were subcategorized into three further refined codes: a) intrinsic goal orientation, b) extrinsic goal orientation, and c) both goal orientation. If a participant’s statement indicates the student’s concentration on learning, comprehending the material and self-improvement, and focus on reasons “such as challenge, curiosity, mastery, which is an end to itself” (Pintrich et al., 1991, p. 10), it is categorized as Intrinsic Goal Orientation. On the other hand, an Extrinsic Goal orientation focuses on grades, approval from others, rewards, or winning, and “participating in a task for reasons such as performance, evaluation by others, and competition, which are the means to an end, and not directly related to the task itself” (Pintrich et al., 1991, p. 10). Both-goal orientation refers to the situation when students indicate a focus on both intrinsic and extrinsic goals.

From participants’ answers to open-ended questions, it was found that at the end of the study, within the subcategories of intrinsic, and extrinsic goals, the experimental and control participants made approximate the same average number of references (.38 vs. .36, .38 vs. .36) per capita (See Table 4.21 for detailed information). This roughly supports the no-difference-between-conditions conclusion about goal orientations from quantitative data analysis. The goals set by respondents included getting a good grade, passing the course, graduating from college, or learning new skills and becoming a better college student.

Table 4.21: Means for goal orientation references mentioned by participants

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
<td>Phase VI</td>
</tr>
<tr>
<td>Mastery/Intrinsic Goal Orientation</td>
<td>0.88</td>
<td>0.38</td>
</tr>
<tr>
<td>Performance/Extrinsic Goal orientation</td>
<td>0.25</td>
<td>0.38</td>
</tr>
<tr>
<td>Both-goal orientation</td>
<td>0.13</td>
<td>0.38</td>
</tr>
</tbody>
</table>

In the Experimental condition, there is a decrease in the number of indications for intrinsic goal orientation (M=.88 to M=.38), and an increase in those for the extrinsic goal (M=.25 to M=.38) and both goal orientations (M=.13 to M=.38) from the beginning to the end of
the study. This seems contradictory to the results from the quantitative data analysis, which indicated that the experimental group learners reported significantly lower extrinsic goal orientation at the end than at the beginning of the study. However, the decrease in references for intrinsic goal orientation is in the same direction as the results from the quantitative data analysis.

In the Control condition, there is also a decrease in the number of indications for intrinsic goal orientation (M=.71 to M=.36), and an increase in those for the extrinsic goal (M=.14 to M=.36) and both goal orientation (M=.07 to M=.14) from the beginning to the end of the study. This looks similar to the qualitative results from the experimental condition. The decrease in references for intrinsic goal orientation is in the same direction as the results from the quantitative data analysis, however, the increase in references for extrinsic goal orientation is inconsistent with the results from the quantitative data analysis, which indicated that the control group learners reported almost significantly ($p=.052$, 2-tailed) lower extrinsic goal orientation at the end than at the beginning of the study.

Changes in goal orientation. One interesting observation about this measure is the inconsistency of goal orientation held by the participants at the beginning and end of the study. The researcher did a query to compare the goal consistency. If participants’ goals from final self-evaluation are in the same category as their goals from the beginning of study, then their goals are considered consistent (1 Experimental vs. 8 Control), if participants’ goals from final self-evaluation included more content than their goals from the initial goal setting, especially when there was a change in goal orientation, then their goals are considered inconsistent (6 Experimental vs. 5 Control). Participants’ inconsistency of goal orientation focus between the beginning and end of the study is also observable in the quantitative data. Here are some examples of the changes in goal orientation from the qualitative data.

(Note: R$_{001}$= Response of the first person from the Control condition, R$_{112}$= Response of the twelfth person from the Experimental condition, and so on)

R101 (intrinsic $\rightarrow$ both goals):
Phase I: learning better testing strategies, and prioritizing,

Phase VI: Study Habits, Making good grades and Learning how to balance my time. Try different things and see which is better for me.

R004 (intrinsic $\rightarrow$ extrinsic):

116
Phase I: My goals in this course is to learn how to study better and to learn new skills. By the end of this semester I plan to reach my goals. I am going better at doing homework everyday. I have completed 2 assignment out of 27. I just did my assignment I had today.

Phase IV: My goals were to pass all my exams and make good grades. I study for class each day. I have reached my goal. Right now I have a B in the class. I have completed all the assignments on time.

R107 (extrinsic → intrinsic):

Phase I: I want an A
Phase VI: To learn the material,

Within participants who held inconsistent goals between the beginning and end of the study, many students moved from one type of goals, either intrinsic or extrinsic, to both types of goals. In the experimental condition, it raised from one (12.5%) participant in Phase I to three (37.5%) participants in Phase VI, with an increase of 25%. While in the control condition, it increased from one (7.15%) participant in Phase I to two (14.3%) participants in Phase VI, with an increase of 7.15%.

Within participants who held inconsistent goals between the beginning and end of the study, some students moved from intrinsic to extrinsic type of goals. In the experimental condition, participants with extrinsic orientation raised from two (25%) in Phase I to three (37.5%) in Phase VI, with an increase of 12.5%. While in the control condition, it increased from two (14.3%) participants in Phase I to five (35.7%) participants in Phase VI, with an increase of 21.4%. Within participants who held inconsistent goals between the beginning and end of the study, only one experimental participant moved from extrinsic to intrinsic type of goals.

Task Value

In this study, task value refers to students’ perceptions of a particular course in terms of interest, importance and utility (Pintrich et al., 1991). Participants’ expressions about task value included their perception about what is motivating in the course and whether the course is challenging.

In Phase I, only 1 Control participant gave 1 response about what motivated her for taking this course. This remark coincides with the learners’ quantitative score for Task Value in Phase I, which is 24 on a scale with 30 points, and among a class average of 22.08. The following is the response from this participant.
R008:
Q: How do you usually approach study in this course? Please describe a study session.
A: I am lazy at times, but somehow taking this course, or the title of it, motivates me.

From participants’ answers to open-ended questions, it was found that at the end of the study, the Experimental participants (M=.75) made much fewer references than the Control learners (M=1.36). However, all of the remarks about task value in Phase VI were negative. For example, 5 Experimental and 11 Control participants said the course was too easy and there was no need for them to use other resources; In addition, 1 Experimental and 5 Control participants mentioned they did not have to deal with any obstacles, and 2 of them (1 Experimental, 1 Control) directly said the course was rather easy. This implies that both groups reduced their task value, and the control group might have a lower task value than the experimental group. This is in the same direction as quantitative data analysis, which indicated that the experimental group was having higher task value at the end of the study. Yet, this result did not reach statistical significance.

In the Control condition, there is an increase in the number of indications for task value (M=.07 to M=1.36) from the beginning to the end of the study. However, all the remarks about task value in Phase VI were negative, and this means that there is a decrease in control learners’ task value. This is in the same direction as quantitative data analysis.

In the experimental condition, there is a similar increase in the number of indications for task value (M=.00 to M=.75) from the beginning to the end of the study. Judging from these numbers and given that all the remarks about task value in Phase VI were negative (e.g., too easy, no need for other resources, etc), it is understandable why there is a trend for decline in this measure, which is shared by both conditions. This seems consistent with the results from the quantitative data analysis, which indicated that both the experimental and control group learners reported significantly lower Task Value at the end than at the beginning of the study.

**Relationship between task value and use of strategies.** From participants’ responses, a relationship is observable between task value and use of strategies, especially resource management strategies. Learners chose and adjusted their learning strategies according to their

(Note: R001 = Response of the first person from the Control condition, R112 = Response of the twelfth person from the Experimental condition, and so on)
valuing of the course or a certain learning task. This supports the quantitative correlations between task value and use of strategies.

An extreme negative case for illustrating the relationship between task value and strategy use is a student from the control condition. He is not required to take this College Success course, and he did not value this course much because it is not one of his core courses. Therefore, he put most of his time into his core classes, did not set goals for this course, did not notice any distractions, and did not even study for the course. In the end, he received a B. The quantitative scores for this participant show that value in Phase I his task was 17 (M=22.08) and total strategy use was 158 (M=161.23); and in Phase VI his task value reduced to 12 (M=20.31) and total strategy use lowered to 90 (M=157.46). The following excerpts demonstrate the relationship between task value and strategy use, which is displayed through this student’s responses.

R013, Phase VI:

Q: How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments
A: I put my time into my core classes, i really didnt study for this class

Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: I really had no goals in this class.

Q: What specifically did you do when you had to deal with distractions while you were trying to study?
A: I never had such problems

Q: How did you know when you understand something really well? What did you do if you didn’t understand something? Or, what did you do when you were trying to understand a new topic?
A: this class was so easy, i cant think of anything i would have had trouble with

Q: Did you use any other resources besides the textbook and material offered online in studying? Why/Why not?
A: No, i didnt even study for this class.

**Self-Efficacy**

In this study, self-efficacy is defined as learners’ personal beliefs about their capabilities to learn or perform skills for completing the course. According to Pintrich et al. (1991), self-
efficacy includes not only judgments about one’s ability but also one’s confidence in skills to perform a certain task. Participants’ expressions about self-efficacy included their anticipation about whether the course is easy or difficult and how confident they are in attaining their goals or performing a learning task (e.g., overcoming obstacles, utilizing other resources, or working in a group setting).

**Between group comparison.** In Phase VI, only 4 Control participants gave 6 references about self-efficacy, which resulted in an average of 0 and .43 references per capita, for the Experimental and Control condition respectively. This made it impossible to confirm the no-difference-between-conditions conclusion about self-efficacy from quantitative data analysis. In addition, further analysis found that within these 4 Control participants, who provided references about self-efficacy, 2 of them received a B, and 1 received a C for final course grades, and their verbal statements do not necessarily match their quantitative scores on self-efficacy, which are 34, 21, 16, respectively on a scale with 40 points, and among a class average of 29.08. This following Table 4.22 depicts this discrepancy.

Table 4.22: Discrepancy between qualitative statements and quantitative scores from MMLQ expressing self-efficacy

<table>
<thead>
<tr>
<th>Students</th>
<th>Grade</th>
<th>MMLQ Self-Efficacy</th>
<th>Excerpts</th>
</tr>
</thead>
<tbody>
<tr>
<td>R001</td>
<td>B</td>
<td>34</td>
<td>Q: When you were reading the textbook material, did you do anything to help you understand the material? When you were reading the online material, did you do anything to help you understand the material? A: no, i just compreheended well.</td>
</tr>
<tr>
<td>R002</td>
<td>A</td>
<td>40</td>
<td>Q: How did you know when you understand something really well? What did you do when you didn't understand something? Or, what did you do when you were trying to understand a new topic? A: i felt good and therefore knew i would have no problem with it,i would ask the teacher or e-mail ,or ask classmates.</td>
</tr>
<tr>
<td>R003</td>
<td>C</td>
<td>21</td>
<td>Q: How did you know when you understand something really well? What did you do if you didn't understand something? Or, what did you do when you were trying to understand a new topic? A: I get a good grade and when I have confident to myself. I try again or ask the teacher.</td>
</tr>
<tr>
<td>R013</td>
<td>B</td>
<td>16</td>
<td>Q: Did you use any special strategies or tricks that help you prepare for exams/quizzes? A: No, i never have and never will.</td>
</tr>
</tbody>
</table>
Within group comparison. In both the experimental (M=1.38 to M=0.00) and control (M=1.07 to M=0.43) conditions, there is a decrease in number of references about self-efficacy from Phase I to Phase VI. Judging from these numbers, and given that most of the remarks about self-efficacy were overly positive (e.g., too easy, no need for other resources, etc), it is difficult to assume whether there is a trend for increase or decrease in this measure, which is shared by both conditions. However, the results from the quantitative data analysis indicated that both the experimental and the control group learners reported slightly lower self-efficacy at the end than at the beginning of the study. Yet, these quantitative results were not statistically significant.

Relationship between self-efficacy and strategy use. We can see from the participants’ answers to the open-ended questions that most of them were pretty self-efficacious about what they were doing. They didn’t expect encountering many obstacles, and thus it was not necessary for them to use other resources for help seeking. Here are some examples of participants’ statements about self-efficacy from Phase I.

(Note: R001 = Response of the first person from the Control condition, R112 = Response of the twelfth person from the Experimental condition, and so on)

R004:
Q: What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?
A: My goals in this course is to learn how to study better and to learn new skills. By the end of this semester I plan to reach my goals. I am going better at doing homework everyday. I have completed 2 assignment out of 27. I just did my assignment I had today.

Q: Do you expect to meet any obstacles in the course? What are they? When faced with obstacles in the course, what will you do to overcome these obstacles?
A: I don't think I will have any obstacles in this course.

Q: Do you use any other resources besides the textbook and material offered online in studying? Why/Why not?
A: No I don't use any other resources because sometimes they take too much time and I might not have to study the other resources. All I need is my notes and note card with terms.

R103:
Q: Do you expect to meet any obstacles in the course? What are they? When faced with obstacles in the course, what will you do to overcome these obstacles?
A: No I don't expect any obstacles.
Q: Do you use any other resources besides the textbook and material offered online in studying? Why/Why not?
A: No, I feel thats all I need.

There were very few not-so-confident cases. It looks like staying in college was a big goal for one control student in Phase I, and her perception about self was still pretty modest in Phase VI. However, this may not reflect her quantitative scores for self-efficacy from the MMLQ instrument, which were 33 for Phase I (M= 30.00) and 31 for Phase VI (M= 29.08). And, it looked like she was pretty strategic (from the following excerpt) during the study and did receive an A for course grade at the end. Maybe her use of strategies navigated her through the semester, and supplemented her lack of self-efficacy for achievement. Here are responses related with her self-efficacy and use of strategies.

R005:
Phase I
Q: What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?
A: I am just hoping for success. As of now, it looks like I am in the process of reaching my goals because I am in college, furthering my education.

Phase VI
Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: My goal for this course was to learn how to manage my time and study more. I didn't really have a plan, I just went with the flow. I am still learning to manage my time, but I have seen an improvement.

Q: How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments
A: Whenever I knew there was a test or quiz coming up I would study for it every chance I got.

Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: The study strategy I used was to study in my room where it was quiet. It works everytime because that is where I always study.

Q: Did you meet any obstacles in the course? What were they? When faced with obstacles in the course, what did you do to overcome these obstacles?
A: The only obstacles I faced was that fact that my friends tried to get me to stop studying and go out with them. Sometimes I would, other times I wouldn't.

*Effects of the environment on self-efficacy.* One statement from Phase I reflected the traumatic effects of the environment on students’ performance and self-efficacy. This study started in the beginning of fall semester 2005, right after hurricane Katrina happened in New Orleans on August 29th 2005. It looks like that the hurricane had at least affected this student psychologically (from her use of the word “devastation”), and was making it harder for her to complete her learning tasks. This may be why she used the word “decently” in her self-evaluation of goal attainment, and it implied that she could have done better if it were not for the hurricane. Fortunately, only this one student made this one comment in the whole record, and this negative effect of hurricane Katrina was not identified at the end of the semester. Here is the statement provided by this participant:

R008, Phase I:
Q: What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?
A: I am working on studying more efficiently and absorbing more information. Yes, I do plan on reaching my goals. I have been decently reaching them, due to the devastation of the hurricane.

*Evidence on Reported Use of Strategies*

*Overall Trend of Strategy Use*

Overall, the experimental group gave more total references for strategy use than the Control group at both Phase I (M= 20.38 vs. M=16.36) and Phase VI (M=18.13 vs. M=15.93), and there is a decrease in the total number of references from Phase I (M= 20.38 & M=16.36) to Phase VI (M=18.13 & M=15.93). Participants referred the most to resource management strategies (range=0-15), and followed by cognitive (range = 0-8) and metacognitive (range = 0-8) strategies. Tables 4.23, 4.24, and 4.25 present information about overall trends in reported use of strategies from qualitative data.
Table 4.23: Means, SD and Mdn for learning strategy references mentioned by participants in Phase VI

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Metacognitive (0-7)</td>
<td>4.75</td>
<td>.46</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>5.13</td>
<td>1.81</td>
</tr>
<tr>
<td>Resource management (0-15)</td>
<td>8.25</td>
<td>2.92</td>
</tr>
<tr>
<td>Total strategy (6-23)</td>
<td>18.13</td>
<td>3.36</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.24: Means, SD and Mdn for learning strategies mentioned by Experimental participants

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Metacognitive (0-8)</td>
<td>5.13</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>5.62</td>
</tr>
<tr>
<td>Resource management (0-15)</td>
<td>9.62</td>
</tr>
<tr>
<td>Total strategy (10-28)</td>
<td>20.38</td>
</tr>
</tbody>
</table>

Table 4.25: Means, SD and Mdn for learning strategies references mentioned by Control participants

<table>
<thead>
<tr>
<th></th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Metacognitive (0-8)</td>
<td>4.86</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>3.42</td>
</tr>
<tr>
<td>Resource management (0-14)</td>
<td>8.07</td>
</tr>
<tr>
<td>Total strategy (4-27)</td>
<td>16.36</td>
</tr>
</tbody>
</table>

From participants’ answers to open-ended questions, it was found that at the end of the study, more (50%) Experimental versus (43%) Control participants gave positive responses about changes in their use of learning strategies. And each experimental participant (M=.75) gave slightly more references than those in the Control condition (M=.71). Judging from these numbers, it seems like more experimental learners think the course or treatment is beneficial to their use of learning strategies. Respondents generally mentioned that they were able to study
more and longer and receive better results, or they learned to manage their time better or were able to use some of the strategies for accomplishing their goals. Here are some examples of these responses.

