

Using Metacognitive Strategies in Reading Comprehension by EFL Students

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Abstract—Metacognitive strategies consistently play important roles in reading comprehension. The metacognitive strategies involve the active monitoring and consequent regulation and orchestration of the cognitive processes in relation to the cognitive objects or data on which they bear. In this paper, the effect of instruction in using metacognitive strategies on reading academic materials, type of metacognitive strategies were mostly used by college university students before and after the instruction and the level they use those strategies before and after the instruction were studied. For these aims, 50 female college students were chosen. Then, they were divided randomly into two groups, experimental and control groups. At first session, students in both groups took the standard TOFEL exam. After the pre-test had been administered, the instruction began. After treatment, a post-test was taken. It is useful to state that after pre-test and post-test the same questionnaire was handed to the students of experimental group. The results of this research show that the instruction of metacognitive strategies has positive effect on the students' scores in reading comprehension tests. Furthermore, it showed that before and after the instruction, the students' usage of metacognitive strategies changed. Also, it demonstrated that the instruction affected the students' level of metacognitive strategies' usage.

Keywords—EFL students, English reading comprehension, instruction, metacognitive strategies.

I. INTRODUCTION

THE objectives of college English teaching are to encourage students to develop more efficient reading abilities as well as listening, writing, and speaking abilities. We need to enable students to obtain information in English concerning their own majors and to lay a solid foundation for further English study.

Clearly, students have to deal with English in their college studies. They are expected to read and to understand various kinds of texts from paragraphs, passages, simplified articles and business letters and operation manuals for tools, equipment, and machinery. The ability to cope with different kinds of texts is considered an important factor for students in choosing their careers and continuing their studies. It is obvious that reading plays an increasingly important role in learning English, especially in higher education and in the instruction of the students who propose to enter professions in science and technology.

Since the early seventies, research in this area has, for the most part, focused on the best way to teach English learners to use a variety of strategies in order to read better. The current focus of research in foreign language reading has begun to

concentrate on readers' strategies. Oxford defines "Strategies, as learning techniques, behaviors, problem solving or study skills which make learning more effective and efficient" [1]. Rigney states that reading strategies are of interest for what they reveal about the way readers manage their interaction with written text and how these strategies are related to text comprehension [2].

Research in second language reading suggests that strategies improve reading comprehension. Comprehension or reading strategies indicates how readers conceive of a task, how they make sense of what they read and what they do when reading comprehension is difficult [3].

According to Nuttall, reading is considered as a process of decoding, deciphering, identifying, articulating, pronouncing, understanding, and responding. It involves the use of cognitive and metacognitive strategies to increase efficiency as readers strive to reach a desirable outcome [4].

Cognition is the intellectual process through which information is obtained, transformed, stored, retrieved, and used. It is also the mental process or faculty of knowing, including awareness, perception, reasoning, language, memory, and judgment [5].

Metacognition is an important concept in cognitive theory. It is Knowing How to Learn and figuring out which strategies work best. It consists of two basic processes occurring simultaneously: monitoring your progress as you learn and making changes and adapting your strategies if you perceive that you are not doing well. Metacognitive strategies involve both knowledge about learning (metacognitive knowledge) and control or regulation over learning (metacognitive strategies or experiences).

According to Block, metacognitive strategies include the activities undertaken by readers to plan, to predict outcomes and to control, to monitor, and to evaluate their comprehension [6]. The author points out that metacognition involves the ability to think about and to control our own learning. Readers need to use a variety of strategies to facilitate comprehension and learning. They must analyze the reading task before them and reflect on what they know or do not know about the material to be read. Finally, they need to devise plans for successfully completing the reading and to constantly evaluate and check their progress in accomplishing various tasks.

In spite of the fact that many of the previous studies have obtained information about learners' strategies and the reading process, few of them have examined the effect of instruction of metacognitive reading strategies on learners' reading performance in L2 (most of them were about L1 reading)

between female university students and how do they use these strategies after instruction. Later, in our context, the universities in Iran, there weren't enough investigations on this field, specifically the studies that investigated Iran's university students' use of the metacognitive strategies in their EFL academic reading.

II. VARIABLES OF THE STUDY

This research will be a quasi-experimental study. As stated by Hatch and Farhadi, in case like this, there will be two kinds of variables [7]:

1. Dependent variable,
2. Independent variable.

The dependent variable in this study simply refers to the level of reading comprehension which is measured by observing the scores of the participants in a series of authentic TOEFL tests.

The independent variable is instruction of using metacognitive strategies in reading procedure, sometimes defined as their state of consciousness of the metacognitive strategies.

