Effects of Self-Regulated Learning Strategy Training in an Online Learning Environment on University Students' Learning Achievement and Their Reported Use of Strategies

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Abstract

The study aimed to apply the self-regulated learning strategy training to an online learning environment in order to examine its impact on university students' learning achievement and their reported use of self-regulated learning strategies. The subjects for this study were 22 fourth-year English major students in the first semester of the academic year 2017 at Thaksin University. They were selected by simple random sampling and assigned into experimental and control groups. The study consisted of 4 steps and took 12 weeks to complete. The quasi-experimental mixed-methods study was adopted in this study. The result indicated that a significant difference was shown between students in both groups on overall performance, and scores on 3 of the course assignments, which were Test 3, group project, and Final exam. For the result of Wilcoxon-Mann-Whitney Test, even though the experimental group had higher scores on the deployment of the metacognitive, cognitive environment and the total strategies than the control group, the differences are not statistically significant.

Keywords*: *Self-regulated learning, online learning, EFL students

1. Introduction

Self-regulated learning is recognized as a process in which individuals are metacognitively, motivationally, and behaviorally active participants in their learning process (Bandura, 1986). This concerns an interdependent interaction among person, environment, and behavior. Each factor interacts with the others to change the behaviors so that a learning goal can be achieved (Bandura, 1986).

Students who have to study independently most of the time in a university can learn to be self-regulated. If they can control themselves, they will be able to adjust themselves to the academic demands of the university. Only a few students in every classroom are competent in regulating their own behavior (Pintrich, 1995). Most students need support and opportunities to improve the cornerstones of self-regulated learning. Thus, the development of self-regulated learning should be integrated into meaningful learning in the classroom (Schunk & Zimmerman, 1998).

Self-regulation has been recognized as one of the crucial factors to enhance learner achievement, motivation, and deployment of learning strategies, which are the major determinants to completion rate in university education. But few studies have empirically investigated the role of self-regulated learning strategy training in a university environment.

Fostering this self-regulation into learners could be enhanced by technologies. The studies on self-regulated learning have been done in both classroom and online learning environments, and some research findings revealed that self-regulated learning is an important factor in learning achievement, especially in online courses (e.g., Antino, 2007; Joo, Bong, & Choi, 2000). According to Kitsantas & Dabbagh (2011), Web 2.0 technologies can be effectively used to facilitate self-regulation, but little studies have been conducted in this area.

Although the self-regulated strategy has had a positive impact on the EFL learners' attitudes, engagement, participation, and performances, the self-regulation has been examined in traditional classroom contexts and there is empirical evidence of a significant relationship between self-regulation and engagement and academic achievement, such studies were limited in an online learning environment in the Thai EFL university context.

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2. Objectives

The purposes of this study were to examine the effects of self-regulated learning strategy training in an online learning environment on undergraduate students' learning achievement and their reported use of strategies at Thaksin University.

3. Materials and Methods

Research design

This study employed a quasi-experimental design with self-regulated learning strategy training (use vs. non-use) as the independent variable. The two conditions in this experiment were: 1) use of self-regulated learning strategy training, and 2) non-use of self-regulated learning strategy training. The intact groups of participants were assigned to the experimental and control groups at the beginning of the intervention. Dependent variables were learning achievement and learners' reported use of strategies. The same instructor and instructional content were used in both classes to guarantee the comparability.

Sample

The participants in this study were undergraduate students enrolled in two sections of Technology and English Language Teaching Materials course taught by the researcher in the first semester of the academic year 2017 at Thaksin University. The participants in this study were 22. These students were in their fourth-year of study with ages ranging from 20 to 23 (M= 21.11). The participants were 17 females and 5 males.

Instrument and Quality

Course content

This course, Technology and English Language Teaching Materials, was designed to develop and reinforce skills necessary for designing and producing appropriate teaching materials for English language teaching. This course was designated as web-assisted, which means that teaching materials were posted on the Moodle website and the instructor and students could communicate via the course website.

Course Approach

The classes met twice a week with 100 minutes for each session. All students were required to take this compulsory course to meet the university requirements. This course used a book with the title of Technology in Language Teaching as the main text for instruction, and the online intervention materials on Self-Regulated Learning were used as a supplement to the course. The course was conducted using class discussions, lectures, required readings and assignments and student presentations. In this course, students were required to complete the tasks below:

- Class Participation and Assignments

Students participated in class discussions, group exercises, and projects. Homework was assigned throughout the semester to help the understanding of the material explained in the textbook and in the classroom.