(Note: \( R_{001} \) = Response of the first person from the Control condition, \( R_{112} \) = Response of the twelfth person from the Experimental condition, and so on)

R101:
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: SQr3, I actually sat and studied longer.

R102:
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: Flash cards. I learn to manage my time to have a more effective study period.

R107:
Q: What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?
A: To learn the material, just studying, I’ve done well, completed all to get an A and use skills for other classes

R006:
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: I became more adapt to my surrounds as in doing the work on time and doing it the right way.

R008:
Q: How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments
A: Honestly, I didn't really take it seriously at first. I began making effective formal outlines to use to study before tests.

R009:
Q: How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments
A: I would get side tracked, not read the chapters like I was supposed too, and sometimes not even study at all. This has changed drastically!
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: Get an academic support group, know where to find help, and have a positive attitude with an internal locus of control. I realized that I needed to study and read more. They changed because SLS 1501 taught me good strategies.

Metacognitive Strategies

In this study, metacognitive strategies refer to the “awareness, knowledge, and control of cognition.” (Pintrich et al., 1991, p. 23). The qualitative data analyzed included answers to open-ended questions, which are related to codes, such as Goal Setting, Strategic Planning, Self-Monitoring, Self-Evaluation. Tables 4.26, 4.27, and 4.28 present information about reported use of metacognitive strategies from qualitative data.
Table 4.26: Means, SD and Mdn for metacognitive strategy references mentioned by participants in Phase VI

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (n=8)</th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Metacognitive (0-7)</td>
<td>4.75</td>
<td>.46</td>
</tr>
<tr>
<td>Goal setting (0-1)</td>
<td>1.00</td>
<td>.00</td>
</tr>
<tr>
<td>Strategic planning</td>
<td>.38</td>
<td>.52</td>
</tr>
<tr>
<td>(0-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>.88</td>
<td>.35</td>
</tr>
<tr>
<td>(0-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>2.50</td>
<td>.76</td>
</tr>
<tr>
<td>(0-4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.27: Means, SD and Mdn for metacognitive strategies mentioned by Experimental participants

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Metacognitive (0-8)</td>
<td>5.13</td>
</tr>
<tr>
<td>Goal setting (0-2)</td>
<td>1.25</td>
</tr>
<tr>
<td>Strategic planning</td>
<td>1.63</td>
</tr>
<tr>
<td>(0-4)</td>
<td></td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>1.25</td>
</tr>
<tr>
<td>(0-3)</td>
<td></td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>1.00</td>
</tr>
<tr>
<td>(0-3)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.28: Means, SD and Mdn for metacognitive strategies references mentioned by Control participants

<table>
<thead>
<tr>
<th></th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Metacognitive (0-8)</td>
<td>4.86</td>
</tr>
<tr>
<td>Goal setting (0-1)</td>
<td>1.00</td>
</tr>
<tr>
<td>Strategic planning</td>
<td>1.71</td>
</tr>
<tr>
<td>(0-4)</td>
<td></td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>1.50</td>
</tr>
<tr>
<td>(0-3)</td>
<td></td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>.64</td>
</tr>
<tr>
<td>(0-4)</td>
<td></td>
</tr>
</tbody>
</table>
**Between group comparison.** At Phase VI, compared with the Control group (M=4.64), the Experimental group (M=4.75) gave a little more references for metacognitive strategy use, which is in the same direction with the quantitative results that indicating the experimental group learners (M = 37.13) reported higher scores on use of metacognitive strategies than the control group learners (M =36.85). However, the quantitative difference did not reach statistical significance.

**Within group comparison.** It looks like there is a decrease in the number of references to metacognitive strategies in both conditions from Phase I (M_{exp}=5.13 & M_{con}=4.86) to Phase VI (M_{exp}=4.75 and M_{con}=4.64). This is inconsistent with the quantitative results, which point out that both the Experimental and Control conditions reported higher use of metacognitive strategies at the end than at the beginning of the study. However, once again, the quantitative results showed no statistical significance. Within the category of metacognitive strategies, there is a decrease in strategic planning (M_{exp}=1.63 and M_{con}=1.71 to M_{exp}=.38 and M_{con}=.21) and an increase in self-evaluation (M_{exp}=1.00 and M_{con}=.64 to M_{exp}=2.50 and M_{con}=2.64), which is shared by both conditions, during the process of the study. This might have been caused by the design/natural sequence of the study because usually strategic planning happens at the beginning and self-evaluation takes place more at the end of a learning task or period.

**Cognitive Strategies**

In this study, cognitive strategies refer to behaviors that are used to rehearse, organize, and transform learning materials for the purpose of memorizing or retaining knowledge. The qualitative data analyzed include answers to open-ended questions, which are related to codes, such as Rehearsal, Organization, and Elaboration.

Overall, the experimental group reported using more cognitive strategies than the control group in both Phase I (M_{exp}=5.62 vs. M_{con}=3.42) and Phase VI (M_{exp}= 5.13 vs. M_{con}=3.36). Across conditions, rehearsal, which is considered a surface-level strategy, is the most-mentioned (range = 0-6) subcategory within cognitive strategies, and there are much fewer references for organization (range=0-3) and elaboration (range=0-3) strategies, which involve deeper cognitive processing. Tables 4.29, 4.30, and 4.31 present information about reported use of cognitive strategies from qualitative data.
Table 4.29: Means, SD and Mdn for cognitive strategy references mentioned by participants in Phase VI

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>5.13</td>
<td>1.81</td>
</tr>
<tr>
<td>Rehearsal (0-6)</td>
<td>4.13</td>
<td>1.81</td>
</tr>
<tr>
<td>Organization (0-3)</td>
<td>.25</td>
<td>.46</td>
</tr>
<tr>
<td>Elaboration (0-3)</td>
<td>.75</td>
<td>1.16</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.30: Means, SD and Mdn for cognitive strategies mentioned by Experimental participants

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>Phase VI</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>5.62</td>
</tr>
<tr>
<td>Rehearsal (0-7)</td>
<td>3.88</td>
</tr>
<tr>
<td>Organization (0-3)</td>
<td>.50</td>
</tr>
<tr>
<td>Elaboration (0-3)</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.31: Means, SD and Mdn for cognitive strategies references mentioned by Control participants

<table>
<thead>
<tr>
<th></th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>Phase VI</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Cognitive (0-8)</td>
<td>3.42</td>
</tr>
<tr>
<td>Rehearsal (0-5)</td>
<td>2.36</td>
</tr>
<tr>
<td>Organization (0-3)</td>
<td>.07</td>
</tr>
<tr>
<td>Elaboration (0-3)</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Between group comparison. At Phase VI, the Experimental participants (M=5.13) made considerably more references to cognitive strategies than the Control participants (M=3.36). This difference is in the same direction as the quantitative results, which show that the experimental group learners (M= 67.13) reported higher scores on use of cognitive strategies than the control group learners (M =61.46). However, this quantitative result was not statistically significant.
notably more references to rehearsal than the Control participants (M=2.43). This difference is also in the same direction as the quantitative results, which indicate that the experimental learners reported higher scores (M =15.06) on use of rehearsal strategies than the students in the control group (M=13.46). However, the quantitative difference did not reach statistical significance.

*Within group comparison.* In the Experimental condition, there is a decrease in the number of references for overall cognitive strategies (M=5.62 to M=5.13), and the subcategories of organization (M= .50 to M=.25) and elaboration (M=1.26 to M=.75). This is in a different direction as the quantitative results, which indicated that the experimental learners’ were using more overall cognitive strategies, and the subcategories of organization and elaboration strategies. However, there is an increase in the experimental group’s qualitative references for rehearsal strategies (M=3.88 to M=4.13). This is consistent with the quantitative results, which indicated that there is an increase in the experimental learners’ use of rehearsal strategies.

In the Control condition, there is a similar decrease in the references for overall cognitive strategies (M=3.42 to M=3.36) and the subcategories of elaboration (M=1.00 to M=.43). This is in the same direction as the quantitative results. However, there is a slight increase in the control learners’ qualitative references for rehearsal (M=2.36 to M=2.43) and organization (M= .07 to M=.50) strategies. This is in a different direction as the quantitative results.

Here are some examples of statements about participants’ use of cognitive strategies:

(Note: \textit{R} \textsubscript{001} = Response of the first person from the Control condition, \textit{R} \textsubscript{112} = Response of the twelfth person from the Experimental condition, and so on. The underlined words in parentheses are codes for certain references)

**Phase I**

\textbf{R004:}

\textbf{Q:} When you are reading the textbook material, do you do anything to help you understand the material? When you are reading the online material, do you do anything to help you understand the material?

\textbf{A:} When I'm reading the textbook I underline (rehearsal) or highlite (rehearsal) sentences that are important.

\textbf{R101:}

\textbf{Q:} What study strategies do you use that have helped you most to be successful in the past?

\textbf{A:} taking Notes, outlining (organization), notecards (elaboration), alot of visuals (elaboration).
R102:
Q: When you are reading the textbook material, do you do anything to help you understand the material? When you are reading the online material, do you do anything to help you understand the material?
A: After reading the material I try to summarize (elaboration) what I read. I don't have any online material to read.

Phase VI
R013:
Q: Did you use any special strategies or tricks that help you prepare for exams/quizzes?
A: read the chapters over and over (rehearsal) till I remember them.

R106:
Q: How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments
A: I would read my book and then outline (organization) what was important. Then I would go back through the chapter that I read and make an outline of what I underlined (elaboration).

R010:
Q: When you were reading the textbook material, did you do anything to help you understand the material? When you were reading the online material, did you do anything to help you understand the material?
A: I made up acronyms for things (elaboration) and little rhythmic notations (elaboration) to help me.

Resource Management Strategies
In this study, resource management strategies involve strategies that students use to manage their environment for example their time, their study environment, and other participants including teachers and peers (cf. Corno, 1986; Zimmerman & Martinez-Pons, 1986 as cited in Hofer et al., 1998). The qualitative data analyzed included answers to open-ended questions, which are related to codes such as Effort Regulation, Peer Learning, Help Seeking, Time Management, and Study Environ Management. Overall, resource management strategies is the most-reported (range = 0-15) category, compared with metacognitive (range = 0-8) and cognitive (range =0-8) strategies. Tables 4.32, 4.33, and 4.34 present information about reported use of resource management strategies from qualitative data.
Table 4.32: Means, SD and Mdn for resource management strategy references mentioned by participants in Phase VI

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Resource management (0-15)</td>
<td>8.25</td>
<td>2.92</td>
</tr>
<tr>
<td>Time and environment (0-5)</td>
<td>2.38</td>
<td>.74</td>
</tr>
<tr>
<td>Effort Regulation (0-5)</td>
<td>2.13</td>
<td>1.36</td>
</tr>
<tr>
<td>Peer learning (0-4)</td>
<td>2.13</td>
<td>.64</td>
</tr>
<tr>
<td>Help-seeking (0-5)</td>
<td>1.63</td>
<td>1.60</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.33: Means, SD and Mdn for resource management strategies mentioned by Experimental participants

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Resource management (0-15)</td>
<td>9.62</td>
</tr>
<tr>
<td>Time &amp; Environment (0-5)</td>
<td>2.23</td>
</tr>
<tr>
<td>Effort Regulation (0-5)</td>
<td>1.75</td>
</tr>
<tr>
<td>Peer learning (0-5)</td>
<td>2.75</td>
</tr>
<tr>
<td>Help-seeking (0-5)</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Table 4.34: Means, SD and Mdn for resource management strategies references mentioned by Control participants

<table>
<thead>
<tr>
<th></th>
<th>Control group (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase I</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Resource management (0-14)</td>
<td>8.07</td>
</tr>
<tr>
<td>Time and environment (0-5)</td>
<td>2.14</td>
</tr>
<tr>
<td>Effort Regulation (0-4)</td>
<td>1.86</td>
</tr>
<tr>
<td>Peer learning (0-4)</td>
<td>2.21</td>
</tr>
<tr>
<td>Help-seeking (0-5)</td>
<td>1.86</td>
</tr>
</tbody>
</table>

Ranges of students’ references in each category are given in parentheses.

Between group comparison. At Phase VI, the experimental group (M= 8.25) provided more references for resource management strategies than the control group (M=7.93). This seems in agreement with the quantitative results, which indicate that the experimental group learners (M= 60.25) reported higher scores on use of resource management strategies than the
control group learners (M = 59.15), but the differences did not reach statistical significance. More specifically, it was found from the qualitative data that the experimental learners gave more references for time and study environment management (M\textsubscript{exp} = 2.38 vs. M\textsubscript{con} = 2.36), effort regulation (M\textsubscript{exp} = 2.13 vs. M\textsubscript{con} = 2.00) and help seeking (M\textsubscript{exp} = 1.63 vs. M\textsubscript{con} = 1.29), and less references for peer learning (M\textsubscript{exp} = 2.13 vs. M\textsubscript{con} = 2.29) than the control participants. The qualitative findings for time and study environment management and help seeking are consistent with the quantitative results, however, the findings for effort regulation and peer learning are inconsistent with the quantitative results.

Within group comparison. In the experimental group, there is a decrease in number of references for overall resource management (M = 9.62 to M = 8.25) and the subcategories of peer learning (M = 2.75 to M = 2.13) and help seeking (M = 3.00 to M = 1.63). However, an increase in number of references was identified for time and study environment management (M = 2.23 to M = 2.38) and effort regulation (M = 1.75 to M = 2.13). The decrease in references for overall resource management and the subcategories of help seeking, peer learning, and a slight increase in references for time and study environment management are consistent with the quantitative results, while the increase in qualitative references for effort regulation is in a different direction as the quantitative result.

In the control condition, there is a similar trend of decrease in overall resource management (M = 8.07 to M = 7.93) and the subcategories of help seeking (M = 1.86 to M = 1.29), and a slight increase in time and study environment management (M = 2.14 to M = 2.36) and effort regulation (M = 1.86 to M = 2.00). Yet, the increase in peer learning (M = 2.21 to M = 2.29) is different from the trend in the experimental condition. The decrease in references for overall resource management and the subcategories of help seeking, and a slight increase in references for time and study environment management and effort regulation are consistent with the quantitative results, while the increase in references for peer learning is in a different direction from the quantitative result.

It looks like the decrease in the number of references to overall resource management strategies in the Experimental and the Control conditions from Phase I to Phase VI is consistent with the quantitative results, which suggest that the experimental group learners reported significantly lower use of resource management strategies at the end (M = 60.25) than at the beginning (M = 64.96) of the study, while the control group learners reported lower use of
resource management at the end (M = 59.15) than at the beginning (M =60.23) of the study. However the result for the control group is not statistically significant.

Here are some examples of statements about participants’ use of resource management strategies:

(Note: R_{001} = Response of the first person from the Control condition, R_{112} = Response of the twelfth person from the Experimental condition, and so on. The underlined words in parentheses are codes for certain references)

**Code: Effort regulation**
R001, Phase I:
Q: What specifically do you do when you have to deal with distractions while you are trying to study?
A: Really try to **ignore them** (effort regulation)

R101, Phase VI:
Q: Did you meet any obstacles in the course? What were they? When faced with obstacles in the course, what did you do to overcome these obstacles?
A: Yes, working with peers. **Did my part and still succeeded** (effort regulation)

**Code: Help seeking**
R002, Phase I:
Q: Do you use any other resources besides the textbook and material offered online in studying? Why/Why not?
A: yes, instructors, tutors, peers help centers (help seeking)

R108, Phase VI:
Q: What did you do if you didn’t understand something? Or, what did you do when you were trying to understand a new topic?
A: If I didn’t understand something I just **asked my teacher**. (help seeking)

**Code: Peer learning**
R102, Phase I:
Q: What study strategies do you use that have helped you most to be successful in the past? How will your approaches to studying in this course change as the semester progress? Why?
A: **Study Groups** (peer learning) and individual study. Because I have made new friends and we can have study groups when major tests are coming up. Because it might help us get a better grade on the test.

**Code: Time and study environment management**
R009, Phase I:
Q: Do you print out hard copies of any online material? Why/why not? If you do print out hard copies, what do you print? Why?
A: If I feel like I need more time to study (time management) and I am not going to be at the computer (study environment management) then I might print it out.

R105, Phase VI:
Q: What specifically did you do when you had to deal with distractions while you were trying to study?
A: I would go to school and study in the library (effort regulation, study environment management)

R007, Phase VI:
Q: What time of day and day(s) of the week did you usually do your offline coursework? Why? What time of day and day(s) of the week did you usually do your online coursework? Why? Did you use any preparatory or mind-setting activities before starting your online work? If so, what did you do?
A: All of my classes start around noon, so I would usually utilize my time between 10 am and 12 pm to do all my school work. (time management)

Use of resource management strategies is influenced by task value. From participants’ responses to the open-ended questions, a relationship is identified between students’ task value and use of resource management strategies. Some learners adjusted their time management strategies because they found the course was not as challenging as they expected, and many of them did not seek help from any other resources because it was not necessary, and they did not use these help-seeking strategies because they thought the course was not taxing enough for them to implement the strategies. From the qualitative data, it was found that 63% (5) experimental and 79% (11) control participants said the course was too easy for them to utilize any other resources; In addition, 13% (1) experimental and 36% (5) control participants recalled that they did not have to deal with any obstacles, and 2 of them (1 Experimental, 1 Control) directly said it was because the course was rather easy. These also support the quantitative conclusion for significant correlation between task value and use of resource management strategies in Phase VI, and help explain the conclusion about a decrease in use of resource management strategies while participants’ task value decreased from quantitative data analysis. Here are some statements that illustrate the influence of Task Value on use of recourse management strategies.

