

SITTE 2013

**24TH INTERNATIONAL
CONFERENCE**

**SOCIETY FOR INFORMATION TECHNOLOGY
AND TEACHER EDUCATION**



Association for the Advancement of Computing in Education

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Editors
Ron McBride
Michael Searson

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The Effect of Metacognitive Strategy Instruction on the Reading Comprehension Skills of Undergraduate Students

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Abstract: This paper is a report on the findings of a study conducted on the reading comprehension skills using CALLA, a metacognitive strategy instruction for 4 weeks. A one-shot case design was used to investigate the effect of metacognitive strategy instruction on the reading comprehension skills of 15 undergraduate Tourism students. During the intervention, they used the reading logs to reflect on their metacognitive awareness and self-regulatory mechanisms while they were engaged in reading tasks on the Internet. Data from participants' reading logs were analyzed qualitatively. Findings reveal that metacognitive strategy instruction can increase their reading comprehension skills. In addition, the results imply that their metacognitive awareness is raised. They have become strategic readers and autonomous learners as well. However, they need vocabulary and syntax instruction and exercises. Also, Reading Comprehension Strategies for the Internet should be taught to them to enhance their effective extensive reading abilities while online information access.

Introduction

Due to the fact that "reading comprehension is a complex cognitive process" (Griffith & Ruan, 2005, p. 22), EFL/ESL learners need effective reading skills to master their reading. "With strengthened reading skills, they will make greater progress and attain greater development in all academic areas" (Anderson, 1999, p. 1). Grabe (2010, pp.5-6) adds that L2 skilled readers accomplish their purposes and goals not only of their advanced study but also of their future careers in modern societies.

Aebersold and Field (2000, p. 16) argue that reading strategies, sometimes called reading skills, are the mental activities that successful readers apply to construct meaning from a text (Anderson et al, Devine, & Hosenfeld et al's studies as cited in Aebersold & Field, 2000, p. 15) consciously or unconsciously. To master their reading, learners need to learn the knowledge of when, how and why a strategy is to be used (Carrell, Gajdusek & Wise, 1998 cited in Phakitti, 2006, p. 55). However, in order to develop reading comprehension, the integration of reading skills and strategies needs to be taught partly through reading instruction (Grabe, 2010, p. 57).

"Metacognition plays a vital role in reading" (Brown, Armbruster, & Baker quoted in Grabe, 2010, p. 52). Also, "metacognitive studies have their roots in comprehension studies". However, the goal of metacognitive strategy instruction is to develop metacognitive awareness and self-regulatory mechanisms which support students to solve their learning problems when they are engaged in a reading activity (Griffith & Ruan, 2005, p. 12). Block (1992, cited in Phakitti, p. 55) added that L2 readers need to be ready to "stand back and observe themselves" (Block, 1992, quoted in Phakitti, p. 55) when they read.

With reference to the results of the midterm exam in the first semester of the academic year 2012, the percentage of the reading test scores of 15 Tourism students in the researcher's class was lower than 50 per cent – the acceptable standard criterion. The average of their reading test scores was 39.67 percent. To help them cope with reading problems, they were taught metacognitive strategies explicitly. Therefore, this study aimed to investigate the effect of metacognitive strategy instruction on reading comprehension abilities.

The Study

Reading comprehension is defined as an interactive process between a reader's linguistic competence and experience and a writer's idea through a text. Reading proceeds when the reader integrates his/her dramatic systemic and schematic knowledge to comprehend what he/she reads fluently and automatically (Devine, 1986; Goodman, 1998; Anderson, 1999; Alyousef, 2005). Alyousef (2005, p. 143) asserts that reading comprehension is "a combination of identification and interpretation skills". Kendeou et al. (2007 quoted in Grabe, 2010) add that

"Comprehension is not a unitary phenomenon but rather a family of skills and activities. A general component in many definitions of comprehension is the interpretation of the information in the text At the core of comprehension is our ability to mentally interconnect different events in the text and form a coherent representation of what the text is about" (p.39).

It can be seen that the comprehension process requires not only linguistic resources and automatic processing but also higher-order abilities (Grabe, 2010, p. 50) such as assessing situations and monitoring current comprehension processes that are associated with metacognition.

"Metacognition or thinking about thinking" (Cromley, 2005, p 187) is prominent in the reading process. It is defined as "knowledge and cognition about cognitive phenomena" (Flavell, 1979 quoted in Griffith & Ruan, 2005, p.3) which is connected with self-regulated through a model of cognitive process including metacognitive knowledge (gained facts or knowledge through experience or association, the act of knowing including awareness and judgment, and phenomenon) and metacognitive experiences (consciously entered metacognitive knowledge) (Flavell, 1979 cited in Griffith & Ruan, 2005, pp. 3-4). Similarly, Harris and Hodges (quoted in Griffith & Ruan, 2005, p. 4) viewed metacognition as "awareness and knowledge of one's mental processes such that one can monitor, regulate, and direct them as a desired end; self-mediation."