III. RESEARCH DETAILS

A. Research Questions

This study will try to answer these questions:

1. Does the instruction of using metacognitive strategies have any effects on first-year Iranian college students' performance on reading academic materials?
2. What type of metacognitive strategies do first-year Iranian college students mostly employ before and after the instruction when they read academic materials?
3. At which level do first-year Iranian college students use these strategies before and after the instruction when they read academic materials?

B. Research Hypotheses

Hypotheses are statements about the possible outcomes of a study. To focus the study, the researcher would have to consider all the possible outcomes; those are the different ways that the study might turn out.

The main hypotheses in this study are as follows:

- H1: The instruction has positive effect on first-year Iranian college students' performance in reading academic materials.
- H2: There is a difference between the students' type of metacognitive strategies use before and after the instruction.
- H3: There is a difference between the students' level of metacognitive strategies use before and after the instruction.

IV. METHODOLOGY

A. Participants of the Study

Participants of this study were first-year students of Tabriz Azad University, who enrolled in the first semester of the 2007 academic year. Their average age was 19 to 20 years old.

They all benefit from an acceptable level of proficiency and more importantly, they benefit from a cognitive maturity.

They were 50 female students divided into two groups randomly, each group comprising 25 students. They were distributed in different majors. Based on their English test score from their university entrance examination, one can come up with the assessment that these students can be considered upper intermediate, as they scored between 70% and 80% in that exam. The researcher hoped that the participants who came from different majors would more accurately reflect the general situation and provide more reliable data. Students had been chosen randomly from four majors: Agriculture (12 students), Mathematics (15 students), Chemistry (15 students) and Fine Arts (8 students).

B. Testing Materials and Instruments

Testing materials in this study were chosen from a couple of books on TOEFL exams. The tests for pre-test and post-test in both control and experimental groups were selected from Barron's TOEFL course and the tests used in treatment part selected from TOEFL Reading Flash.

The instruments were used in this study were questionnaire and classroom observation. The questionnaire used in this study is known as the Metacognitive Awareness of Reading Strategies Inventory (MARS) devised for assessing the metacognitive awareness of the participants of their own reading strategies [8]. This questionnaire consisted of an inventory of 30 statements that gauged the use of three kinds of strategies most often used by the students. There were three strategy subscales or category in this inventory: Global Reading Strategies, Problem-Solving Strategies, and Support Reading Strategies.

The first category (Global Reading Strategies) contained 13 items and represented a set of reading strategies oriented toward a global analysis of the text. Examples include "I decide what to read closely and what to ignore", "I think about what I know to help me understand what I read" and "I have a purpose in mind when I read". These strategies can be thought of as generalized, intentional reading strategies aimed at setting the stage for the reading act (e.g. setting purpose for reading and making predictions).

The second category (Problem-Solving Strategies) contained 8 items that appeared to be oriented around strategies for solving problems when text becomes difficult to read. Examples of these strategies include "When the text becomes difficult, I reread to increase my understanding," and "I adjust my reading speed according to what I read." These strategies provide readers with action plans that allow them to navigate through text skillfully. Such strategies are localized, focused problem-solving or repair strategies used when problems develop in understanding textual information (e.g. checking one's understanding, on encountering conflicting information or rereading for better understanding).

The third category (Support Reading Strategies) contained 9 items and primarily involved the use of outside reference materials, taking notes, and other practical strategies that might be described as functional or support strategies.

Examples include "I take notes while reading;" "I underline or circle information in the text to help me remember it;" and "I summarize what I read to reflect on important information in the text." Strategies such as these serve useful function for some of the students who seem to invoke them as needed. These strategies provide the support mechanisms aimed at sustaining responses to reading (i.e. use of reference materials such as dictionaries and other support systems). These three types of strategies (i.e. Global, Problem-Solving, and Support Strategies) interact with each other and have an important influence on text comprehension.

In examining the reading strategy usage of individual and groups of students on the MARSII, which ranges from 1 to 5, three levels of usage were identified, as suggested by Oxford for language learning strategy usage: high (mean of 3.5 or higher), medium (mean of 2.5 to 3.4) and low (2.4 or lower). These usage levels provide a helpful standard that can be used for interpreting the score averages obtained by individual or groups of students. The scores obtained should be interpreted using the high, moderate, and low usage designations shown on the scoring rubric that accompanies the scale. These usage designations are based on the average performance of the students who were used to validate the MARSII (the norm group).

As a general rule, the overall score averages indicate how often students use all the strategies in the inventory when reading academic materials. The averages for each subscale in the inventory show which group of strategies (i.e. Global, Problem Solving, and Support Strategies) students use most or least when reading. This information enables them to tell if they score very high or very low in any of these strategy groups. A low score on any of the subscales or parts of the inventory indicates that there may be some strategies in these parts that they might want to learn about and consider using when reading. Note, however, that the best possible use of these strategies will ultimately depend, to a great extent, on the students' age, their reading ability, text difficulty, type of material read and other related factors.