Phase VI
R010:
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: As the semester passed by I realized that it wasn't really challenging so my study time decreased a lot
R108:
Q: Did you use any other resources besides the textbook and material offered online in studying? Why/Why not?
A: No (other resources), all I needed to know was given to me in class or in the book.

Incidental findings

These qualitative findings are not directly related to the research questions of the study, but they might help clarify and interpret some of the previous results.

Naïve Self-Regulated Learners

It was found from the answers to the open-ended questions that these participants in the study can be considered naïve self-regulated learners (Ertmer & Newby, 1996). The following are evidence from the data, which validate this assertion.

Work for pay and time for study. This question “What time of day and day(s) of the week do/did you usually do your offline coursework? Why? What time of day and day(s) of the week do/did you usually do your online coursework? Why?” was included to gather participants’ strategies for time management. One interesting finding from this question is that whether a student work or not is making a big difference in the way students arranged time for studying.

Table 4.35 contains information about this.

Table 4.35: Time management by work-for-pay hours

<table>
<thead>
<tr>
<th>Wk4pay Hrs</th>
<th>Phase I</th>
<th></th>
<th></th>
<th>Phase VI</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Indefinite</td>
<td>Don’t know</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Do not work for pay</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>1-10 hours</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>11-20 hours</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>21-30 hours</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>31-40 hours</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>=&gt; 40 hours</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Total of work for pay</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

In Phase I, a large number of people, who work for pay, planned to study during the night (8) or gave indefinite (4) answers. In Phase VI, however, a large number of people, who work for pay, reported that they actually studied during the day (6) and indefinite (6/10) time more than
during the night. These participants did not carry out their strategies for time management exactly as they had planned during the semester. However, a significant correlation was not found from the quantitative data analysis.

“Test-taking strategies.” In this study, the “test-taking strategies” code was used to categorize situations when participants gave test-taking-strategies answers to questions asked them about their general strategies for completing certain tasks.

When given the question “How do/did you usually approach study in this course? Please describe a study session to explain how you typically approach/approached your individual assignments.” 2 participants (1 Experimental vs. 1 Control) answered it with strategies related to test taking in Phase I. Here are the responses.

R102: I do the easy problems first and come back to the hard one's later.
R009: I haven't had a chance to have to 'study' for a test or something in this course yet.

In Phase IV, two experimental participants (25%) and five control students (36%) gave responses to this same question with strategies related to test taking. Here are some examples of the responses.

R108: I read that book to study for quizzes. I also read my notes. Alone in my room without any distractions.
R003: Just write down the important thing that I think that going to be on the quizzes or exams.
R005: Whenever I knew there was a test or quiz coming up I would study for it every chance I got.

When asked “What study strategies do/did you use that have helped you most to be successful in the past/the course?” two experimental participants (25%) and one control student (7%) indicated that test-taking strategies were the most helpful ones to them in Phase I, while in Phase IV none participant replied with similar answers. Here are some examples of the responses.

R103: Actually doing my work & looking over notes before the test.
R014: studying right before the test for about 15 minutes.

It looks like that test-taking strategies are so important to some of these participants, and they were the only learning strategies that these students remembered or could describe. And, some of these students thought study was only for taking tests, and they only study when there is a test or exam arriving very soon. This might be the reason why some students turned to be more
extrinsic goal oriented at the end of the study, when the pressure for getting a performance outcome reached its climax.

Using "grades" as a measure for self-monitoring. From participants’ answers to the question “How do/did you know when you understand/understood something really well?”, it was found that several participants (Experimental 1 vs. Control 2) used grades as a measure to check whether they understood something really well in Phase VI. But using grades as a method for self-monitoring might be too late for students to adjust the use of other strategies for attaining optimal learning outcome. In addition, it looks like that this theme is related to learners’ extrinsic or both goal orientation. This theme was not identified in Phase I. Here are some examples of the responses.

- R107: when i got a good grade on it, (Qualitative, Both goal orientation)
- R003: I get a good grade and when I have confident to myself. (Qualitative, Extrinsic goal orientation)
- R004: I knew that I knew something really well if I received a good grade on that assignment, paper or Test. (Qualitative, Extrinsic goal orientation)

From the above evidence, it was found that these participants did not execute their plan for strategy use as they had proposed; described test-taking strategies when they were asked about their general strategies for regular study; considered it too early to make strategic planning at the beginning of a semester because they had not met a test or exam yet; and even used grades as a measure for ongoing self-monitoring of comprehension. There is much space for these community college students to improve the “skill” and “will” (Hofer et al., 1998) for the proper use of their learning strategies.

**Improvement in Metacognitive Awareness**

Metacognitive awareness refers to students’ attentiveness to their own strategies and motivation for learning, and their relative effectiveness. The following are evidence, which explains why an improvement in learners’ metacognitive awareness exits according to the qualitative data.

**Description about self-monitoring.** The question “How do/did you know when you understand/understood something really well?” was included to qualify participants’ metacognitive awareness or self-monitoring of their comprehension. The answers to this question indicated that students’ description about understanding were at different levels of clarity. The
following Table 4.36 is a tabulation of number and example of descriptions about understanding in both Phase I and Phase IV.

Table 4.36: Levels of description about understanding (in unit of cases).

<table>
<thead>
<tr>
<th></th>
<th>Phase I</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exp</td>
<td>Con</td>
</tr>
<tr>
<td>Clear</td>
<td>37.5%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vague</td>
<td>37.5%</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No good</td>
<td>25%</td>
<td>0</td>
</tr>
</tbody>
</table>

Regarding the answers to this same question “How do/did you know when you understand/understood something really well?”, several students (2 Experimental vs. 2 Control) mentioned in Phase I "it will just click in my head", “it comes naturally” or “I just know”, which are very indistinct or unclear descriptions of their understanding. In Phase VI, only 1 Control participant mentioned it will just click in my head, but provided some detailed explanation as he stated “things would just click into place for me. i knew if i knew something when i could recite it without aid”(R007). This looks like that participants in both groups were improving in their description about understanding. However, compared with the control participants (57%), more people in the experimental (75%) condition were in the “clear” category at the end of the study.

“Just- study”. In this study, the “just-study” code was used to categorize situations when participants gave “Just study” or “Just studied” answers to questions asked them about their
specific strategies for completing certain tasks. These answers are considered not very clear description about strategies. Its implication could range from putting in effort (effort regulation) for accomplishing a task to not knowing how to describe a learning behavior. All of the answers are answers to question “Do/Did you use any special strategies or tricks that help you prepare for exams/quizzes?”

In the Experimental condition, 3 (37.50%) and 0 (0%) cases gave “just-study” responses at Phase I and Phase VI respectively. Experimental participants made 3 and 0 references, which yielded an average of .38 and 0 references for Phase I and Phase VI respectively. In the Control condition, 6 (42.86%) and 3 (21.43%) cases gave “just-study” responses at Phase I and Phase VI respectively. Control participants made 6 and 3 references, which yielded an average of .43 and .21 for Phase I and VI respectively. It looks like there is a decrease in the number of “just-study” references in both the Experimental and Control conditions from Phase I to Phase VI, and the decrease is larger in the Experimental (M=.38 to M=0) than the Control (M=.43 to M=.21) condition. Here are some examples of participants’ “just-study” responses:

(Note: R001= Response of the first person from the Control condition, R112= Response of the twelfth person from the Experimental condition, and so on)

Phase I
R005:
A: Just your basic studying.

R101:
A: notecards and studies

Phase VI
R004:
A: I didn't really use any special strategies. I just studied.

R005:
A: The only strategy I used to prepare for a test or quiz was to study.

“No Strategies.” In this study, the “no-strategy” code was used to categorize situations when participants gave “no strategy” or “don’t know” answers to questions asked them about their specific strategies for completing certain tasks. These answers are considered completely no awareness, no description or knowledge about strategies.
In the Experimental condition, 5 (62.50%) cases gave “no-strategy” responses at both Phase I and Phase VI respectively. Experimental participants made 14 and 8 references, which yielded an average of 1.75 and 1 reference for Phase I and Phase VI respectively. In the Control condition, 7 (50.00%) and 10 (71.43%) cases gave “no-strategy” responses at Phase I and Phase VI respectively. Control participants made 17 and 16 references, which yielded an average of 1.21 and 1.14 for Phase I and VI respectively. It looks like there is a decrease in the class mean for “no-strategy” references in both the Experimental and Control conditions from Phase I to Phase VI, and the decrease is much larger in the experimental (mean difference =.75) than the Control (means difference=.07) condition.

Here are some examples of participants’ “no-strategy” responses:

(Note: R001= Response of the first person from the Control condition, R112= Response of the twelfth person from the Experimental condition, and so on)

Phase I
R003:
Reference 1 -
Q: How do you usually approach study in this course? Please describe a study session.
A: dont understand
Reference 2 -
Q: How do you usually work on group projects?
A: dont understand
R104:
Q: How will your approaches to studying in this course change as the semester progress? Why?
A: i don't know yet just started.

Phase VI:
R001:
Q: When you were reading the textbook material, did you do anything to help you understand the material? When you were reading the online material, did you do anything to help you understand the material?
A: no, i just comperhended well.

R104:
Q: What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?
A: note taking. i do not know all these question jes.
From the above evidence, it is found that participants in both groups were improving in their description about understanding and were giving more meaningful answers to questions about their learning strategies. However, compared with the control participants, more experimental learners provided clearer description about their understanding, and the experimental participants also reduced the occurrence of nonsense answers to questions at the end of the study.

Summary of Findings

The major purpose of this study is to evaluate the effectiveness of a web-based intervention that provides students with training on self-regulated learning strategies, in a community college setting. A summary of findings from the current study is presented in Table 4.37.

Table 4.37: Summary of Findings

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Quantitative Results</th>
<th>Sig or not?</th>
<th>Qualitative findings</th>
<th>Triangulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypothesis 1</strong>: Students who were exposed to the training intervention would outperform students who were not exposed to the training on each of the achievement measures</td>
<td>Higher overall performance</td>
<td>Yes</td>
<td>More (50%) Experimental versus Control (36%) participants gave positive responses about their achievements.</td>
<td>Same direction</td>
</tr>
<tr>
<td></td>
<td>Higher Test 3, Higher Career Exploration Paper Higher Final exam scores Higher Presentation project Lower Test 1 Higher Test 2 Higher Test 4</td>
<td>Yes</td>
<td>Experimental participants gave more (M=.63) positive references than Control condition (M= .50) about their achievements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotheses</td>
<td>Quantitative Results</td>
<td>Sig or not?</td>
<td>Qualitative findings</td>
<td>Triangulation</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td><strong>Hypothesis 2:</strong> experimental students would have more positive motivation in terms of higher self-efficacy, task value, self-satisfaction and intrinsic goal orientation and lower extrinsic goal orientation than control learners.</td>
<td>Higher self-efficacy</td>
<td>Only 4 Control participants gave 6 references about self-efficacy, which resulted in an average of 0 and .43 references per capita, for the Experimental and Control condition respectively</td>
<td>Hard to compare results</td>
<td></td>
</tr>
<tr>
<td>Higher task value,</td>
<td>The Experimental participants made much fewer (M=.75) negative references than the Control learners (M=1.36). The control group might have a lower task value than the experimental group.</td>
<td>Same direction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher self-satisfaction</td>
<td>More (75%) experimental versus control (57.14%) participants gave responses to express their self-satisfaction. The Experimental participants gave more (M=.88 ) references than the control condition, (M=.86) to express their self-satisfaction</td>
<td>Same direction for self- satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slightly higher intrinsic goal orientation Slightly Higher extrinsic goal orientation <em>(opposite to hypothesis)</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The experimental and control participants made approximate the same average number of references (.38 vs. .36, .38 vs. .36) per capita. Within participants who held inconsistent goals between the beginning and end of the study, some students moved from intrinsic to extrinsic type of goals. In the experimental condition, participants with extrinsic orientation raised form two (25%) in Phase I to three (37.5%) in Phase VI, with an increase of 12.5%. While in the control condition, it increased from two (14.3%) participants in Phase I to five (35.7%) participants in Phase VI, with an increase of 21.4%.</td>
<td>This roughly supports the no-difference-between-conditions conclusion about goal orientations from quantitative data analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotheses</td>
<td>Quantitative Results</td>
<td>Sig or not?</td>
<td>Qualitative findings</td>
<td>Triangulation</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>----------------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>Hypothesis 3:</strong> The experimental students would have more positive motivation, defined as higher self-efficacy, task value, self-satisfaction and intrinsic goal orientation and lower extrinsic goal orientation, at the end than the beginning of the study.</td>
<td>Lower self-efficacy</td>
<td></td>
<td>A decrease in number of references about self-efficacy from Phase I to Phase VI. Most of the remarks about self-efficacy were overly positive</td>
<td>Hard to compare results</td>
</tr>
<tr>
<td></td>
<td>Lower intrinsic goal orientation</td>
<td>Yes</td>
<td>A large decrease in the number of indications for intrinsic goal orientation (M=.88 to M=.38), and</td>
<td>Same direction for intrinsic goal orientation</td>
</tr>
<tr>
<td></td>
<td>Lower extrinsic goal orientation</td>
<td>Yes</td>
<td>an slight increase in those for the extrinsic goal (M=.25 to M=.38) and both goal orientations (M=.13 to M=.38) from the beginning to the end</td>
<td>Different direction for extrinsic goal orientation</td>
</tr>
<tr>
<td></td>
<td>Lower task value</td>
<td>Yes</td>
<td>A similar increase in the number of indications for task value (M=.00 to M=.75) from the beginning to the end of the study. Yet all the remarks about task value in Phase VI were negative</td>
<td>Same direction</td>
</tr>
<tr>
<td><strong>Hypothesis 4:</strong> The control students would have no difference in their motivation, in terms of self-efficacy, task value, self-satisfaction, intrinsic and extrinsic goal orientation, at the end than the beginning of the study.</td>
<td>Lower self-efficacy</td>
<td></td>
<td>A decrease in number of references about self-efficacy from Phase I to Phase VI. Most of the remarks about self-efficacy were overly positive</td>
<td>Hard to compare results</td>
</tr>
<tr>
<td></td>
<td>Lower intrinsic goal orientation</td>
<td></td>
<td>A large decrease in the number of indications for intrinsic goal orientation (M=.71 to M=.36), and</td>
<td>Same direction</td>
</tr>
<tr>
<td></td>
<td>Lower extrinsic goal orientation</td>
<td></td>
<td>an increase in those for the extrinsic goal (M=.14 to M=.36) from the beginning to the end of the study</td>
<td>Different direction for extrinsic goal orientation</td>
</tr>
<tr>
<td></td>
<td>Lower task value</td>
<td>Yes</td>
<td>An increase in the number of indications for negative task value (M=.07 to M=1.36) from the beginning to the end of the study.</td>
<td>Same direction</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>Quantitative Results</td>
<td>Sig or not?</td>
<td>Qualitative findings</td>
<td>Triangulation</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>Hypothesis 5:</strong> The experimental students would have higher scores on reported use of strategies than control learners.</td>
<td></td>
<td></td>
<td>The Experimental group gave a little more references (M=4.75 vs. M=4.64) for metacognitive strategy use,</td>
<td>In the same direction with the quantitative results</td>
</tr>
<tr>
<td>Higher Metacognitive Strategies</td>
<td></td>
<td></td>
<td>The Experimental group gave a little more references (M=4.75 vs. M=4.64) for metacognitive strategy use,</td>
<td>In the same direction with the quantitative results</td>
</tr>
<tr>
<td>Higher Cognitive Strategies</td>
<td></td>
<td></td>
<td>The Experimental participants (M=5.13) made significantly more references to cognitive strategies than the Control participants (M=3.36).</td>
<td>This difference is in the same direction as the quantitative results</td>
</tr>
<tr>
<td>Higher Rehearsal</td>
<td></td>
<td></td>
<td>The Experimental participants (M=4.13) made significantly more references to rehearsal than the Control participants (M=2.43).</td>
<td>This difference is in the same direction as the quantitative results</td>
</tr>
<tr>
<td>Higher organization</td>
<td>Fewer references (M=.25 vs. M=.50) for organization</td>
<td></td>
<td>Different direction</td>
<td></td>
</tr>
<tr>
<td>Higher elaboration</td>
<td>More references (M=.75 vs. M=.43) for elaboration</td>
<td></td>
<td>Same direction</td>
<td></td>
</tr>
<tr>
<td>Higher resource management strategies</td>
<td>The experimental group (M=8.25) provided more references for resource management strategies than the control group (M=7.93).</td>
<td></td>
<td>This seems in agreement with the quantitative results</td>
<td></td>
</tr>
<tr>
<td>Higher time and environment management</td>
<td>More references (M=2.38 vs. M=2.36) for time and study environment management.</td>
<td></td>
<td>Same direction</td>
<td></td>
</tr>
<tr>
<td>Lower effort regulation</td>
<td>More references (M=2.13 vs. M=2.00) for effort regulation</td>
<td></td>
<td>Inconsistent</td>
<td></td>
</tr>
<tr>
<td>Slightly higher peer learning</td>
<td>Fewer references (M=2.13 vs. M=2.29) for peer learning</td>
<td></td>
<td>Inconsistent</td>
<td></td>
</tr>
<tr>
<td>Slightly higher help seeking</td>
<td>More references (M=1.63 vs. M=1.29) for help seeking</td>
<td></td>
<td>Consistent</td>
<td></td>
</tr>
</tbody>
</table>