- Tests

There were four tests during the semester in addition to the final exam. Test 1, 2 and 4 were short and aimed at evaluating students' knowledge and understanding of the assigned reading. The format of test 3 included fill-in-the-blank, multiple-choice, and short answer test items.

- Self-Regulation Learning Units

Students completed 4 online modules on self-regulated learning, which was the intervention material used as a supplement to the instruction.

- Group Presentation

Students were assigned to groups. Each group gave an interactive presentation on a topic from the text. The highlights of the group's findings were addressed during this presentation.

- 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, multiple-choice, and short answer items.

Validity and reliability of the instrument

Self-Regulation Learning Units

The content of initial online lessons was approved and analyzed by 3language specialists in English teaching. After the approval of the language specialists, the lessons were revised accordingly. The storyboard was evaluated and approved by five media experts. The evaluation form adapted from the Department of Curriculum and Instruction Development was employed to check the quality of the online lessons in four aspects: content, instructional design, screen design and techniques (Department of Curriculum and Instruction Development, Ministry of Education, 2003).

Tests and final exams

Three English language specialists were consulted to check the content and validity of this test. The feedback was used for improving the test before administering it with students. In this study, the value of the Index of Item-Objective Congruence (IOC) is between 0.6-1.0. The revised tests were tried out with 6 fourth-year students who had previously studied in 'Technology and English Language Teaching Materials' course in order to check the level of difficulty of test items (p) and the discrimination index (D). These students are a different group from those in the sample group. The test items with the value of the level of difficulty between .20 to .80 and the discrimination index higher than .20 were selected. The test was then tried out with fourth-year students who are in a different group from those in the first tryout. The test scores were calculated to check for the reliability using the Kuder-Richardson Formula 20 (KR20). The value of this reliability test was 0.81.

Surveys

- Self-Regulated Learning Strategies Survey (SRLSS)

The Self-Regulated Learning Strategies Questionnaire (SRLSS) 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 three strategies. Three Language specialists were consulted to check the content of the survey. The value of IOC was between 0.6-1.0. The initial survey was then tested with the students who are a different group from those in the sample group and improved to make it more comprehensive, reliable and valid for collecting data. For this study, the internal-consistency coefficient alpha of the SRLSS was .94 and the Guttman Split-Half coefficient was .83 based on a pilot study in January 2017. For the pilot study of each sub-strategies of SRLSS, Cronbach's alpha coefficients of metacognitive, cognitive and environmental strategies were .84, .73 and .78, respectively.

- Open-ended questions

Seven open-ended questions were employed at the beginning and end of the study to gather additional qualitative evidence concerning students' use of learning strategies. 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 survey.

Procedures

This experiment consisted of four phases and lasted for about 12 weeks. The following is a summary of the experiment sequence.

First, activity involved gathering the initial data in terms of demographic information, reported use of strategy through the use of online survey (SRLSS).

Then, the activity was to teach participants in an online learning environment and collect data regarding students' attendance and their knowledge of SRL strategies. Participants in the SRL training conditions received specific instructions for their participation via Moodle. The researcher informed these participants to browse the online tutorial on SRL and to complete the knowledge exercises and test. During this phase, participants in the experimental group went through the Unit 1 to Unit 4 of the tutorial based on the sequence of their teaching content for the course, and they also completed all the exercises and a test within the tutorial. During this period, participants in the control group did not receive any of these treatments.

Next, participants in the experimental group were to complete an online study plan. Next, in about one month, the experimental students were invited to complete a self-evaluation for the learning period. Study plan forms were posted at the beginning of each 4-week period for students to set goals and plan for strategies to use for completing tasks within this learning period. Self-evaluation forms were posted 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 group did not receive any of these treatments.

After the completion of the last set of online surveys for strategy practice, another message was posted for the participants in both groups to do the final evaluation surveys (SRLSS) which were used to measure learners' reported use of strategies.