Skilled readers can image what they have read from the text by their schemata with the interaction of macro- and microprocesses (Irwin, 1991; Kintsch & van Dijk, 1978; van den Broek, 2000 cited in Griffith & Ruan, 2005, p. 5). At the two levels, they are able to summarize, draw inferences, and integrate ideas to concepts by linking their background knowledge with the reading of a text (Pearson & Johnson, 1978; Raphael, 1986; Reder, 1980, cited in Griffith & Ruan, 2005, p. 5).

Griffith & Ruan (2005, pp. 12-13) propose that L2 readers should be supported to solve their reading problems themselves when they encounter a difficult reading text by developing their metacognitive awareness and self-regulatory mechanisms through metacognitive strategy instruction.

An instruction model, Cognitive Academic Language Learning Approach (CALLA) based on cognitive theory and research was developed by Chamot and O'Malley (1994). CALLA is an explicit metacognitive strategy instruction model which integrates instruction in the content area and develops the language skills needed for learning and for academic tasks (Chamot & Robbins, 2006).

Participants were 15 second-year students who enrolled in English in the first semester of the academic year 2012 and achieved the reading scores in the midterm exam of lower than 50 percent. They were from the Tourism program at the Faculty of Management Science, Silpakorn University in Petchaburi, Thailand. Due to the classroom action research, the researcher used purposive sampling technique by selecting her lower level students to be the subjects of the study.

The three instruments that were used in this study as follows: 1) four lesson plans according to CALLA undertaken with the material and exercises developed from the pre-intermediate level textbook, *English for International Tourism* by the researcher and authentic articles from websites. The lesson plans were used as the treatment for 4 weeks, 2) the post-test consisted of 30 four multiple-choice items of reading comprehension, which was developed by the researcher. The test content downloaded from websites was related to tourism. The test was

tried out with another 15 lower level students of the same characteristics from other groups and improved for reliability and validity before it was used as the post-test for the study, and 3) the points in reading logs were adjusted from Metacomprehension Strategy Index (MSI) (Schmitt, 1990 cited in Griffith & Ruan, 2005, pp. 114-118). Documentary data from the students' reading logs was subject to content analyses.

Method

The research procedures for data collection were three stages: 1) before the metacognitive strategy instruction, the students were asked to elicit their schemata on reading strategies and introduced how to access online texts for extensive reading assignment, 2) during the metacognitive strategy instruction, the students received 100 minutes of metacognitive strategy instruction through a reading comprehension class based on the CALLA model (Chamot and O'Malley, 1994) for 4 weeks. During the intervention, the students reflected on their metacognitive awareness in reading logs while they were reading and doing tasks through the Internet, and 3) after the metacognitive strategy instruction, the students were administered to the 30 four multiple-choice post-test of comprehension reading for 50 minutes. The post-test or achievement test was marked and recorded by the researcher's assistant. Their reading logs were gathered and analyzed.

The five steps of the CALLA model of teaching learning strategy (Chamot & O'Malley, 1994) which were used in this study are: 1) **Preparation:** The researcher elicited the students' prior knowledge about which strategies they may already know, when, and how they are used. Also, she indicated the importance of using metacognitive strategies and of establishing specific reading purposes for reaching the reading achievement. In addition, the students were guided how to accomplish the expanded tasks on the Internet and how to reflect on their reading in a reading log when they were assigned to read, 2) **Presentation:** The students learned the variety of new language and strategies from the researcher demonstrating how to comprehend reading texts from different types such as web pages, e-magazines, e-news, etc. 3) **Practice:** The students practiced reading texts in a pre-intermediate textbook, "English for International Tourism" and reading articles and news related to tourism which were downloaded from the Internet. While they were engaged in reading, the researcher used the scaffolding approach and monitored their learning process. Furthermore, in order to examine and follow up what they were doing or which strategies they were using, the researcher asked them or allowed them to think out loud. 4) **Evaluation:** The students performed classroom activities as individuals, in pairs, and in groups with exercises developed by the researcher to assess their comprehension. They were also asked to reflect on their reading in the reading log to summarize the content and identify the effective strategies in the reading text and assess their learning. In addition, they noted problems they encountered while reading and made suggestions. 5) **Expansion:** The individuals were assigned to select authentic articles relevant to tourism on some recommended web sites by the researchers. While the students were engaged in reading on the Internet, they had to make their own questions about what they were reading and to find the answers. Also, they had to summarize what they had read. After reading, they were asked to reflect on their metacognitive awareness in reading logs.

After the 4-week instruction, the students were administered to the 30 four multiple-choice post-test of reading comprehension for 50 minutes. The post-test papers were marked and the scores were recorded by the researcher and her assistant. The students' post-test scores were compared to the standard criterion – the reading comprehension scores must be higher than 50 per cent. The data from the reading logs was analyzed qualitatively.

Findings

The average score of the post-test scores, percentage of the post-test scores, the maximum score, and the minimum score are shown in Table 1 below.