145
<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Quantitative Results</th>
<th>Sig or not?</th>
<th>Qualitative findings</th>
<th>Triangulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher total strategies</td>
<td></td>
<td></td>
<td>The experimental group gave more total references for positive changes in strategy use than the Control group at Phase VI (M=18.13 vs. M=15.93). More (50%) Experimental versus (43%) Control participants gave positive responses about changes in their use of learning strategies. And each experimental participant (M=.75) gave more references than those in the Control condition (M=.71).</td>
<td>Same direction</td>
</tr>
<tr>
<td><strong>Hypothesis 6:</strong> The experimental students would have higher scores on reported use of strategies at the end than the beginning of the study.</td>
<td></td>
<td></td>
<td>A decrease in the number of references to metacognitive strategies in Experimental condition from Phase I (M=5.13) to Phase VI (M=4.75).</td>
<td>This is inconsistent with the quantitative results</td>
</tr>
<tr>
<td>Higher metacognitive strategies</td>
<td></td>
<td></td>
<td>A decrease in the number of references for overall cognitive strategies (M=5.62 to M=5.13), and the subcategories of organization (M=.50 to M=.25) and elaboration (M=1.26 to M=.75).</td>
<td>These are in a different direction as the quantitative results,</td>
</tr>
<tr>
<td>Higher cognitive strategies</td>
<td>Higher Organization</td>
<td>Yes</td>
<td>An increase in the experimental group’s qualitative references for rehearsal strategies (M=3.88 to M=4.13).</td>
<td>This is consistent with the quantitative results</td>
</tr>
<tr>
<td></td>
<td>Higher Elaboration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher rehearsal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher total strategies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

146
### Table 3.37 Continued

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Quantitative Results</th>
<th>Sig or not?</th>
<th>Qualitative findings</th>
<th>Triangulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower resource management strategies</td>
<td></td>
<td></td>
<td>A decrease in number of references for overall resource management (M=9.62 to M=8.25) and the subcategories of peer learning (M=2.75 to M=2.13) and help seeking (M=3.00 to M=1.63).</td>
<td>The decrease in the number of references to overall resource management strategies, peer learning and help seeking from Phase I to Phase VI is consistent with the quantitative results</td>
</tr>
<tr>
<td></td>
<td>Lower peer learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower help seeking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher time and environment mgt</td>
<td></td>
<td></td>
<td>More references (M=2.23 to M=2.38) for time and environment management.</td>
<td>Consistent</td>
</tr>
<tr>
<td>Lower effort regulation</td>
<td>Yes</td>
<td></td>
<td>An increase in number of references was identified for effort regulation (M=1.75 to M=2.13).</td>
<td>Inconsistent</td>
</tr>
</tbody>
</table>

**Hypothesis 7:** The control students would have no significant difference in scores on reported use of strategies at the end than the beginning of the study.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Quantitative Results</th>
<th>Sig or not?</th>
<th>Qualitative findings</th>
<th>Triangulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher metacognitive strategies</td>
<td></td>
<td></td>
<td>A decrease in the number of references to metacognitive strategies in the Control condition from Phase I (M=4.86) to Phase VI (M=4.64).</td>
<td>This is inconsistent with the quantitative results</td>
</tr>
<tr>
<td></td>
<td>Lower total strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower cognitive strategies</td>
<td>Lower Elaboration</td>
<td></td>
<td>This is in the same direction as the quantitative results.</td>
</tr>
<tr>
<td></td>
<td>Lower Rehearsal Lower Organization</td>
<td></td>
<td></td>
<td>This is in a different direction as the quantitative results.</td>
</tr>
<tr>
<td></td>
<td>Lower resource management</td>
<td>Lower help seeking</td>
<td></td>
<td>consistent with the quantitative results for overall resource management and help seeking strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A similar trend of decrease in overall resource management (M=8.07 to M=7.93) and the subcategories of help seeking (M=1.86 to M=1.29 ), and</td>
<td></td>
</tr>
</tbody>
</table>

147
Table 3.37 Continued

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Quantitative Results</th>
<th>Sig or not?</th>
<th>Qualitative findings</th>
<th>Triangulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher time and environment mgt</td>
<td>An increase (M=2.14 to M=2.36) in references for time and environment management.</td>
<td>Consistent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher effort regulation</td>
<td>A slight increase in effort regulation (M=1.86 to M=2.00).</td>
<td>Consistent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower peer learning</td>
<td>A slight increase in peer learning (M= 2.21 to M=2.29)</td>
<td>Inconsistent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A significant difference was found between students who received the web-based training on SRL strategies and the students who did not receive the training in terms of overall performance, and performance on some of the course assignments, such as Test 3, Career Exploration Paper, Group Presentation Project and Final exam.

Regarding hypotheses on the effect of the SRL strategy training on student motivation, a significant difference was not found between students who received the web-based training on SRL strategies and the students who did not receive the training in terms of task value, self-efficacy, intrinsic and extrinsic goal orientation. However, a significant difference was found between students who received the web-based training on SRL strategies and the students who did not receive the training on self-satisfaction. In addition, students who received the web-based training on SRL strategies did report significantly lower task value and extrinsic goal orientation at the end than at the beginning of the study.

Concerning the hypotheses on the effects of the SRL strategy training on students’ reported use of strategies, even though students who received the web-based training on SRL strategies did report higher scores on use of metacognitive, cognitive and resource management strategies and the total strategies than students who did not receive the training, but the differences did not reach statistical significance. For students who received the web-based training on SRL strategies, although they did report higher use of metacognitive, cognitive strategies and total strategies at the end than at the beginning of the study, the differences did not reach statistical significance. However, these students who received training did report
significantly lower use of resource management strategies at the end than at the beginning of the study.

The qualitative findings were consistent with 5 of the significant quantitative results on 6 major categories, such as the between-group comparison on overall performance, self-satisfaction, the experimental group’s lower task value and lower use of resource management strategies and the control group’s lower task value at the end of the study; and these findings were also in the same direction as the quantitative results on the subcategory of the experimental group’s significantly higher use of rehearsal strategies at the end of the study; and they were coherent with non-significant results on 11 other major categories. However, the qualitative findings were inconsistent with significant quantitative results on 1 other major category, which is extrinsic goal orientation for the experimental group from the beginning to the end of the study; and they were in different direction with non-significant quantitative results on 4 major categories, which were the lower extrinsic goal orientation and higher metacognitive strategy use for the control group, the higher metacognitive and cognitive strategy use for the experimental group at the end of the study, and 9 sub-categories, including higher organization strategies, lower effort regulation and higher peer learning of the experimental learners in group comparison, the higher organization, elaboration and lower effort regulation strategy use for the experimental group and the lower rehearsal, organization and effort regulation strategy use for the control group at the end of the study. In addition, the qualitative findings were not comparable with quantitative results on all three indicators for self-efficacy.

The qualitative data also indicated that even though participants were still at their primitive stage of self-regulated learning, they were gaining more sophisticated understanding of learning strategies, and becoming more expressive and elucidating in description of strategies that they had used. The researcher found anecdotal evidence for the effect of SRL training on improvement in metacognitive awareness. The SRL strategy training did make participants reflect more on how they learn, what they think about learning in a course, and how their learning strategies are affecting their performance in the course.

Overall, the findings of this study suggested that the web-based tutorial on SRL strategies and the online Study Plan and Self-Evaluation questionnaires were helpful to learners on their achievement, persistence, self-satisfaction and metacognitive awareness, and it showed a trend that adding the strategy training was better than non-training in terms of facilitating use of
learning strategies. However, the findings about the motivation constructs, including self-efficacy, task value, intrinsic and extrinsic goal orientation, were mixed. Interpretations of all these data are included in the discussion of study results in the following chapter.
CHAPTER V

DISCUSSION

The major purpose of this current study was to evaluate the effectiveness of a web-based intervention that provides students with training on self-regulated learning strategies, in a community college setting. This chapter provides a summary of results (See Table 4.37 in Results chapter for details) from the study, an interpretation of these results, and implications for theory and practice. A description of the study’s limitations is then presented, as well as suggestions for future research.

Interpretation of Results

In this following section, the treatment effects on achievement, motivation and strategy use are discussed and summarized on the basis of the research questions and hypotheses that were stated in Chapter 2 and the data analyses presented in Chapter 4.

Effects on Achievements

The research question and hypothesis concerning the treatment effects on achievement stated in Chapter 2 are:

Question 1. Will self-regulated learning strategy training in a web-based environment influence learning achievement/performance?

Hypothesis 1. There will be a significant difference in course percentage grades and grades for each of the major course activities between students in the SRL strategy training condition and those in the non-training condition. Students in the training condition are expected to perform better than those in the non-training condition.

According to a Wilcoxon-Mann-Whitney U Test, the experimental group learners (M = 93.88) performed significantly (U=28.50, p<.05, r= .47) better in overall performance than the control group learners (M =88.77). This indicated that the participants who received the SRL strategies training achieved significantly higher course percentage grades than those who did not receive the training. Therefore, the hypothesis of a significant effect on overall performance was supported.

A further analysis of the performance of students on different learning tasks showed that the achievement of students in the SRL strategy training group was significantly better than those
in the non-training group on Test 3 (U=27.00, p<.05, r=.51), Career Exploration Paper (U=28.50, p<.05, r=.48), and Final exam scores (U=28.00, p<.05, r=.48), which were mostly tasks completed at a later time in the semester and required longer time and more effort to prepare. As a result, the hypotheses of a significant effect for performance on each of the course assignments were partially confirmed, and adding the self-regulated learning strategy training seems to help with students’ accomplishment of long-term tasks, such as Test 3, Career Exploration Paper, and Final exam scores, which involves continuing effort and where cramming is not enough.

The data from final evaluation online questionnaire also supported the above result. Within 8 experimental participants, two (25%) said web based tutorial was helpful for learning, while two (25%) said online Study Plan and Self-Evaluation questionnaires were helpful for learning.

From the participants’ answers to open-ended questions, it was found that more (50%) Experimental versus Control (36%) participants gave positive responses about their achievements. In addition, Experimental participants gave more (M=.63) positive references than Control condition (M=.50) about their achievements. Respondents generally mentioned that they received good grades, or their grades improved during the course, or their goals included a good grade, and they were accomplishing their goals. Most of these comments were made by high achievers; however, none of these remarks linked the students’ improvement in achievement directly to the intervention.

Experimental students might have been using the training materials (esp. Study Plans and Self-Evaluation online questionnaires) as reminders for them to work on and complete long-term tasks. The following excerpts from Self-Evaluation I might help explain this possibility.

From Self-Evaluation I:

R102:
Q: When, during these past 2 weeks, did you start working on the tasks? On what days? At what times? How often?
A: The day the study plan began, and I usually work about 2 to 3 hours every day.

R101:
Q: How did you motivate yourself to complete these tasks? What did you use as a reward when you completed your tasks?
A: looked at the future with the met goal.,,

During the semester for the study, all of the experimental participants completed each of their course assignment, while 4 of the control participants did not complete 1 to 2 of the later,
long-term assignments (project and paper) in the course. This could be the reason why the control group received significantly lower average scores on these assignments and the final course grade.

The findings from this study on learners’ achievement are in line with results from studies conducted by several other researchers (McKeachie, Pintrich, & Lin, 1985; Shafer et al., 2002; Tuckman, 2002, 2003a, 2003b). Decades ago, McKeachie et al. (1985) conducted a study to evaluate a semester-long introductory cognitive psychology course that taught both the concepts of cognitive psychology and their application to learning strategies with intact groups of students. Every week, the course consisted of two 1-hr lectures, where students learned about the cognitive theories and empirical results; and one 3-hr laboratory meeting, where student applied learning strategies and carried out team projects about the development and evaluation of learning strategies. “The course covered the topics of attention, memory, problem solving, self-management, time management, comprehension monitoring, test- taking strategies, motivational strategies, and peer learning” (McKeachie et al., 1985, p. 156). McKeachie et al. (1985)’s study found that the learning strategies course was substantially successful in affecting students' self-reported study habits and modestly successful in affecting students' achievement in the 2 semesters following the study. Their (McKeachie et al., 1985) study is comparable to the current study in that both used intact groups for comparison, the topics covered are quite similar, and the duration of the study is almost the same, and the findings are in the same direction. However, the McKeachie et al. (1985) study was conducted in a traditional classroom setting using a larger sample and it measured students’ self-reported study habits using an unpublished version of the Learning and Study Strategies Inventory (LASSI) (Weinstein, 1982).

Shafer et al. (2002)’s study (see Literature Review in Chapter II for details) is similar to the study described here in that it used the CyberClass system as an instructional supplement, and it found significant positive effects on achievement measured with course grades resulted from a range of learning opportunities. However, it is different to the current study in that it had a much larger sample (743 students), 92% of the participants were required to take the course and it did not examine the effects of the system on learners’ strategy use.

Compared with this current study, Tuckman’s ADAPT (Active Discovery and Participation thru Technology) system, with 200 computer-mediated activities, provided participants with more sophisticated training in learning strategies and more intensive immersion
in application of SRL. In addition, Tuckman’s studies usually had a much larger sample (189 to 397 students), used analysis of covariance with prior cumulative GPA as the covariate to compare the groups. This was not possible with the study described here because of the small sample (N_{exp}=8 vs. N_{con}=13) size, the freshmen status of most participants, and inability to access some of the students’ record. Like this current study, Tuckman examined learners’ GPA in the term during which the training was received and in the term after the training was received to look at both near and far transfer of strategies. However, Tuckman’s studies never assessed changes in students’ strategy use with any measures. In one of the Tuckman studies (Tuckman, 2003c), the researcher also found higher retention rate, the likelihood for students to return and attend their next year of college, within at risk experimental participants whose prior cumulative GPAs were below 2.0. This current study went one step further in this respect by looking at not only the number of courses participants registered but also the credit hours they completed for the next term.

*Effects on Motivation*

The research question and hypothesis concerning the treatment effects on motivation stated in Chapter 2 are:

**Question 2.** Will self-regulated learning strategy training in a web-based environment influence learner motivation (in terms of task value, self-efficacy, goal orientation, self-satisfaction)?

**Hypothesis 2.** There will be a significant difference in learner motivation (in terms of task value, self-efficacy, goal orientation, self-satisfaction) between students in the self-regulated learning strategy training condition and those in the non-training condition. Students in the training condition are expected to have more positive motivation, defined as higher task value/interest, self-efficacy, self-satisfaction, and mastery/learning goal orientation, and lower extrinsic/performance goal orientation, at the end of study than those in the non-training condition.

According to a *Wilcoxon-Mann-Whitney U Test*, the experimental group learners (M = 17.38) did report significantly (U = 27.50, p = .04, r = .39) higher on self-satisfaction than the control group learners (M = 15.08). This indicated that the participants who received the SRL strategies training perceived significantly more satisfied than those who did not receive the training. However, the *Wilcoxon-Mann-Whitney U Test* also revealed that the SRL strategies
training group learners did not report significantly higher on task value, self-efficacy and intrinsic goal orientation and lower on extrinsic goal orientation than those in the non-training group. Hence, the hypotheses of a significant effect on task value, self-efficacy, self-satisfaction, and goal orientation were only partially supported. Adding the SR learning strategies training appears to raise students’ self-satisfaction from taking the course.

From participants’ answers to open-ended questions, it was found that more (75%) experimental versus control (57.14%) participants gave responses to express their self-satisfaction. Furthermore, the Experimental participants gave more (M=.88) references than the control condition (M=.86) to express their self-satisfaction. Findings from qualitative data analysis were consistent with the quantitative results on almost all indicators for motivation.

The positive correlation ($\tau=.50$, $p<.01$) between self-satisfaction and final cumulative course scores might be an explanation for this result. Since the experimental learners achieved significantly better on the final cumulative score and 3 of the 7 course assignments, it is reasonable that they would be generally more satisfied with their learning outcomes from the course. The positive correlation between self-satisfaction and use of cognitive ($\tau=.65$, $p<.01$), metacognitive ($\tau=.40$, $p<.05$), resource management ($\tau=.69$, $p<.01$) and total strategies ($\tau=.67$, $p<.01$) after the intervention might be another reason for this result. The intervention, especially the online Study Plans and Self-Evaluation, was intended to encourage participants to engage in self-regulated learning more than the control learners. A Wilcoxon-Mann-Whitney U Test revealed that the experimental group learners (M = 37.13, 67.19, 60.25, 164.56) did report higher scores on use of metacognitive, cognitive and resource management strategies and the total strategies than the control group learners (M= 36.85, 61.46, 59.15, 157.46), yet, the differences did not reach statistical significance. Experimental learners’ immersion in self-regulated learning might have also brought about their higher scores on self-satisfaction, even though the treatment effect might not be strong enough to make their scores on use of strategies significantly different from those of the control group. This finding is consistent with the result from Zimmerman & Kitsantas’ (1999) study on combining a series of kernel sentences into a single nonredundant sentence. In their study girls, who were involved in self-monitoring during the process of combining sentences, reported higher degree of satisfaction than those who did not.