Data Analysis

Quantitative Data Analysis

Due to the low sample size for this study, the Wilcoxon-Mann-Whitney Test is used for analyzing student achievement scores. After collecting all individual assignment scores and final course score, the Wilcoxon-Mann-Whitney Test procedure was performed for each individual assignment scores (including test 1, test 2, test 3, test 4 and group project), as well as for the final course score.

Scores from the Self-Regulated Learning Strategies Survey (SRLSS) were also analyzed using the Wilcoxon-Mann-Whitney Test nonparametric procedure to compare the difference in post-intervention reported use of learning strategies between the experimental and control groups. As in the case of the achievement measures, the α level was set at 0.05. Statistics on each of the 3 individual strategy measures (metacognitive, cognitive and environmental strategies) were analyzed.

Qualitative data analysis

The data obtained from the survey in the open-ended section was labeled and coded so that the differences and similarities between all the answers were seen.

4. Results and Discussion

The effects of the self-regulated strategy training in online environment on students' learning achievement

In order to measure the effects of the self-regulated strategy training on students' achievement, the data analysis was conducted on students' final course scores and each of the major assignment scores, which were obtained from the instructor after the semester was completed. The descriptive statistics for achievement measures are described in Table 1.

Table 1 shows Descriptive statistics for learning achievement

	Experimental group (N = 10)			Control group (N = 12)		
	M	SD	Mdn	M	SD	Mdn
Overall Exam	74.82	4.05	76.50	67.47	7.21	71.00
Test 1	65.92	10.88	68.00	69.02	7.89	71.00
Test 2	67.76	8.23	65.50	66.43	11.24	69.00
Test 3	72.25	3.76	73.00	65.66	10.07	70.00
Test 4	72.41	5.01	73.00	70.01	12.34	75.00
Group Project	69.11	8.01	73.00	58.91	19.45	77.00
Final exam	70.28	4.01	72.00	64.11	6.89	67.00

The Wilcoxon-Mann-Whitney U Test showed that experimental group students (M = 74.82) significantly outperformed the control group students (M = 67.47) on overall performance, and a significant effect for overall performance ($U=25.50$, $p < .05$, $r =.43$) was confirmed.

In terms of the effect of the SRL strategies training on each of the course assignments, the Wilcoxon-Mann-Whitney U Test showed that experimental group students (M = 72.25, 69.11, 70.28) significantly outperformed students in the control group on Test 3, group project and final exam scores (M = 65.66, 58.91, 64.11). A significant effect for performance on each of the course assignments were partially confirmed on Test 3 ($U = 24.00$, $p < .05$, $r = .46$), group project ($U = 26.50$, $p < .05$, $r = .48$ and final exam ($U = 25.00$, $p. < .05$, $r = .45$). Statistical findings regarding student achievement are described in Table 2.

Table 2 shows Wilcoxon-Mann-Whitney U Test results for student achievement

Achievement measure	Mann Whitney U	Wilcoxon W	Z	1-tailed Sig.
Overall Exam	25.50	116.50	-1.62	**.04**
Test 1	36.00	72.00	-.82	.18
Test 2	47.00	83.00	-.16	.44
Test 3	24.00	115.00	-1.81	**.04**
Test 4	38.00	74.00	-.81	.21
Group Project	26.50	117.50	-1.55	**.04**
Final exam	25.00	116.00	-1.65	**.04**

Effects of intervention on reported use of strategies

A between-group comparison was conducted on students' post-intervention measures on their deployment of metacognitive, cognitive and environmental strategies, which were gathered through the Self-Regulated Learning Strategies Survey (SRLSS) as an online survey at the end of the study. The descriptive statistics for strategy use are described in Table 3.

Table 3 Descriptive statistics for post-intervention learning strategy use

Strategies	Experimental group		Control group	
	M	SD	M	SD
Metacognitive	39.24	5.16	37.79	10.32
Cognitive	63.77	6.33	57.45	12.41
Environment	64.05	7.34	63.13	9.87

Regarding the effects of the SRL strategies training on student reported use of strategies, the findings showed that even though the experimental group (M = 39.24, 63.77, 64.05) had higher scores on the use of metacognitive, cognitive and environmental strategies than the control group (M= 37.79, 57.45, 63.13); however, the differences did not show statistical significance. The group comparison results on learners' reported use of metacognitive strategies (U=42.50, r = .34), cognitive strategies (U=38.00, r = .18), and environmental strategies (U=34.00, r = .12) were not statistically significant.