Passive participant observation, check list and note-taking were used during the instruction to explore what really happened while reading academic text [9].

C. Procedure

The participants were divided in two groups 25 persons in each. At first session, a standard TOEFL exam was administered in both groups. A 50 item reading comprehension test was handed to students to have some initial measure of the reading scores in both groups [10].

After the pre-test had been administered, the questionnaire was given only to experimental group and then the instruction which has been fully explained in the following part began. It is needless to remind that the treatment was just administered in the experimental group. Within 3 sessions, the treatment of the study was applied in the context of the classroom to find out if there is a relation between explicit teachings of metacognitive reading strategies (and by that increasing their consciousness of the reading strategy they used) and their

performance on reading tests and also their usage of these strategies. Each session at least one authentic reading comprehension test was handed to them and some relevant instructions were given to them explicitly to remind of them the strategies they used.

At the end of the instruction both the control group and the experimental group were given reading comprehension tests (post-test) and the results of the tests were compared to find the effects of the training. Again, 50-item authentic reading comprehension tests were administered among students, both of the groups. After the exam, some questionnaires were handed to the students of experimental group. The questionnaire (MARSII) is an inventory of 30 questions which gauges the metacognitive strategies of the students while reading a text [8]. The students were supposed to answer the questions regarding the strategies they used while reading a text. Each question in this inventory should be answered with regard to the frequency the students use them. The frequency is represented in a scale of 5 possibilities numbered from 1 to 5. Number 1 represents the least frequent strategy and number 5 the most frequent one. After selecting the proper scale for each of the 30 items, the average use of each strategy was calculated and tabulated. The score of the students for each strategy shows which strategy is used most often by the students.

V. DATA ANALYSIS AND RESULTS

To test the effect of instructions on using metacognitive strategies in reading on the level of students' reading comprehension, at first one pre-test for both groups and after instruction to experimental group one post-test for both groups were administered. Both of the pre-test and post-test consist of 50 reading comprehension questions. It is necessary to mention that 25 students participated in each group. The scores of the students in pre-test and post-test in both groups are presented in Tables I and II.

According to the data given in Tables I and II, the following statistical analysis were done:

A. Comparing Mean Scores

The statistical analysis shows that the mean score of experimental and control group were nearly at the same level and control group partly did better than experimental group but an observable increase of experimental group's mean score in contrast with control group in post-test. In other words, the experimental group after treatment outperformed the control group.

From another point of view if we compare the scores of pre-test and post-test in each of the groups, it becomes quite clear that in control group, post-test scores compared with pre-test scores are low, as it was stated the mean score of control group in pre-test was 35.64 and in post-test it was 32.52 [10].

In experimental group, the same comparison showed a different result. In other words, in this group there was a valuable increase in the pre-test and the post-test scores. The mean score of experimental group in pre-test was 35.2 and in post-test it was 38.16 [10].

TABLE I
PRE-TEST AND POST-TEST SCORES: CONTROL GROUP [10]

No. of participants	Pre-test scores	Post- test scores
1	45	45
2	20	16
3	40	37
4	33	36
5	40	37
6	28	22
7	37	40
8	40	47
9	29	37
10	38	39
11	37	33
12	39	33
13	43	43
14	33	40
15	37	33
16	46	46
17	38	40
18	30	29
19	31	28
20	40	39
21	33	30
22	36	35
23	29	28
24	41	38
25	28	29

B. T- Test

In order to test the significance of the difference of mean scores between experimental and control group two paired sample T-tests were applied, one to measure the significance of differences between pre-test and post-test scores in control group and the other one for the measurement of the significance of the pre-test and post-test scores in the experimental group. Afterwards the results of these two measurements were compared to see the meaningfulness of

the differences. The data gathered from the pre-test and post-test scores, were analyzed by SPSS software and the results were tabulated.

TABLE II
PRE-TEST AND POST-TEST SCORES: EXPERIMENTAL GROUP [10]

No. of participants	Pre-test scores	Post- test scores
1	21	30
2	41	44
3	34	30
4	34	37
5	27	37
6	31	40
7	28	35
8	42	42
9	32	38
10	28	35
11	40	45
12	25	27
13	32	40
14	36	43
15	36	40
16	44	48
17	30	36
18	26	30
19	29	37
20	28	42
21	29	44
22	31	38
23	41	45
24	38	42
25	30	29

In Table III, we cannot observe the significant difference between mean differences. The significance shown in this table (0.570) is not meaningful for this study. For this reason we can conclude that the difference of means between pre-test and post-test in control group is not significant.