In the same direction with the hypotheses, the Experimental group learners did report slightly higher on task value, self-efficacy and intrinsic goal orientations than those in the non-
training group, yet the results did not reach statistical significance. Contrary to the hypothesis, the Experimental group learners reported slightly higher extrinsic goal orientation; however, the result did not reach statistical significance. Level of course difficulty might be an explanation for these unexpected results. In this current study, learners reduced their use of resource management strategies after they found out the course was not as challenging as they expected, and many of them did not use any other resources for help-seeking because they thought it was not necessary. This study was designed to improve learners’ motivation by engaging them in learning and implementing self-regulated learning strategies through the tutorial and self-reflective practice, however the level of course difficulty did not provide learners enough opportunity to practice and utilize the strategies that they learned from training and consequently diminished the treatment effect on motivation.

Hypothesis 3. There will be a significant difference in learner motivation (in terms of task value, self-efficacy, goal orientation, self-satisfaction) before and after the treatment for students in the self-regulated learning strategy training condition. Students in the self-regulated learning strategy training condition are expected to have more positive motivation, defined as higher task value/interest, self-efficacy, self-satisfaction, and mastery/learning goal orientation and lower extrinsic/performance goal orientation, at the end than the beginning of study.

According to a Wilcoxon Signed Ranks Test, the participants who received the SRL strategies training did not report significantly different in self-efficacy and intrinsic goal orientation at the end than at the beginning of the study. However, data analysis did show that the experimental group learners reported significantly lower task value and extrinsic goal orientation at the end (M =20.63, 13.88) than at the beginning (M = 24.13, 16.96) of the study. This indicated that participants who received the SRL strategies training perceived significantly lower task value towards the course and less tendency to extrinsic goal orientation at the end than at the beginning of the study. The hypotheses of a significant effect on task value (z=-2.21, p<.05, r= .61) self-efficacy (z=-.94, ns, r=.26), intrinsic goal orientation (z=-.73, ns, r=.20) and extrinsic goal orientation (z=-2.21, p<.05, r=.61) were only partially confirmed, and adding the SR learning strategies training might assist students in reducing focus merely on grades and rewards for studying.
The quantitative result of significantly lower task value for the experimental condition was out of expectation. However, this result was supported by qualitative findings because there was an increase in the number of indications for task value (M=.00 to M=.75) from the beginning to the end of the study. Yet all the remarks about task value in Phase VI were negative. For example, 5 Experimental participants said the course was too easy and there was no need for them to use other resources and 1 Experimental participant mentioned he did not have to deal with any obstacles, and directly said the course was rather easy. It was predicted that the experimental learners would have higher task value at the end of the study because of their engagement in self-regulated learning, however, the treatment effect was not strong enough to produce this result and it looked like that task value was influenced more by other variables, such as whether the course was challenging enough for students to implement the self-regulated learning strategies.

The quantitative result of significantly lower extrinsic goal orientation for the experimental condition was consistent with the expectation. It looks like there might be an effect of the treatment to help learners reduce their emphasis on performance because the web-based tutorial was designed to advocate the importance of intrinsic and both goal orientations. Yet, this quantitative result is in a different direction as the qualitative findings, which indicated that there was a slight increase in references for the extrinsic goal (M=.25 to M=.38) from the beginning to the end. There might be several perspectives to look at this inconsistency between the qualitative and quantitative findings.

First, if the participants were being honest with their answers, the quantitative result should be more accurate because it was derived from 5-point Likert-type scales with more refined measurement of degrees for each test item. However, participants tend to select choices for more socially desirable behaviors when they are completing self-report 5-point Likert-type instruments (Ley & Young, 1998). This might have been another cause for the significantly lower extrinsic goal orientation for the experimental learners at the end of the study.

Second, it is harder for participants to be dishonest when they answer open-ended questions, yet they may become less enthusiastic or impatient as the study progresses to provide really meaningful or explanatory answers. With the end of the semester coming closer and the final grades being usually the major measure of performance used in courses, it may be
reasonable for students to become more extrinsic- or both- goal oriented when they were under extreme pressure for outcome.

The result of no significant difference in self-efficacy and intrinsic goal orientation for the Experimental participants at the end versus at the beginning of the study was unexpected. These within-group comparisons for the experimental condition of the current study are similar to the Hofer & Yu (2003) study because it only investigated the students who participated in the strategy training. Hofer & Yu (2003) conducted a study similar to McKeachie et al. (1985)’s to assess the impact of a semester-long undergraduate Learning to Learn course designed to teach college students to become self-regulated learners. This course used the same instructional design as McKeachie et al. (1985)’s, but students met every week for 2 hours in lecture and 2 hours in a lab/discussion format to apply course contents to their learning. Hofer & Yu (2003)’s study found positive effects on students’ mastery goal orientation, self-efficacy for learning, valuing of the course and cognitive strategy use, and test anxiety over the term. It also found that motivational beliefs and strategy use were positively correlated at the end of the term. Even though the Hofer & Yu (2003) study used the same MSLQ to measure students’ motivation, the results were quite different from those of the current study. For example, Hofer & Yu (2003) found that students increased in their mastery goal orientation, self-efficacy for learning and their valuing of the course; however, these were the opposite of the results from this current study. Yet, the quantitative results from this study described here were backed up by qualitative findings from students’ answers to open-ended question, while MSLQ was the only instrument used in the Hofer & Yu (2003) study. It was possible that their results might have been biased if their participants selected choices for socially desirable behaviors, and the results of the current study might have been compromised by the level of course difficulty.

Hypothesis 4. There will be no significant difference in learner motivation (in terms of task value, self-efficacy, goal orientation, self-satisfaction) before and after the treatment for students in the non-training condition. It was expected that the control students would have no difference in their motivation, in terms of self-efficacy, task value, self-satisfaction, intrinsic and extrinsic goal orientation, at the end than the beginning of the study.

According to a Wilcoxon Signed Ranks Test, the participants who did not receive the SR learning strategies training did not report significantly different in self-efficacy, intrinsic and extrinsic goal orientation at the end than at the beginning of the study. However, data analysis
did show that the control group learners reported significantly lower task value at the end (M = 20.31) than at the beginning (M = 22.08) of the study.

This quantitative result is in the same direction as the qualitative findings because there was an increase in the number of indications for negative task value (M=.07 to M=1.36) for the control group from the beginning to the end of the study. For example, 11 Control participants said the course was too easy and there was no need for them to use other resources and 5 Control participants mentioned they did not have to deal with any obstacles, and 1 of them directly said the course was rather easy. It looks like this is a trend shared by both conditions, and might have been caused by the design of the course instead of the variables measured for testing the effects of the treatment.

**Effect on Strategy Use**

The research question and hypothesis concerning the treatment effects on strategy use stated in Chapter 2 are:

**Question 3.** Will self-regulated learning strategy training in a web-based environment influence students’ use of strategies?

**Hypothesis 5.** There will be a significant difference in learner self-reported use of strategies between students in the SRL strategy training condition and those in the non-training condition. Students in the training condition are expected to have higher scores on self-reported use of strategies at the end of study than those in the non-training condition.

According to a *Wilcoxon-Mann-Whitney U Test*, the experimental group learners (M = 37.13, 67.19, 60.25, 164.56) did report higher scores on use of metacognitive, cognitive and resource management strategies and the total strategies than the control group learners (M= 36.85, 61.46, 59.15, 157.46), but the differences did not reach statistical significance. Therefore, the hypotheses of a significant effect on learners’ reported use of metacognitive, cognitive, resource management, and the total strategies were not supported.

Except for 3 subcategories (organization, effort regulation and peer learning), the qualitative findings were consistent with the quantitative results on all 4 major categories, which are metacognitive, cognitive and resource management strategies and the total strategies, and the other 4 subcategories. However, none of the group comparison results were statistically significant.
Even though this result indicated that the participants who received the SRL strategies training tend to use learning strategies more than those who did not receive the training, and adding the SR learning strategies training is likely to increase students’ self-reported use of strategies, the treatment effect might not be strong enough to make the use of strategies scores significantly different between the experimental and control group.

In this current study, even though the experimental group learners reported higher scores on use of metacognitive, cognitive and resource management strategies and the total strategies than the control group learners, students in both groups made adjustments to their use of strategies based on level of course difficulty. Learners reduced their use of resource management strategies after they found out the course was not as challenging as they expected, and many of them did not use any other resources for help-seeking because they thought the course was not necessary. This study was designed to improve learners’ strategy use by engaging them in learning and implementing self-regulated learning strategies through the tutorial and self-reflective practice, however the level of course difficulty did not provide learners enough opportunity to practice and utilize the strategies that they learned from training and as a result compromised the treatment effect on reported use strategies.

**Hypothesis 6.** There will be a significant difference in learner self-reported use of strategies before and after the treatment for students in the self-regulated learning strategy training condition. Students in the SRL strategy training condition are expected to have higher scores on self-reported use of strategies at the end than the beginning of study.

According to a Wilcoxon Signed Ranks Test, even though the participants who received the SRL strategies training did report higher use of metacognitive, cognitive strategies and total strategies at the end (M=37.13, 67.19, 164.56) than at the beginning (M = 35.96, 63.27, 164.19) of the study, the differences did not reach statistical significance. However, data analysis did reveal that the experimental group learners reported significantly lower use of resource management strategies at the end (M =60.25) than at the beginning (M = 64.96) of the study. This indicated that participants who received the SRL strategies training reported significantly lower use of resource management strategies at the end than at the beginning of the study. Even though the hypotheses of a significant effect on use of metacognitive, cognitive, and total strategies were not significantly confirmed, the results showed a trend that adding the SRL
strategies training was better than non-training in terms of facilitating self-reported use of these learning strategies.

The data from final evaluation online questionnaire also supported the above result. Out of a total of 8 experimental participants, two (25%) made a choice of “4” (true) for web based tutorial being helpful for study habits, while two (25%) selected an answer of “4” (true) for online Study Plan and Self-Evaluation questionnaires being helpful for study habits.

The quantitative result about significantly lower use of resource management strategies was opposite to the prediction. In addition, the qualitative data also supported this with a decrease in the number of references to resource management strategies provided by the experimental participants from Phase I to Phase VI. This discrepancy between the findings and hypothesis can be explained from several angels. First, it was found that there was a significantly positive correlation ($\tau = .57, p<.01$) between task value after the intervention and use of resource management strategies. Evidence from qualitative data can also provide confirmation for this correlation between task value and use of resource management strategies because resource management strategies made up a major portion of all the strategies that students reportedly use. Learners adjusted their time management strategies after they found the course was not as challenging as they expected, and many of them did not seek help from any other resources because it was not necessary, or they did not use any other help-seeking strategies because they thought the course was not taxing enough for them to implement the strategies. With learners’ experiencing significant decrease in their task value, it is reasonable to assume that they would stop using or at least reduce the frequency of using some of the strategies. This finding is in line with results from previous research on the positive relationship between valuing (Miller et al., 1993) and interest (McWhaw & Abrami, 2001) and the use of self-regulated learning strategies.

Second, higher use of strategies does not necessarily mean effective use of strategies. On the contrary, reducing the use of certain strategies might be an effective adjustment according to the demand of task. It might not have been appropriate to hypothesize that the more a student used a strategy, the more successful he or she is in self-regulated learning. Sometimes intentional adjustment in strategies may even indicate improvement in strategy use or metacognitive awareness. This could also be the case with the experimental learners in this study.

**Hypothesis 7.** There will be no significant difference in learners’ self-reported use of strategies before and after the treatment for students in the non strategy training condition.
Students in the non training condition are expected to have no significant difference in scores on reported use of strategies at the end than the beginning of the study.

According to a Wilcoxon Signed Ranks Test, the control group learners reported slightly higher use of metacognitive (M = 36.85 vs. 36.62) strategies, and lower use of cognitive (M=61.46 vs. 64.38), resource management (M= 59.15 vs. 60.23), and total strategies (M=157.46 vs. 161.23) at the end than at the beginning of the study, but the differences did not reach statistical significance. The hypotheses of no significant effect on reported use of metacognitive, cognitive, resource management and total strategies were not rejected.

The qualitative findings about this hypothesis are mixed. These findings were consistent with the quantitative results on 2 major categories (cognitive and resource management strategies) and 4 sub-categories, but inconsistent with the quantitative results on the major category of metacognitive strategies and 3 other sub-categories. The inconsistency between the qualitative findings and quantitative results might have been caused by several reasons. First, difference in measurement might have been one reason for this discrepancy. The quantitative results were from a 5-point Likert-type instrument and it has more sophisticated measurement for frequency of strategy use while the narrative answers to open-ended questions were text description of strategy use with very little information about how frequent the strategies were used. However, the results from a 5-point Likert-type instrument are more vulnerable to conformity to socially desirable behaviors. Second, control learners’ lack of knowledge of or ability to describe strategies used might have been another reason. These learners were found to be Naïve learners from the qualitative findings. They might not have the awareness and skills to enable them to express themselves about the more sophisticated learning strategies that they had used.

Even though the findings from this current study on learners’ strategy use are mixed to some extent, the method for investigation is comparable to several other studies (Hartley, 2001; Hofer & Yu, 2003; McKeachie et al., 1985). Hartley (2001) conducted a mixed-methods study to investigate the possibility of integrating learning strategy instruction into hypermedia learning materials. In his study, an intact high school computer class participated in a six-week intervention. Thirteen students were randomly assigned to the experimental (N=7) and control group (N=6). The experimental group received learning strategy training together with hypermedia computer networking lessons. Pre and post measures of metacognitive awareness
and achievement were assessed. Findings revealed that strategy training had a positive effect on student’s regulation of their own cognition, which is in the same direction as the results about use of strategies measured with MSLQ in this current study. However, Hartley (2001)’s intervention did not show positive effects on students’ knowledge of cognition and achievement.

Similar to this current study, the learning strategy instruction in Hartley (2001)’s study was presented to students in a computer-mediated hypertext format. However, Hartley’s intervention was more closely integrated with a subject matter. The strategy instruction lessons were each presented on one page and each of these pages was related to a computer network lesson. The strategy instruction pages illustrated a learning strategy, supplied an example and assigned a task related to each particular lesson. A task journal template was provided for each week’s lessons. Students were required to record the results of the assigned task in the designated area of the task journal. This functioned in a similar way to the online Study Plans and Self-Evaluation in the current study. The step-by-step integration between Hartley’s strategy instruction and a subject matter might have made the strategies appear more relevant to learners and encouraged students to utilize them more, while in the current study, the strategy instruction (tutorial) and application (Study Plans and Self-Evaluations) were integrated in a more remote and flexible way with the application appearing every 2 weeks. This could be a reason why the Hartley’s study found a significantly positive effect, while the current study identified a tendency instead of a significantly positive effect on use of strategies.

Like the current study, Hartley’s study had a small sample and did not use standardized tests for assessing students’ achievement, and included a qualitative part in the investigation. Two of Hartley (2001)’s major themes, which were 1) reading over and over (rehearsal) was a major strategy reported by students and 2) the difficulty of the task impacted students’ strategy use (e. g., course easy, did not use strategies), from qualitative data analysis were also evident in this current study. In addition, Hartley (2001) also noticed students’ increased awareness of the importance of regulation of cognition. However, Hartley’s study used a mixed-subjects repeated measures design (ANOVA?) for quantitative data analysis. It may not be appropriate to use this statistical test with such a small sample.

Besides Hartley’s intervention, the findings from this current study are also consistent with results on use of strategies from Hofer & Yu (2003) and McKeachie et al. (1985)’s studies conducted in a traditional classroom setting. Hofer & Yu (2003)’s study found positive effects
on students’ mastery goal orientation, self-efficacy for learning, valuing of the course and cognitive strategy use, and test anxiety over the term, and motivational beliefs and strategy use were positively correlated at the end of the term. However, these results can only be equated to the within-group comparisons for the experimental condition of the current study because it only investigated the students who participated in the strategy training. McKeachie et al. (1985)’s study found that a learning strategies course was substantially successful in affecting students' self-reported study habits; however, his study used a much larger sample and it measured students’ self-reported study habits using an unpublished version of the Learning and Study Strategies Inventory (LASSI) (Weinstein, 1982).

This current study adds to existing research that addresses the effectiveness of training on self-regulated learning strategies. This investigation is different from the majority of research in that it used a mixed-methods design. Even though the hybrid system for strategy training might be less sophisticated than those used in other studies, this study used the most in-depth comparison and triangulation with the available data, and it attempted to help the population of community college students, who might need the strategy training the most.

**Incidental Findings**

**Persistence**

According to a Wilcoxon-Mann-Whitney U Test, the experimental learners (M = 2.75) achieved significantly higher on GPA in the 2nd term than the control learners (M = 1.77). It was also found that, during the semester for the study, there was no drop-out from the course among the experimental participants, while one control participant withdrew from the class. Furthermore, during the 2nd term, the drop-out rates increased to 29% and 12.5% for the Control and Experimental conditions respectively. However, the experimental condition still had a much smaller proportion of students who did not complete the courses they registered. It seems like that the experimental learners might have transferred their learning about the strategies, and the treatment might have had some effects on helping the experimental participants stay with the course, and it might also have had a long-term effect on GPA and overall persistence.