Table 4 Wilcoxon-Mann-Whitney U Test results for student reported use of strategy

Strategy measure	Mann Whitney U	Wilcoxon W	Z	1-tailed Sig.
Metacognitive	42.500	74.000	-.3.66	.34
Cognitive	38.000	124.000	-.6.75	.18
Environment	34.000	120.000	-1.020	.12
Total Strategies	36.500	122.000	-1.016	.17

An 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 and Final exam scores, 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 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' achievement of long-term tasks, such as Test 3 and Final exam scores, which needed continuing effort. The findings from this study on students' learning achievement are consistent with results from other studies (e.g. Ghanizadeh, 2012; Kitsantas, Winsler, Huie, 2008).

The data from final evaluation online questionnaire also supported the above result. From ten experimental participants, four said online interactive program was useful for learning the content in the course, while four reported that online Study Plan and Self-Evaluation surveys were beneficial for learning.

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 SRL 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 groups. The findings were in line with Garrison (2003) who suggested that online learners must be more capable of "self-regulating" their cognition, motivation, and behavior in these highly autonomous learning environments when compared to those who study in the traditional classroom. Lynch & Dembo (2004) also agree that self-regulated learning seems to provide a useful framework for online learning studies, as it provides important insights into the functioning of independent learners.

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 the level of course difficulty. These findings are consistent with Hu's (2007) study. He revealed that a significant difference was shown between the experimental and the control group on self-satisfaction after they received SRL strategy training, but a significant difference was not found between both groups in terms of task value, self-efficacy, intrinsic and extrinsic goal orientation, use of metacognitive, cognitive, resource management. 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 strategy teaching and self-reflective practice, however, the level of course difficulty did not provide learners with 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.

5. Conclusion

The findings showed that the performance of students taught using the self-regulated learning strategy in an online learning environment was statistically significantly higher than the non-use strategy class. The findings revealed that this intervention was beneficial to EFL learners regarding their learning achievement. In addition, it revealed that integrating self-regulated learning strategy training was more effective than non-use strategy class regarding enhancing the use of learning strategies, although the results on learners' reported use of the metacognitive, cognitive and resource management strategies were not statistically significantly higher than the control group. This intervention was beneficial for curriculum developers and instructors to use it as an option to overcome the obstacles faced by EFL university learners in Thailand, which include low proficiency levels, lack of opportunities for language practice, and teacher-led classes.

6. References

Artino, A. R. (2007). Self-regulated learning in online education: A review of the empirical literature. *International Journal of Instructional Technology and Distance Learning, 4*(6), 3-18.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, Prentice-Hall, Inc. Pearson Education Company.

Garrison, D. R. (2003). Self-directed learning and distance education. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of distance education* (pp. 161-168). Mahwah, NJ: Lawrence Erlbaum Associates.

Ghanizadeh, A. (2012). EFL learners' self-regulation, critical thinking and language achievement. *International Journal of Linguistics, 4*(3), 451-468.

Hu, H. (2007). Effects of Self-Regulated Learning Strategy Training on Learners' Achievement, Motivation and Strategy Use in a Web-Enhanced Instructional Environment. Doctoral Dissertation. The Florida State University, Florida.

Joo, Y., Bong, M., & Choi, H. (2000). Self-efficacy for self-regulated learning, academic self-efficacy, and Internet self-efficacy in Web-based instruction. *Educational Technology Research and Development, 48*(2), 5-17.

Kitsantas, A., & Dabbagh, N. (2011). The role of web 2.0 technologies in self-regulated learning. *New Directions for Teaching and Learning, 126*, 99-106.

Kitsantas, A., Winsler, A., & Huie, F. (2008). Self-regulation and ability predictors of academic success during college: A predictive validity study. *Journal of Advanced Academics, 20*, 42–68.

Lynch, R., & Dembo, M. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning, 5*(2), 1-16.

Pintrich, P. R. (1995). Understanding self-regulated learning. *New Directions for Teaching and Learning, 63*, 3-12.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor, Michigan: The University of Michigan.

Schunk, D. H., & Zimmerman, B. J. (1998). Conclusions and future directions for academic interventions. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-Regulated learning: From teaching to self-reflective practice*. New York, NY: The Guilford Press.