Table 1: Post-test Scores, Percentage of Post-test Scores, Maximum Score, and Minimum Score

Overall score	30	100%
Mean	20.27	65.57
S.D.	1.28	
Max	23	76.67%
Min	19	63.33%

From Table 1, overall, the students could pass the post-test after metacognitive strategy instruction. The average score was 20.27 equals to the percentage of 65.57 (S.D. = 1.28).

The 8th student could get 23 of the 30 overall score (76.67 percent) that was the maximum score, whereas six students (1st, 2nd, 5th, 7th, 13th, and 14th students) could get 19 (63.33 percent) of the 30 overall score that was the minimum score.

In order to show the efficacy of the intervention, mean, standard deviation, percentage of the mean, and percentage of acceptable criterion for reading comprehension test are shown in Table 2 below.

Table 2: Mean, Standard Deviation, Percentage of the Mean, and Percentage of Acceptable Criterion for Reading Comprehension Test

Number of students	Mean of Post-test scores	Standard Deviation	Percentage of Mean	Percentage of Acceptable Criterion
15	20.27	1.28	65.57	50

From Table 2, it can be seen that the average of the post-test scores is 20.27 (S.D =1.28) of the 30 overall score. It equals 65.57 per cent which is higher than 50 per cent (the standard criterion).

According to the result shown in Table 2, it revealed that the subjects' reading comprehension abilities were improved after the metacognitive strategies instruction. This means that the students know themselves which strategies should be used, when, why, and how to use them appropriately within different contexts. That is, they could use their schemata with the interaction of macro- and microprocesses to solve reading problems. They have become skilled readers who can image what they have read from the text (Irwin, 1991; Kintsch & van Dijk, 1978; van den Broek, 2000 cited in Griffith & Ruan, 2005, p. 5). It could be concluded that metacognitive strategies enable the students comprehend the difficult texts even though the percentage of the mean score was not much higher than the standard criterion. Because of the limited teaching time, the students' reading skills had developed by a small margin.

At the phase of expansion, the students were assigned to read the information on the Internet. According to their reading logs, the data from the students' reading logs was analyzed and presented below.

Before they began to read, they read the title or the topic of the reading text, looked at the pictures and tried to predict what they thought would happen in the text. While reading, they skimmed through the text without paying attention to unfamiliar words, and then asked themselves and guessed the answers about the picture, the people, and the event in the text. Later, they reread the important or interesting text and thought about the title or the pictures to guide what was going to happen next. They checked their guessed answers. After they had read, they examined whether they met their purpose for reading the text. Next, they checked their understanding by retelling the main points to their friends. After that, they summarized what they had read and how they would apply this to their future career.

According to the data from their reading logs, it could be concluded that all of them can read by themselves. They know what strategies should be used, when, why and how to use them; nevertheless, a few students had a problem with guessing meaning of some vocabulary in the context because of their lower vocabulary level.

Overall, the students reflected that learning metacognitive strategies could improve their reading skills. Also, it could make them more confident in reading. After the instruction, they felt reading was not too difficult for them. This accords with Griffith & Ruan (2005, pp. 12-13), strategy instruction is very useful for lower level readers. Most of them could understand the whole text well even though a few students still got confused about some points.

However, some of them noted that they had some reading problems on the Internet. They could not derive the meaning of the some unknown words using word roots and contextual clues. Sometimes they had to look up the meaning in the dictionary. Some noted that they had a problem with syntax of the sentences. They added that they could image the whole text when they read. But if each sentence was considered, they were not sure its meaning when it was needed for answering the exercise or the test. Due to the fact that the hypertext has flexible and complex structures, few skilled readers encounter difficulties when reading (Afflerbach & Cho, 2009, pp. 81-82). Therefore, Reading Comprehension Strategies for the Internet and hypertext should be taught to the students. Moreover, the students suggested that guessing meaning of the vocabulary and syntax of the sentences should be taught and there should be some more vocabulary and grammar exercises.

Conclusions and Recommendations

Reading comprehension is defined as an interactive process between a reader's linguistic competence and experience and a writer's idea through a text. Also, metacognition plays a vital role in reading. To support poor readers to solve their reading problem themselves, the teacher should focus on developing their metacognitive awareness and self-regulatory mechanisms through metacognitive strategy instruction because the goal of metacognitive strategy instruction is to develop students to be strategic and autonomous readers. According to the findings of the study, the instruction on using metacognitive strategies can increase students' reading comprehension abilities. They enable students to tackle a difficult reading problem themselves. That is, they could use their schemata with the interaction of macro- and microprocesses to solve the reading problem. Furthermore, they become more confident in reading. Metacognitive strategy instruction also improves their metacognitive awareness and self-regulatory behavior. Nevertheless, instructing lower level readers should take a longer time. Many models of reading strategies are needed. The students were introduced how to access the online articles and allowed to select online texts themselves, yet they encountered a few difficulties of the reading problem due to lack of the basics of reading (vocabulary and syntax in the sentence). Because of this, reviewing the basics of reading should meet their requirements. Moreover, Reading Comprehension Strategies for the Internet should be instructed to students to enhance effective extensive reading abilities while they have access to a computer network themselves.

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