Experimental learners’ better performance on persistence can also be explained with the correlations between students’ achievement and self-satisfaction and persistence. There were significant positive correlations between cumulative course score and 4 of the measures for persistence, which are credit earned for fall 2005 (τ=.49, p<.01), GPA for fall 2005 (τ=.36,
p<.05), credit earned for spring 2006 (τ=.50, p<.01), and GPA for spring 2006 (τ=.54, p<.01). There were also significant positive correlations between satisfaction and 3 of the measures for persistence, which are credit earned for fall 2005 (τ=.41, p<.05), credit earned for spring 2006 (τ=.35, p<.05), and GPA for spring 2006 (τ=.36, P<.05). With the experimental learners achieving significantly better than the control students, they were more likely to feel more satisfied with the learning experience and be more persistent in face of difficulty or in a long run. With the final participants in this study mainly consisting of 18 freshmen (and 3 sophomores), this reasoning is in line with the research about public 2-year institution attrition, which indicated that students’ academic achievement during the freshman year was negatively related with attrition rate at postsecondary institutions (Bradburn & Carroll, 2002; Horn & Nevill, 2006).

Naïve Learners

From the qualitative data, it was found that these participants in this study did not have the control to enable them to carry out their plan for time management; they were either having high test anxiety or not aware of their other strategies because they described test-taking strategies when they were asked about their general strategies for regular study; they were not very planful because they considered it too early to make strategic planning at the beginning of a semester and they had not have to deal with a test or exam yet; and some of them used a measure for self-evaluation or at least periodic self-monitoring, which is grades, as a measure for ongoing self-monitoring of comprehension; they use simple cognitive strategies, such as memorization, rather than deeper processing strategies for learning because there was a large increase in references for rehearsal strategies in qualitative data, and the mean for rehearsal strategy was significantly higher in quantitative data for the experimental condition at the end of the study. These characteristics match the features described by Ertmer & Newby (1996) and Pintrich (1995) for naïve self-regulated learners, and are consistent with the research on college readiness of 2-year institution students, which demonstrates that a large proportion of community college students entered their postsecondary education without proper preparation for college-level study (Wirt et al., 2004).

Even if the experimental learners had already participated in the intervention, and might be better or more effective than the control students on the use of some strategies, they might still be weak on the other strategies. Extensive long-term practice and feedback are still needed for
them to be able to automatically and effectively implement expert learning strategies (Ertmer & Newby, 1996).

**Improvement in Metacognitive Awareness**

From the qualitative data in this study, it is found that students were developing in their awareness of their own strategies and motivation for learning, and their relative effectiveness. Participants in both groups were improving in their description about understanding, and were giving more explanatory answers to questions about their learning strategies. In addition, compared with the control participants, a larger proportion of the experimental learners provided more elucidating description about their understanding, and they also reduced the number of nonsense answers to questions more effectively at the end of the study.

Even if the treatment was not strong enough to produce significant differences between the experimental and control groups on quantitative measures for use of strategies, it might be effective in at least improving learners’ metacognitive awareness. This improvement can help students become more adaptable to self-regulating learning through three channels (Hofer et al., 1998): 1) conducting ongoing self-monitoring; 2) self-knowledge about their strengths and weaknesses as learners, and personal preference; and 3) understanding about the relative effectiveness of various strategies and selecting strategies that are better suited to their goals or preferences. This is a perfect beginning for the participants to develop into expert self-regulated learners.

**Implications**

The findings of this study have some implications for practice and theory. The findings of this study demonstrate that this SRL strategy training intervention was helpful to learners on their achievement, persistence, self-satisfaction and metacognitive awareness, and it showed a trend that adding the strategy training was better than non-training in terms of facilitating use of learning strategies. This intervention can be used as an alternative to instructors or counseling when having limited resources. This can be especially useful to community colleges because a large portion of students at 2-year public institutions need remedial education or academic counseling, and this has become a burden for many of such institutions (Anonymous, 2006). At the same time, community colleges students are having less interaction with professors outside classes because of lack of availability of some faculty (Schmid & Abell, 2003). This made it harder for students to receive the much needed support for
them to overcome difficult financial and academic times, which happen more often to this population. This distance learning intervention can be an option with flexible, self-paced scheduling and adaptable location that make it easier for nontraditional community college students to complete part of their remedial education more quickly. In addition, the design for online research used in this study can be a viable method for conducting evaluation research for hybrid or distance education courses.

The result from this study about adjustments in strategy use brought insights for instructional design of College Success courses. If the purpose of the course is for learners to learn and experience more sophisticated learning strategies, then the course may need to be challenging enough to encourage or force students to apply these strategies. Maybe the course can include a project that requires students to use the library or internet to research for information; or utilize the online discussion board to enable students to exchange opinions and learn from each other on a certain topic related to the course; or to use some performance tests to really assess the internalized learning or actual use of strategies instead of memorization of knowledge about strategies. These changes might help make the course more interesting and demanding to the students and enable them to try out and transfer the strategies, which can help them thrive in their academic career and benefit them all their lives.

On the other hand, the result from this study challenges the concept of effective strategy use as it concerns adjustment based on task demand. It shows that learners reduced the use of their resource management strategies after they found out the course was not as challenging as they expected, and many of them did not use any other resources because it was not necessary, or they did not implement any other help-seeking strategies because they thought the course was not taxing enough. These deliberate adjustments in strategies may be signs for improvement in strategy use or metacognitive awareness. Very few studies looked at the adjustment, especially reduction, in strategy use as an effective approach. Many traditional studies considered the more frequent use of strategies the better. Future studies might want to investigate the definition of effective use of learning strategies by observing experienced and novice learners, reexamine whether resource management strategies are the most susceptible to change depending on task demand, and retest whether the results from this study are logical. Future research can also investigate if we can use self-regulated learning strategies to help students keep themselves
motivated, make adjustments in strategy use, and eventually get more out of courses they perceive as not especially relevant.

Limitations of the Current Study

There are several limitations that need to be considered in regard of this study.

First, the achievement posttest and all the other course assignments were not standardized test. They were created by the instructor and validated by her colleagues. If there were standardized tests available, the validity and reliability of the tests would be better, and the results might be more trustworthy/convincing.

Second, the sample size for this study was fairly small (N = 8 for experimental group, N = 13 for control group). Although data were analyzed with the recommended nonparametric statistical procedures (the Wilcoxon-Mann-Whitney Test and the Wilcoxon Signed Rank Test), this can still be considered as a threat to external validity. Results may not reliably apply to other populations due to this small sample size. In addition, participants in the study were community college students. A more traditional college student population may not generate the same results.

The mortality threat still affected the study even though measures were taken trying to alleviate the effect. Because this study required participants to be involved with the treatment intensely for a long period of time (14 weeks), it was very likely for individuals to drop out of the experiment during the process for lack of interest or time, and this was the major cause for the small sample size.

The participants in this study were undergraduate students enrolled in 2 sections of a College Success course with the same instructor at a community college in Southeast U. S. Originally, 55 students registered for these 2 sections of the course, and were supposed to participate in the study. However, many of the participants dropped out of the experiment during the process of the study. Only students who completed all the steps of the intervention and continued until the end of the experiment were included as actual participants for the study. The final participants in this study were 21 (8 experimental vs. 13 control) undergraduate students, resulting in a participating rate of 38%. An examination of the self-reported data on the demographic information, motivation and use of strategies from the Experimental students who did and did not complete the whole study showed some pattern of student characteristics. It was found that there were no significant difference between the dropouts and the completers on
demographic information (age, credit hours attempted in fall 05); motivation in terms of task value, self-efficacy, and intrinsic and extrinsic goal orientations; and 10 of the 11 indicators for use of strategies. However, a significant difference was detected on use of help-seeking strategies (U= 35.50, p<.05, r= .42) between the dropouts and the completers within the Experimental condition, and dropouts were more likely to withdraw from the course or to leave assignments incomplete. As a result, these may have caused the final results from the study to be biased and not generalizable to some extent. Future research might compare level of voluntary use of help-seeking strategies between high vs. low self-regulated learners, and examine the correlation between level of help-seeking strategy use and persistence.

Third, this study also suffered from some history threats. There was a decrease in enthusiasm for participating in the study. The whole study lasted for 14 weeks, and students became impatient with the open-ended questions (e.g., when asked strategies to help him understand materials, R104 answered “took note y'all ask the same question.” When asked about most helpful strategy and changes in strategy use, he answered “note taking. i do not know all these question jes.”). In addition, 2 major devastating hurricanes (Katrina and Wilma) happened during the study. And the college was closed one day after each hurricane. This might have affected the instructional time of the course, and some of the learners’ motivational factors (e.g. self-efficacy). These could have created some history effects, which could be a threat to the internal validity of the study and have confounded the findings. The learners might have become physically or psychologically exhausted at the end of the semester, and would like to finish with the answers to the open-ended questions as soon as they could. Thus, their answers might not be completely reliable.

Forth, the treatment effect was not strong enough to produce significant difference between the experimental and control conditions. Learners’ performance on the tutorial test was only used as a measure to check their attendance. There is really no other means to examine whether students had really studied the contents about SRL strategies or not. The design of the tutorial, Study Plan, Self-Evaluation and feedback might need to be more adaptable to the course content and personal preferences. These were technical issues due to limited resources. If there were more sufficient funding and technical assistance, it might be possible to integrate more sophisticated measure for examining students’ learning and to make the intervention more individualized.
Suggestions for Future Studies

The above discussion indicates that in this study the proposed hypotheses were partially supported and the research has some limitations. Based on the findings and limitations of this study, the design of the study needs to be enhanced on the following aspects to improve/capture treatment effect, if future investigations will be carried out to reexamine the effects of the intervention.

First, future studies should try to find effective methods to reduce the participant dropout rate and to establish longitudinal and tolerable interventions for continued effects. The small sample size of this current study might have affected the reliability of the study, and limited the generalizability of the results. Future studies can try to have the course instructor personally instruct students to complete each task (not just with emails from the experimenter) and have the instructor integrate the training/questionnaires directly into the course assignments. Future studies can also try to reduce the amount of time and effort that students must exert to complete the interventions. Researchers can try to improve the design of the Tutorial Test and the 2nd cycle of the Study Plan and Self-Evaluation by making them more interesting and relevant; decrease the content of the training by trimming or eliminating the tutorial according to learners’ needs and course characteristics; make the training more individualized and interesting based on each learner’s specific needs and link from the application questions back to the tutorial content. Researchers can also try to use self-regulated learning strategies to help student get more out of courses they perceive as not especially relevant by teaching them different kinds of adjustment, such as reducing the use of some learning strategies, depending on requirements of task.

Second, the data collection method and instruments need to be improved. 1) Currently, each open-ended question was made up of several minor questions, which were designed to help students recall or describe what they did during a learning period. However, these several minor questions might have caused confusion or have interfered with participants’ answers to the questions. Some of the participants would answer just one of the minor questions or would miss some of the more important questions. Future study need to use just one question at a time. 2) Some open-ended questions need to be added to ask about the effects of intervention on students’ learning and study habits, and to capture the effects of treatment qualitatively. Currently, they are questions included in the quantitative part of the final evaluation online questionnaires. With a limited sample size, it is really difficult to identify meaningful difference between the groups on
this aspect using reduced data like this. 3) Phone interview or focus-group interviews can be used instead of open-ended questions to obtain a richer view of the situation. It was suggested that interviewing is a powerful approach to investigate use of self-regulated learning strategies (Groot, 2002). Focus group might also be useful as a means of sharing strategies during the practice phase, and it might gather more useful answers to qualitative questions. Future studies using the interviewing approach may help capture the development of the individual learners in context (Groot, 2002). 4) Currently learners’ participation in the tutorial test was only used as a measure to check their attendance. There is really no examination of whether students had really studied and mastered the contents about SRL strategies or not. Future studies can try to measure students’ performance on the tutorial test and correlate it to the dependent variables of interest.

Third, the course used in the study was a College Success course. Some contents of the course were redundant with the contents in the web-based tutorial. Due to limited financial and technical recourses, it was not possible for the researcher to eliminate the redundant contents to avoid confounding effects to the results of the study. In addition, it might have made it more difficult for participants to notice what had really helped them. Future study should extend the scope of course content to other subjects, such as math or reading, where students can actually apply what they have learned from the tutorial to the instructional tasks. Using the Intervention in courses other than College Success or Study Skills might also help to investigate whether its beneficial effects can be generalized to other subject content. Future research can also try to study totally online course, instead of web-assisted courses, where students receive less direct guidance from the instructor than in F2F meetings and may be more inclined to complete the self-regulated learning activities. Future research can also try to use the intervention in courses with high level of difficulty.

Forth, this study is an experiment of the mixed research methodologies, combining both the qualitative and quantitative approaches. Unlike the previous studies, this study quantified qualitative data to avoid subjectivity and to maintain the richness of the context (Chi, 1997), and compared the findings from the qualitative content analysis to the quantitative results from traditional 5-point Likert-type instruments. This study showed that the qualitative findings were consistent with 5 of the 6 significant quantitative results on major categories, and with the significant quantitative result on the subcategory of the experimental group’s higher use of rehearsal strategies at the end of the study; they were also in the same direction as the
quantitative results on 11 non-significant major categories. However, the qualitative findings were inconsistent with significant quantitative results on 1 major category; and they were in different direction with non-significant quantitative results on 4 major categories and 9 sub-categories. In addition, the qualitative findings were not comparable with quantitative results on all three indicators for self-efficacy. With these mixed comparison results, future studies are needed to further test whether this mixed-methods approach is appropriate for investigation in use of self-regulated learning strategies. Research to explore the (qualitative content analysis) data analysis method is also needed to solve or at least to reduce the difference in measurement between the qualitative and quantitative aspects. Adding inquiries about frequency of strategy use to open-ended questions or interview protocol may be an option for researchers to try for this purpose.

Finally, based on analysis of experimental participants’ pre-intervention motivation and strategy use data, there was a significant difference between students who dropped out of the study and who stayed until the end of the study on use of help-seeking strategies and there was a general tendency for persistence, which was identified from participants’ perseverance in both the course and the study but not detected with the MMLQ instrument. Future studies can reexamine if use of help seeking strategies is really related with persistence, and try to identify or create an appropriate instrument to measure learners’ general tendency for persistence.

Conclusion

This mixed-methods study investigated the effects of an intervention, which was made up of a web-based tutorial on Self-regulated learning strategies and the online Study Plan and Self-Evaluation questionnaires, on students’ achievement, motivation and self-reported use of strategies.

The findings of this study indicated that the intervention was helpful to learners on their achievement, persistence, self-satisfaction and metacognitive awareness, and it showed a trend that adding the strategy training was better than non-training in terms of facilitating use of learning strategies. However, the findings about the motivation constructs, including self-efficacy, task value and intrinsic and extrinsic goal orientation, were mixed. Therefore, future research is recommended to reexamine the effects of the intervention with a larger sample size, more sophisticated study materials and maybe more advanced data analysis methods.
Even though the findings from this study were inconclusive to some extent, it can still be valuable to the academic community in some respect. It empirically tested the effects of a strategy training intervention in a field setting; it contributes to the understanding about self-regulated learning and persistence in the community college population; it is a pioneering trial of conducting learning strategy research using mixed methodologies, bringing both the qualitative and quantitative approaches together.
Date: 5/11/2005

To:
Haihong Hu
160 Crenshaw Drive, Apt. 13
Tallahassee, FL 32310
Dept: Educational Psychology and Learning System

From: Thomas L. Jacobson, Chair

Re: Use of Human subjects in Research

The memorandum that you submitted to this office in regard to the requested change in your research protocol for the above-referenced project have been reviewed and approved. Thank you for informing the Committee of this change.

A reminder that if the project has not been completed by 5/21/2006, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Marcy P. Driscoll
APPLICATION NO. 2005.315-R
Informed Consent Form

My name is Haihong Hu. I am a doctoral student under the direction of Dr. Marcy P. Driscoll in the Department of Educational Psychology and Learning Systems at the Florida State University. I am conducting a study to examine the effects of self-regulated learning strategy training on students’ performance, motivation and strategy use in a web-based distance education environment. This study partially fulfills the requirements for a doctoral degree in the Instructional Systems program. You are invited to participate in this research study. You will receive the same instruction for the course, which is decided by your instructor. And, the experiment will not affect the implementation of the instruction by any means.

During the study, your participation involves completing several online questionnaires, an online tutorial on self-regulated learning strategies and possibly participating in an online forum, which is designed to facilitate your study in an online course. Completion of these materials is expected to take a total of approximately 3 hours of your convenient spare time within a semester. Participation is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. There are no foreseen risks to you by participating in this study. You may benefit from participation through achieving learning goals, assessing your learning strategies and motivation, and probably enhancing your academic self-regulation in an online course. In addition, you may receive indirect benefits by contributing to a better understanding of learner self-regulation, and by informing instructional design of web-based distance education.

After I get your completed materials, I will disassociate your name, email address or any other irrelevant personal information from the same. Only the information relevant to the study will be put into the database so as to keep identities confidential to the extent allowed by law, and any irrelevant personal information from those who respond will be destroyed once the data is in the computer.

The results of this research study may be published, but your name will not be used. Information obtained during the course of the study will remain confidential, to the extent allowed by law. If you have any questions, concerns, or requests for group results, please contact Haihong Hu at (850) 644-4952 or e-mail address: hhh2214@garnet.acns.fsu.edu.

Please access the online materials for the study as you have been directed, if you have read and understood this consent form. Your completion of the online materials will be considered your consent to participate. Thank you in advance for your participation.