TABLE III
PAIRED SAMPLES T-TEST FOR CONTROL GROUP [10]

Control Group	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of Difference				
				Lower	Upper			
Pre-test Scores & Post-test Scores	0.440	3.81969	0.76394	-1.13669	2.01669	0.576	24	0.57

TABLE IV
PAIRED SAMPLES T-TEST FOR EXPERIMENTAL GROUP [10]

Control Group	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of Difference				
				Lower	Upper			
Pre-test Scores & Post-test Scores	-5.640	4.22177	0.84435	-7.38266	-3.89734	-6.68	24	0.00

VI. CONCLUSION

The present study was designed and carried out in order to provide empirical evidence on the effect of the instruction of using metacognitive strategies on students' performance in reading comprehension in academic materials and to find out the effect of instruction on choosing different types of

metacognitive strategies and on students' level of use.

According to the statistical analysis of the present data, the research questions were answered. Results of the study indicate that:

1. The significant correlation between instruction and the results of post-test for the experimental group provided evidence that the higher a learner's awareness of reading

metacognitive strategies, the higher the score is likely to be on the reading comprehension test. It was assumed that explicit instruction on the course of reading strategies can increase the awareness of the participants in the context of language learning and consequently yields better results in their performance.

Considering that the experimental group outperformed the control group in post-test, the scores of students on reading comprehension tests corroborate the H1, that is, the instruction has positive effect on first-year Iranian college students' performance on reading academic materials. So, instructions of metacognitive strategies facilitate and improve students' reading comprehension performance on reading of academic materials.

It may also be assumed that the results were due to some other factors like the participants' growing test-wise, their maturation process and age or simply the sex factor. In this regard it is worthwhile to mention a few points. The participants of the research were all of nearly the same age range. They were all female university students of Tabriz Azad University who aged between 19 to 21 years old. However, the possibility of becoming test-wise is not totally rejected. There may be some minor relations between the participants' becoming test-wise and the improvement of their performance. If that is the case, the improvement should be represented in both groups. However, the data represented in Tables I to IV clearly show that the improvement can be observed just in the experimental group.

2. The results demonstrate that the students employed different types of metacognitive strategies in reading academic materials before and after the instruction. Before the instruction, most of the experimental group's students used Global Reading Strategies but a brief look at the data analysis shows that after the instruction all three categories of metacognitive strategies (Global Reading Strategies, Problem Solving Reading Strategies and Support Reading Strategies) were approximately used at the same rate. It means that instruction increased students' awareness of these strategies and this enrich them in their reading strategies when they confront with problems in comprehension of reading. The results verify H2 in which the researcher states that there is a difference between the students' type of metacognitive strategies used before and after the instruction.
3. Also, there were some differences in students' level of metacognitive strategies' usage before and after the instruction. Before the instruction, most of the students were low users but after the instruction, they became moderate users of metacognitive strategies. This indicates that explicit instruction of these strategies in three sessions helped students to increase their level of use and these results show the trueness of H3 in that there is a difference between the students' level of metacognitive strategies used before and after the instruction.

The results show that college students as a result of the instruction manage to comprehend academic reading material by using a number of metacognitive strategies in spite of their

limited knowledge of the target language. The results also can be useful for both teachers and researchers. So, the teachers can use them in teaching reading comprehension in second language classrooms.

The findings of this study are in line with a few studies which were reflected upon in the previous chapters. Schmidt pointed out that the body of research into learning strategies is another way of understanding language learners' conscious awareness of language learning [11]. A former research showed that even as students of modern languages, her subjects possessed a model of language and strategies for learning, but both were significantly limited. This suggests that a well-structured environment, pedagogical support, sufficient time and opportunity should be provided for students to develop the strategies necessary for meaningful learning. Nevertheless, a review of the literature shows that language-learning strategy research has produced sufficient evidence to inform language teaching and learning practices, but some reports directly addressed the improvement of the learners' reading strategies though explicit teaching are insufficient [12]-[14].

Field reported that PRC (People's Republic of China) EFL readers were not able to use their conceptual abilities to the fullest potential, even though they were advanced readers in the target language. What she meant was, because of the difficulty in transfer of reading skills from LI to L2 and sociocultural interference, they were unable to use the more abstract process strategies (e.g. guessing contextual meaning) to attain 'fluent levels of reading skill' [13].

Wenden maintains that L2 learners' metacognitive knowledge of language learning can offer us important information about their conceptualizations of the language-learning process. Perhaps inspired by this thought, recent attempts have started to investigate their metacognitive knowledge of L2 learning strategies in order to establish possible links between learners' knowledge and use of strategies in context [15].

Overall, according to other studies which have been done in this field, most of them, like the findings of the present study, show that students' learning about strategies improve their second language proficiency.

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