Sincerely,

Haihong Hu
Doctoral Candidate
Instructional Systems Program
Educational Psychology and Learning Systems Department
College of Education
Florida State University
Appendix B: PERMISSION TO USE THE MSLQ QUESTIONNAIRE
PERMISSION TO USE THE MSLQ QUESTIONNAIRE

Haihong Hu
160-13 Crenshaw Drive
Tallahassee, FL 32310

Marie-Anne Bien, Secretary
The University of Michigan
Combined Program in Education & Psychology (CPEP)
610 East University, 1413 School of Education
Ann Arbor, MI 48109-1259

Dear Ms. Bien:

I am completing a dissertation at Florida State University entitled “EFFECTS OF SELF-REGULATED LEARNING STRATEGY TRAINING ON LEARNERS’ PERFORMANCE, MOTIVATION AND STRATEGY USE IN A WEB-BASED EDUCATION ENVIRONMENT.” I would like your permission to reprint in my dissertation excerpts from the following:


The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages. These rights will in no way restrict republication of the material in any other form by you or by others authorized by you. This authorization is extended to University Microfilms International, Ann Arbor, Michigan, for the purpose of reproducing and distributing copies of this dissertation. Your signing of this letter will also confirm that you own [or your company owns] the copyright to the above-described material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me in the enclosed return envelope. Thank you very much.

Sincerely,

Haihong Hu

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Ms. Marie-Anne Bien
CPEP, the University of Michigan

Date: 3/8/2005
Appendix C: BASELINE INFORMATION FOR PHASE I
Phase I

Baseline Information

I. Demographic Information

Please answer the following questions by following the directions for each:

1. First Name: ____________ Middle Initial: ___________ Last Name: __________
2. Class level. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior ☐ Graduate
3. Gender. ☐ Male ☐ Female
4. Age. __________
5. Which year did you graduate from high school? Drop down menu ______________
6. Ethnic background (please check one)
   ☐ African-American or Black ☐ Asian-American ☐ Caucasian ☐ Hispanic or Spanish Speaking ☐ Other
7. Overall College Grade Point Average (GPA). ________/4.0, ☐ Not available (only for first semester college students)
8. How many courses are you registered for this semester? __________
9. How many of these courses are online? __________
10. How many of these courses are on campus? __________
11. Is this a required course for you? ☐ Yes ☐ No
12. How many hours a week, on average, do you study for this course? _______
13. How many hours per week do you work for pay?
   ☐ Do not work for pay ☐ 1-10 hours ☐ 11-20 hours ☐ 21-30 hours ☐ 31-40 hours ☐ more than 40 hours
14. How many hours per week do you offer volunteer work?
   ☐ Do not offer volunteer work ☐ 1-10 hours ☐ 11-20 hours ☐ 21-30 hours ☐ 31-40 hours ☐ more than 40 hours
15. What family responsibilities do you have (if any) that may affect your time for studying for this course? ______________
16. Who mainly pays your tuition for this course? (please select only one)
   - [ ] Self
   - [ ] Financial aid (e.g. loans, grants, scholarships)
   - [ ] Parents or Grandparents
   - [ ] Spouse
   - [ ] Employer

17. How many hours per week do you use a computer in general (for studying, work, or for pleasure)?
   - [ ] Less than 2 hours
   - [ ] 3-6 hours
   - [ ] 7-10 hours
   - [ ] 11-14 hours
   - [ ] more than 15 hours

18. Which of the following do you feel that you can use competently? (Select all that apply)
   a. PC or Mac
   b. Internet
   c. E-mail
   d. Discussion Board (e.g., in Blackboard, etc.)
   e. Online Synchronous Chat (IRC, Net Meeting, etc.)

II. Open-Ended Questions to verify general use of learning strategies:

1. What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?

2. How do you usually approach study in this course? Please describe a study session to explain how you typically approach your individual assignments.

3. What study strategies do you use that have helped you most to be successful in the past? How will your approaches to studying in this course change as the semester progress? Why?

4. Do you expect to meet any obstacles in the course? What are they? When faced with obstacles in the course, what will you do to overcome these obstacles?

5. What specifically do you do when you have to deal with distractions while you are trying to study? These distractions may be external (e.g., the phone ringing, noise in the house, etc.) or internal (e.g., feeling “blue,” worrying about something, etc.).

6. How do you know when you understand something really well? What do you do if you don’t understand something? Or, what do you do when you are trying to understand a new topic?

7. When you are reading the textbook material, do you do anything to help you understand the material? When you are reading the online material, do you do anything to help you understand the material?
8. Do you print out hard copies of any online material? Why/why not? If you do print out hard copies, what do you print? Why?

9. Do you use any other resources besides the textbook and material offered online in studying? Why/Why not?

10. How do you usually participate in discussion? Do you compose your discussion messages online or offline? Why? Do you return to the discussion area to re-read messages? (If yes) How often?

11. What time of day and day(s) of the week do you usually do your offline coursework? Why? What time of day and day(s) of the week do you usually do your online coursework? Why? Do you use any preparatory or mind-setting activities before starting your online work? If so, what do you do?

12. How do you usually work on group projects/assignment?

13. Do you use any special strategies or tricks that help you prepare for exams/quizzes?
Appendix D: PHASE II & IV STUDY PLAN
Phase II & Phase IV

Study Plan

Please answer the following questions by following the directions for each:

1. What are your goals (with respect to this class) for this semester? Please make sure your goals are in line with your general system of values when you set them.

_______________________________________________________________________

2. How certain are you that you will achieve these course goals?

   a. 100% certain I'll get it
   b. About a 75% chance of getting it.
   c. About a 50% chance of getting it.
   d. About a 25% chance of getting it.
   e. No chance of getting it.

3. What tasks are you planning to accomplish in the next two weeks to help you achieve your goals for this course?

_____________________________________________________________________

4. How would you describe the tasks you are about to perform in terms of their value to you and your ability to accomplish them?

_________________________________________________

5. What are the things that might prevent you from completing your tasks?

6. How will you overcome these obstacles?

7. How will you determine that your goals (for the next two weeks) have been met? What evidence will you use to support this?

8. What will you do to attain these goals (for the next two weeks)? Please be specific with your plan of action.

9. When will you start working toward these goals? On what days? At what times? How often? How much time do you intend to spend on these tasks?

10. Where will you do these?
11. With whom will you do these?

12. What additional information/assistance will you need?

13. If you need help reaching your goals, you will: ____________________________

14. How will you motivate yourself to complete these tasks? What will you use as a reward if you complete your tasks?

15. How will you monitor or record your progress?

16. When will you stop or pause to evaluate your progress?
Appendix E: PHASE III & V SELF-EVALUATION
Phase III & Phase V

**Evaluation of Your Progress**

Display of participants’ 1) course goals, 2) immediate goals for the 2 weeks, 3) plan of action

Please answer the following questions by following the directions for each:

1. How well did your plan work during these past 2 weeks? Give specific examples. Check all that apply.
   Drop-down menu:
   - Improved test scores
   - All homework turned in
   - Assignments completed on time
   - Readings completed
   - Notes taken for chapters assigned
   - Other, explain __________

2. Did you complete the tasks you had planned during these past 2 weeks?
   - Yes
   - No
   If No, why not?

3. Are you getting closer to your course goals for this semester?
   - Yes
   - No

4. How certain are you that you will achieve your course goals for this semester?
   - 100% certain I'll reach my goals
   - About a 75% chance of reaching my goals
   - About a 50% chance of reaching my goals
   - About a 25% chance of reaching my goals
   - No chance of reaching my goals

5. When, during these past 2 weeks, did you start working on the tasks? On what days? At what times? How often?

6. How much time did you actually spend on the tasks during these past 2 weeks?
   - Over 12 hours
   - 9-11 hours
   - 6-8 hour
   - 3-5 hours
   - Less than 2 hours.

7. Where did you work on the tasks during these past 2 weeks?

8. Who did you study with during these past 2 weeks?
   - Yourself
   - Your friends, classmates or family members who share the same life interests.
c. Your friends, classmates or family members who share the same study interests
d. Others, please specify _______________________

9. What are the things that did prevent you from completing your tasks?

10. How did you overcome these obstacles?

11. What additional information/assistance did you need?

12. If you needed help completing your tasks during these past 2 weeks, what did you do?

13. How did you motivate yourself to complete these tasks? What did you use as a reward when you completed your tasks?

14. Did you monitor or record your progress as you had planned? Is your method of recording effective?

15. What learning strategies worked well?

16. I am feeling pleased with my progress in the course.

   1
not at all true of me

   2

   3

   4

   5 very true of me

17. I think that I have achieved all the course objectives during these past 2 weeks.

   1
not at all true of me

   2

   3

   4

   5 very true of me

18. I have really enjoyed this course.

   1
not at all true of me

   2

   3

   4

   5 very true of me

19. I think taking this course is really satisfying to me.

   1
not at all true of me

   2

   3

   4

   5 very true of me

188
20. What did you learn about yourself?

21. What was it that you had missed in your study plan for these 2 weeks?

22. What will you do next to achieve your course goals?
   a. Take a break.
   b. Adjust learning strategies.
   c. Put in more effort.
   d. Other, please specify:
Phase VI

Evaluation of Your Outcome

Please answer the following questions by following the directions for each:

14. What goal(s) were you working toward in this course? Did you have a plan for reaching your goals? So far, how have you done with reaching your goals? What percentage of the assignments have you completed?

15. How did you usually approach study in this course? Please describe a study session to explain how you typically approached your individual assignments.

16. What study strategies did you use that have helped you most to be successful in the course? How did your approaches to studying in this course change as the semester progressed? Why?

17. Did you meet any obstacles in the course? What were they? When faced with obstacles in the course, what did you do to overcome these obstacles?

18. What specifically did you do when you had to deal with distractions while you were trying to study? These distractions may be external (e.g., the phone ringing, noise in the house, etc.) or internal (e.g., feeling “blue,” worrying about something, etc.).

19. How did you know when you understand something really well? What did you do if you didn’t understand something? Or, what did you do when you were trying to understand a new topic?

20. When you were reading the textbook material, did you do anything to help you understand the material? When you were reading the online material, did you do anything to help you understand the material?

21. Did you print out hard copies of any online material? Why/why not? If you did print out hard copies, what did you print? Why?

22. Did you use any other resources besides the textbook and material offered online in studying? Why/Why not?

23. How did you usually participate in discussion? Did you compose your discussion messages online or offline? Why? Did you return to the discussion area to re-read messages? (If yes) How often?
24. What time of day and day(s) of the week did you usually do your offline coursework? Why? What time of day and day(s) of the week did you usually do your online coursework? Why? Did you use any preparatory or mind-setting activities before starting your online work? If so, what did you do?

25. How did you usually work on group projects/assignment?

26. Did you use any special strategies or tricks that helped you prepare for exams/quizzes?

27. I am feeling pleased with my progress in the course.

1 2 3 4 5
not at all true of me very true of me

15. I think that I have achieved all the course objectives up to now.

1 2 3 4 5
not at all true of me very true of me

16. I have really enjoyed this course.

1 2 3 4 5
not at all true of me very true of me

17. I think taking this course is really satisfying to me.

1 2 3 4 5
not at all true of me very true of me

18. The major reason for my progress or failure in the course is:

a. My use of learning strategies. (e.g. planning, monitoring, elaborating, time management, etc.)
b. My level of capability
c. My level of effort
d. All of the above
e. Other, please specify: ______________

19. I would like to take more courses like this in the future.

1 2 3 4 5
20. I think going through the Web Tutorial on Learning Strategies has helped me achieve better learning results.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Why? __________________________

21. I think going through the Web Tutorial on Learning Strategies has helped me become more confident about your study habits.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. Any suggestions for improving the Web Tutorial on Learning Strategies?

_______________________________________________________

23. I think going through the online questionnaires has helped me achieve better learning results.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

24. I think going through the online questionnaires has helped me become more confident about your study habits.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>true of me</td>
<td>very true of me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Any suggestions for improving the online questionnaires?

_______________________________________________________
Appendix G: SELF-REGULATED LEARNING STRATEGIES QUESTIONNAIRE (SRLSQ)
The following questions ask about your learning strategies for this class. **There are no right or wrong answers.** Answer the questions about how you study in this class as accurately as possible. If you think the statement is very true of you, circle 5; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not at all true of me</td>
<td></td>
<td></td>
<td></td>
<td>very true of me</td>
</tr>
<tr>
<td>1. When I study the readings for this course, I outline the material to help me organize my thoughts.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. When studying for this course, I often try to explain the material to a friend or family member.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I usually study in a place where I can concentrate on my course work.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. When reading for this course, I make up questions to help focus my reading</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I often find myself questioning things I hear or read in this course to decide if I find them convincing.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. When I study for this class, I practice saying the material to myself over and over.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. When I become confused about something I’m reading for this class, I go back and try to figure it out.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I make good use of my study time for this course.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. If course readings are difficult to understand, I change the way I read the material.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I try to work with other students from this class to complete the course assignments.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. When studying for this course, I read my class notes and the course readings over and over again.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I work hard to do well in this class even if I don't like what we are doing.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I make simple charts, diagrams, or tables to help me organize course material.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>When studying for this course, I often set aside time to discuss course material with a group of students from the class.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>I treat the course material as a starting point and try to develop my own ideas about it.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I find it hard to stick to a study schedule.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Before I study new course material thoroughly, I often skim it to see how it is organized.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>I ask myself questions to make sure I understand the material I have been studying in this class.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>I try to change the way I study in order to fit the course requirements and the instructor's teaching style.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>I often find that I have been reading for this class, but don't know what it was all about.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>I ask the instructor to clarify concepts I don't understand well.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>I memorize key words to remind me of important concepts in this class.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>When course work is difficult, I either give up or only study the easy parts.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>I try to relate ideas in this subject to those in other courses whenever possible.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>When I study for this course, I go over my class notes and make an outline of important concepts.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>When reading for this class, I try to relate the material to what I already know.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>I have a regular place set aside for studying.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>I try to play around with ideas of my own related to what I am learning in this course.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>When I can't understand the material in this course, I ask another student in this class or family members for help.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>I try to understand the material in this class by making connections between the readings and the concepts from the lectures.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>I make sure that I keep up with the weekly readings and assignments for this course.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>I make lists of important items for this course and memorize the</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Even when course materials are dull and uninteresting, I manage to keep working until I finish.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>I try to identify students in this class or family members whom I can ask for help if necessary.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>When studying for this course I try to determine which concepts I don't understand well.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>I often find that I don't spend very much time on this course because of other activities.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>When I study for this class, I set goals for myself in order to direct my activities in each study period.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>If I get confused taking notes in class, I make sure I sort it out afterwards.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>I rarely find time to review my notes or readings before an exam or a project.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>I try to apply ideas from course readings in other class activities such as lecture and discussion.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H: MEASUREMENT OF MOTIVATION FOR LEARNING QUESTIONNAIRE (MMLQ)
Measurement of Motivation for Learning Questionnaire (MMLQ)

The following questions ask about your motivation for this class. **There are no right or wrong answers.** Answer these questions about how you feel about this class as accurately as possible. If you think the statement is very true of you, circle 5; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>not at all true of me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. In a class like this, I prefer course material that really challenges me so I can learn new things. 1 2 3 4 5
2. I think I will be able to use what I learn in this course in other courses. 1 2 3 4 5
3. I believe I will receive an excellent grade in this class. 1 2 3 4 5
4. I am certain I can understand the most difficult material presented in the readings for this course. 1 2 3 4 5
5. Getting a good grade in this class is the most satisfying thing for me right now. 1 2 3 4 5
6. It is important for me to learn the course material in this class. 1 2 3 4 5
7. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade. 1 2 3 4 5
8. I'm confident I can learn the basic concepts taught in this course. 1 2 3 4 5
9. If I can, I want to get better grades in this class than most of the other students. 1 2 3 4 5
10. I'm confident I can understand the most complex material presented by the instructor in this course. 1 2 3 4 5
11. In a course like this, I prefer course material that arouses my curiosity, even if it is difficult to learn. 1 2 3 4 5
12. I am very interested in the content area of this course. 1 2 3 4 5
13. I'm confident I can do an excellent job on the assignments in this course. 1 2 3 4 5
14. I expect to do well in this class. 1 2 3 4 5
15. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible. 1 2 3 4 5
16. I think the course material in this class is useful for me to learn. 1 2 3 4 5
17. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade. 1 2 3 4 5
18. I like the subject matter of this course. 1 2 3 4 5
19. Understanding the subject matter of this course is very important to me. 1 2 3 4 5
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20. I'm certain I can master the skills being taught in this class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix I: SELF-SATISFACTION SCALE (SSS)
Self-Satisfaction Scale (SSS)

1. You are feeling pleased with your progress or success in the course.
   - Definitely true
   - Very true
   - Somewhat true
   - False
   - Definitely false

2. You think that you have achieved all the course objectives up to now.
   - Definitely true
   - Very true
   - Somewhat true
   - False
   - Definitely false

3. You have really enjoyed this course.
   - Definitely true
   - Very true
   - Somewhat true
   - False
   - Definitely false

4. You think taking this course is really satisfying to you.
   - Definitely true
   - Very true
   - Somewhat true
   - False
   - Definitely false
Appendix J: SCREEN CAPTURE OF MATERIALS FOR INTERVENTION
SELF-REGULATED LEARNING IN WEB-ENHANCED COURSES

Overview to Self-Regulated Learning in Web-Enhanced Courses

Welcome to Self-Regulated Learning in Web-Enhanced Courses!

- This is an online tutorial on "Self-Regulated Learning in Web-Enhanced Courses". It covers the basic concepts about self-regulated learning (SRL) and how SRL strategies can be used in web-enhanced educational environment. This tutorial is designed with the hope to make students’ life easier when taking web-enhanced courses.

- Objectives for this tutorial:
  - The learner will be able to identify problems in use of Self-Regulated Learning strategies and provide suggestions for solving these problems.
  - When taking a web-enhanced course, the learner will be able to plan how to complete assignments and evaluate outcomes.
  - When taking a web-enhanced course, the learner will choose to use SRL strategies independently.

- This tutorial has 5 CHAPTERS, 1 Graded TEST and 1 REFERENCE. Each chapter contains several Sections, one Ungraded Exercise and one Summary. You will need to complete the Ungraded Exercise in each Chapter before you can complete the Test of Knowledge about Learning Strategies.
- Please click on any of the Chapter Number on the left to start your exploration within this tutorial.
- Please click on the Test button on the left to complete your test.

Chapter 1: Self-Regulated Learning in Web-Enhanced Courses

Self-Regulated Learning Strategies

Self-regulated learning strategies refer to actions and processes that learners take to attain information or skills (Zimmerman, 1990). Self-regulated learning process consists of execution of several major strategies, including:

- **Cognitive strategies** for learning and comprehending the materials such as rehearsal, elaboration and organization,
- **Resource-management strategies** including help seeking and time management,
- **Motivational strategies**, such as self-efficacy, attribution and self-satisfaction,
- **Metacognitive strategies** such as planning, goal setting, monitoring and self-evaluation.

The implementation of these strategies leads to successful accomplishments of learning tasks.
Chapter 3. Resource-Management Strategies

1. Time management
2. Help-Seeking
3. Managing Physical Environment
4. Mood & Effort Management

Self-Regulated Learning in Web-Enhanced Courses

Test of Knowledge about Learning Strategies

1. This Test has 4 Sections. Each section contains questions on the basic concepts about self-regulated learning strategies and how you can use them in a web-based instructional environment.
2. You will need to complete the Ungraded Exercise in each Chapter before you can complete this Test of Knowledge about Learning Strategies.
3. The result of this test will be GRADED to see how much you have learned from this tutorial, and you can only complete this test ONCE.
4. Please click on the Numbers below the Test Heading to complete the questions in each individual section of this test.

Good Luck with Your Test of Knowledge about Self-Regulated Learning Strategies

Created by strategy.learning.net
Last updated on August 16, 2005
SELF-REGULATED LEARNING IN WEB-ENHANCED COURSES

Learning Strategy Support

Welcome to the Learning Strategy Support System!

Web-enhanced courses are different from face-to-face courses in that students need to take more responsibility for their learning. These web pages are designed to make it easier for you to manage your learning as a student taking this kind of courses. Hopefully, going through these web pages will help you achieve better learning results and become more confident about your study.

Following this page are questions that pertain to your study of the course that you are presently taking. Please use these questions to assist you plan and evaluate your study.

Login Name
(Please enter your preferred email account)

Please enter your Email account again

Course Name & Number
College Success SLS 1501

Reference Number
37112

Password
(The last four digits of your social security number)

Submit Reset

Demographic Information

1. Please answer the subsequent questions by following the directions for each:
2. Class level:
3. Gender: □ Male □ Female
4. Age:
5. Which year did you graduate from high school?
6. Ethnic background (please check one):
   □ African-American or Black □ Asian-American □ Caucasian
   □ Hispanic or Spanish speaking □ Other
7. Overall College Grade Point Average (GPA):
   (a) □ At 0 (b) □ Not available (only for first semester college students)
8. How many courses are you registered for this semester?
9. How many of these courses are online?
10. How many of these courses are on campus?
II. Please answer the subsequent questions by following the directions for each:

1. What goal(s) are you working toward in this course? Do you have a plan for reaching your goals? So far, how are you doing with reaching your goals? What percentage of the assignments have you completed?

2. How do you usually approach study in this course? Please describe a study session to explain how you typically approach your individual assignments.

3. What study strategies do you use that have helped you most to be successful in the past? How will your approaches to studying in this course change as the semester progresses? Why?

4. Do you expect to meet any obstacles in the course? What are they? When faced with obstacles in the course, what will you do to overcome these obstacles?

III. The following questions ask about your learning strategies for this class. There are no right or wrong answers. Please answer the questions as accurately as possible.

1. When I study the readings for this course, I outline the material to help me organize my thoughts.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

2. When studying for this course, I often try to explain the material to a friend or family member.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

3. I usually study in a place where I can concentrate on my course work.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

4. When reading for this course, I make up questions to help focus my reading.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

5. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

6. I often find myself questioning things I hear or read in this course to decide if I find them convincing.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

7. When I study for this class, I practice saying the material to myself over and over.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

8. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

9. When I become confused about something I'm reading for this class, I go back and try to figure it out.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me

10. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.  
   - Not at all true of me  
   - Somewhat true of me  
   - Neutral  
   - Somewhat true of me  
   - Very true of me
SELF-REGULATED LEARNING IN WEB-ENHANCED COURSES

Study Plan (Part I)

1. Please answer the subsequent questions by following the directions for each:

   1. What are your goals (with respect to this class) for this semester? Please make sure your goals are in line with your general system of values when you set them.

   2. How certain are you that you will achieve these course goals?

      - 100% certain I'll get it
      - About a 75% chance of getting it.
      - About a 50% chance of getting it.
      - About a 25% chance of getting it.
      - No chance of getting it.

   3. What tasks are you planning to accomplish in the next two weeks to help you achieve your goals for this course?

Study Plan (Part II)

II. Please answer the subsequent questions by following the directions for each:

   1. When will you start working toward these goals (for the next two weeks)? On what days? At what times? How often? How much time do you intend to spend on these tasks?

   2. Where will you do the things you have planned?

   3. With whom will you do the things you have planned?

   4. What additional information/assistance will you need?
Dear Helen,

Here is the study plan you entered on May 23, 2007.

1. What are your goals (with respect to this class) for this semester? Please make sure your goals are in line with your general system of values when you set them.
   
   Your answer:

2. How certain are you that you will achieve these course goals?
   
   Your answer: About a 25% chance of getting it.

3. What tasks are you planning to accomplish in the next two weeks to help you achieve your goals for this course?
   
   Your answer:

4. How would you describe the tasks you are about to perform in terms of their value to you and your ability to accomplish them?
   
   Your answer:

5. What are the things that might prevent you from completing your tasks?
   
   Your answer:

6. How will you overcome these obstacles?
   
   Your answer:

---

Welcome Helen

Evaluation of Your Progress (Part II)

1. Please answer the subsequent questions by following the directions for each:
   
   1. How well did your plan work during these past 2 weeks? Please give specific examples. Check all that apply.
      
      - [ ] Improved test scores
      - [ ] All homework turned in
      - [ ] Assignments completed on time
      - [ ] Readings completed
      - [ ] Notes taken for chapters assigned
      - [ ] Others, please explain:

   2. Did you complete the tasks you had planned during these past 2 weeks?
      
      - [ ] Yes
      - [ ] No
      - If not, why not?

   3. Are you getting closer to your course goals for this semester?  
      
      - [ ] Yes
      - [ ] No

   4. How certain are you that you will achieve your course goals for this semester?
      
      - [ ] 100% certain
      - [ ] 75% chance of reaching my goals
II. Please answer the subsequent questions by following the directions for each:

1. What additional information/assistance did you need?

2. If you needed help completing your tasks during these past 2 weeks, what did you do?

3. How did you motivate yourself to complete the tasks? What did you use as a reward when you completed your tasks?

4. Did you monitor or record your progress as you had planned? Was your method of recording effective?

5. What learning strategies worked well?

---

Dear Helen,
Your response has been recorded.

1. How well did your plan work during these past 2 weeks? Give specific examples:
   Your answer:
   • Improved test scores
   • Readings completed

2. Did you complete the tasks or as much of it as you had planned during these past 2 weeks?
   Your answer: Yes

3. Are you getting closer to your course goals for this semester?
   Your answer: Yes

4. How certain are you that you will achieve your course goals for this semester?
   Your answer: About a 75% chance of reaching my goal

5. When, during these past 2 weeks, did you start working on the tasks? On what days? At what times? How often?
   Your answer: cccccc

6. How much time did you actually spend on the tasks during these past 2 weeks?
   Your answer: 9-11 hours

7. Where did you work on the tasks during these past 2 weeks?
   Your answer: cccccc
<table>
<thead>
<tr>
<th>Strategy/Belief</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal setting</td>
<td>Statements indicating students’ determining target results of learning or setting of sub-goals</td>
<td>“My goal for this course was to learn how to manage my time and study more.”</td>
</tr>
<tr>
<td>Strategic planning</td>
<td>Statements demonstrating students’ selection of learning strategies or methods to achieve the desired goals</td>
<td>“My goals were to do better on my quizzes. The plan was to study hard.”</td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>Statements indicating students’ monitoring of their attention, comprehension and learning outcomes.</td>
<td>“I asked myself questions while reading.”</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Statements indicating students’ comparing feedback information from self-monitoring with certain kind of standard or goal to self-judge if they are making progress.</td>
<td>“I don’t think I came to any (obstacles) in this course.”</td>
</tr>
<tr>
<td>Task value</td>
<td>Statements indicating students’ perceptions of a particular course in terms of interest, importance and utility</td>
<td>“I would just read and recite. Nothing (no strategy) changed because there was no need for it to.”</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Statements indicating students’ personal beliefs about their capabilities to learn or perform skills for completing the course.</td>
<td>“This class was so easy, I can’t think of anything I would have had trouble with.”</td>
</tr>
<tr>
<td>Mastery/Intrinsic goal orientation</td>
<td>Statements indicating students’ participating in a task for reasons such as challenge, curiosity, mastery and concentration on learning, comprehending the material and self-improvement.</td>
<td>“In this course I was looking forward to gaining skills that will help me be a better college student.”</td>
</tr>
<tr>
<td>Performance/Extrinsic goal orientation</td>
<td>Statements indicating students’ participating in a task for reasons such as performance, evaluation by others, and competition and focuses on grades, approval from others, rewards, or winning.</td>
<td>“I wanted to get an A.”</td>
</tr>
<tr>
<td>Both goal orientation</td>
<td>Statements indicating the situation when students have a tendency to focus on both mastery/intrinsic and performance/extrinsic goals</td>
<td>“…to get an A and use skills for other classes.”</td>
</tr>
<tr>
<td>Self-satisfaction</td>
<td>Statements indicating students’ feelings about the fulfillment of their learning goals and enjoyment from</td>
<td>“I’ve done pretty well.”</td>
</tr>
</tbody>
</table>

212
<table>
<thead>
<tr>
<th>Strategy/Belief</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal</td>
<td>Rehearsal statements indicate students' strategies to select and encode</td>
<td>“read the chapters over and over till I rememberd them”</td>
</tr>
<tr>
<td></td>
<td>information in a verbatim manner</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>Organization statements indicate students' strategies to construct internal</td>
<td>“I would read my book and then outline what was important. Then I would go back through the chapter that I read and make an outline of what I underlined.”</td>
</tr>
<tr>
<td></td>
<td>connections among information given in the learning material</td>
<td></td>
</tr>
<tr>
<td>Elaboration</td>
<td>Elaboration statements indicate students' strategies to make information</td>
<td>“I made up accronyms for things and little rythmic notations to help me”</td>
</tr>
<tr>
<td></td>
<td>meaningful and to build connections between information given in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>learning material and a learner’s prior knowledge</td>
<td></td>
</tr>
<tr>
<td>Time management</td>
<td>Time management statements indicate students' strategies for scheduling,</td>
<td>“All of my classes start around noon, so i would usually utilize my time between 10 am and 12 pm to do all my school work.”</td>
</tr>
<tr>
<td></td>
<td>planning, and managing one's study time.</td>
<td>“i would go to school and study in the library”</td>
</tr>
<tr>
<td>Study environment</td>
<td>Study environment management statements indicate students' strategies to</td>
<td>“Really try to ignore them (distractions)”</td>
</tr>
<tr>
<td>management</td>
<td>make his or her study environment organized, quiet, and relatively free of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>visual and auditory distractions</td>
<td></td>
</tr>
<tr>
<td>Effort Regulation</td>
<td>Effort Regulation statements indicate students' strategies to control their</td>
<td>“Study Groups and individual study. Because I have made new friends and we can have study groups when major tests are coming up.”</td>
</tr>
<tr>
<td></td>
<td>effort and attention in the face of distractions and uninteresting tasks.</td>
<td></td>
</tr>
<tr>
<td>Peer learning</td>
<td>Peer learning statements indicate students' strategies to collaborate with</td>
<td>“If I didnt understand something I just asked my teacher.”</td>
</tr>
<tr>
<td></td>
<td>peers, and to use dialogue with peers to help clarify course material and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reach insights that may not have been attained when he or she studies alone</td>
<td></td>
</tr>
<tr>
<td>Help-seeking</td>
<td>Help-seeking strategies indicate students' strategies to secure assistance</td>
<td>“Just write down the important thing that i think that going to be on the test-taking strategies</td>
</tr>
<tr>
<td></td>
<td>from others or tools to cope with academic difficulty</td>
<td></td>
</tr>
<tr>
<td>Test-taking strategies</td>
<td>Test-taking strategies are situations when participants gave test-taking</td>
<td></td>
</tr>
<tr>
<td>Strategy/Belief</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Just-study</td>
<td>Situations when participants gave “Just study” or “Just studied” answers to questions that asked them about their specific strategies for completing certain learning tasks.</td>
<td>“I didn't really use any special strategies. I just studied.”</td>
</tr>
<tr>
<td>No-strategy</td>
<td>Situations when participants gave “no strategy” or “don’t know” answers to questions that asked them about their specific strategies for completing certain learning tasks.</td>
<td>“I don't know yet just started.”</td>
</tr>
</tbody>
</table>
Appendix R: SELF-REGULATION IS A CYCLIC PROCESS
Figure 2.1: Self-Regulation is a Cyclical Process
(Adapted from Zimmerman, 1998)
REFERENCES


BIOGRAPHICAL SKETCH

Haihong (Helen) Hu

EDUCATION

(GPA: 3.98)
M. S. (Instructional Design) University of South Alabama Jan/1998-Dec/1999
(GPA: 4.0)
B. A. (English) Shanghai Teachers’ Univ. Sep/1988-July/1992

EMPLOYMENT

Office of Distance and Distributed Learning, Florida State University;
Graduate Assistant (Instructional Designer) Aug/2004-Dec/2005
Instructional Systems Program, Florida State University. Tallahassee, FL;
Teaching or Research Assistant Aug/2000-Dec/2003,
Pudong Shangri-La Hotel, Shanghai, China; Assistant Training Manager Apr/2000-July/2000
Shanghai Second Institute of Education. Shanghai, China; Lecturer July/1992-Dec/1997

SELECTED PROJECTS AND ACTIVITIES

Instructional Design, Development:
Designed, developed and evaluated online distance learning courses for FSU’s School of Nursing.
Provided customized assistance or training to the Nursing faculty on instructional design, multimedia
design and development, evaluation, and use of the BlackBoard system at Florida State University.

Designed and developed NETg courseware for CISCO Internetworking technology certification as an
intern instructional designer for Media Consulting Inc. in Dayton, OH. Provided Multimedia design and
development, including interactive training, computer-based training (CBT), CD-ROM, and graphic
design and development.

Training:
Managed the training department and training officers at Pudong Shangri-La Hotel, Shanghai, China.
Responsibilities included strategy development, personnel management, developing, delivering and
evaluating training to hotel employees, coordinating with internal departments and external consultants on
training efforts, organizing events to promote employee motivation, preparing career development plans
for high-level executive managers, and monitoring the implementation of and outcomes from their plans.
Designed and implemented Safety Training Needs Assessment Project as a *Training Assistant at Mobile Pulley and Machine Works.* Mobile, AL, and presented the results at Alabama Adult and Community Education Summer Conference on July 23, 1998. Designed and implemented safety training courses for Alabama Work Place Education Partnership program.

*Teaching:*
Designed, developed course materials, assessment and evaluation for teaching undergraduate and graduate students, and delivered course content through face-to-face, hybrid or online format at Florida State University.

Taught English courses (Comprehensive Reading, Extensive Reading, Phonetics, Listening Comprehension and Cambridge Business English) to college English major students at Shanghai Second Institute of Education

*Research:*
Co-author of 2 journal articles and author of papers presented at refereed national conferences. Most of these articles and papers reported experimental research studies that I conducted or participated.

Recipient of Certificate in Educational Measurement and Statistics by Department of Educational Psychology and Learning Systems, Florida State University, Tallahassee, Florida.

**SERVICE**


Acted as a member of the Strategic Planning Taskforce for Association for Educational Communications and Technology. Provided comments and suggestions re streamlining the operation of AECT as a national non-profit organization. Contributed ideas re AECT’s HUMAN CAPITAL CAMPAIGN from the perspective as an international graduate student.

**ACADEMIC AWARDS**

University Fellow, Florida State University. 2003~2004.

AECT Conference Cochran Internship, Association of Educational Communication and Technology, Anaheim CA. October, 2003

Dean’s Scholar, College of Education, Florida State University. 2000~2003.