The effect of teaching cognitive and metacognitive strategies on EFL students' reading comprehension across proficiency levels

Ali Gholami Mehrdad a *, Mohammad Reza Ahghar b, Manuchehr Ahghar c

a Islamic Azad university, Hamedan Branch, Hamedan, Iran
b Islamic Azad university, Hamedan Branch, Hamedan, Iran
c Islamic Azad university, Hamedan Branch, Hamedan, Iran

Abstract

The present study is an attempt to find out whether teaching "cognitive and meta-cognitive strategies" affects EFL students' reading comprehension across proficiency levels. To that end, one hundred and eighty B.A. students majoring in English from Azad University were randomly selected and were divided into three proficiency groups on the basis of their scores on the quick Test of Michigan. Subsequently, the subjects at each proficiency level were divided into two equal sub-groups, and were randomly assigned to the control and experimental groups. The subjects in each experimental group were taught the desired cognitive and metacognitive strategies, whereas those in the control groups received some sort of instruction on vocabulary and structure. At the end, all the subjects were given reading comprehension tests geared at their proficiency levels. The data thus collected were then analyzed by SPSS statistical package to find out the difference between the means of the groups through the estimation of independent samples t-tests. The results revealed that "teaching cognitive and metacognitive strategies" had no significant effects on the reading comprehension of elementary students, neither did it have any effect on the reading comprehension of advanced students. However, teaching such strategies had significant effects on the reading comprehension of intermediate students.

Keywords: Cognitive strategies, metacognitive strategies, proficiency level, EFL student

1. Introduction

After their introduction into the field of second language studies in 1970s, Language Learning Strategies LLSs) have been the focus of many studies. Early studies on LLSs tended to make lists of strategies and other features presumed to be essential for all good language learners (Oxford, 1994), while in the late 1980s, the focus of studies shifted away from attempts to investigate what language learners do to help their learning to the processes involved in learning. In this new approach an LS is defined as any choice, behavior, thought, plan and technique utilized by a learner to facilitate their learning process (Chamot, 1990; Cook, 2001; Macaro, 2001; Oxford, 1990).

Then efforts were made to create taxonomies of LLSs, among which those proposed by Rubin (1987), Oxford (1990) and O’Malley and Chamot (1994) attracted more attention and still continue to do so. These models, although fundamentally similar, treat LLSs differently in that a certain group of such strategies might be classified under

* Ali Gholami Mehrdad. Tel.: +98-811-4494000
E-mail address: ali.gholami.mehrdad@gmail.com
different headings; however, one proper subset of all such models is Metacognitive Learning Strategies (MLSs), which, according to scholars (Cornford, 2002; Harris, 2003; Leaver, Ehrman & Shekhtoman, 2004; O’Malley & Chamot, 1990; Oxford, 1990, 1994), are concerned with guiding the learning process and include strategies for planning, monitoring and evaluating one’s own learning, or, to put it another way, they involve thinking about thinking skills or learning to learn skills (Anderson, 2002).

According to Veenman, Van Hout-Wouters, and Afflerbach (2006) the relationship between cognition and metacognition and between cognitive and metacognitive strategies is complex and not easy to define. Metacognition is regarded as higher-order cognition about cognition. But at the same time metacognition is also cognition. Veenman et al. (2006) point out that metacognition is contingent on cognition. Domain-specific knowledge is necessary to apply metacognitive functions adequately. Metacognitive planning cannot be used without cognitive activities referring to the task at hand.

Whatever the nature of this relationship, many experts view the use of metacognitive skills as necessary for achieving educational success. Some, e.g. Iwai (2011) and Cornford (2002), state that from a cognitive psychology perspective, effective learning is dependent upon effective information processing and the possession and quality of basic learning-to-learn skills and knowledge centered upon cognitive and metacognitive skills. Filchre and Miller (2000) believe that “The metacognitive strategies and resource management strategies may provide adult students with the most promising tools to enhance their success.”

2. Reading and metacognition

Our understanding of reading strategies has been shaped significantly by research on what expert readers do (Bazerman, 1985; Pressley & Afflerbach, 1995). These studies demonstrate that successful comprehension does not occur automatically. Rather, successful comprehension depends on directed cognitive effort, referred to as metacognitive processing. During reading, metacognitive processing is expressed through strategies, which are “procedural, purposeful, effortful, willful, essential, and facilitative in nature” and “the reader must purposefully or intentionally or willfully invoke strategies” (Alexander & Jetton, 2000, p.295), and does so to regulate and enhance learning from text.

Through metacognitive strategies, a reader allocates significant attention to controlling, monitoring, and evaluating the reading process (Pressley, 2000; Pressley, Brown, El-Dinary, & Afflerbach, 1995).

Poor readers are less aware of effective strategies and of the counterproductive effects of poor strategies, and are less effective in their monitoring activities during reading. Brown and Palincsar (1985) suggested that an effective reading instruction program should require the identification of complementary strategies that are modeled by an expert and acquired by the learner in a context reinforcing the usefulness of such strategies. Adult and college readers who show evidence of metacognitive deficiencies may be considered as unaware and incapable of monitoring their mental processes while reading. Unskilled reading comprehension is one aspect to show the importance and need for training (Cohen, 1986). Unskilled readers can become skilled readers and learners of whole text if they are given instruction in effective strategies and taught to monitor and check their comprehension while reading.

With respect to this point, Al Melhi (2000) has found that some differences do exist between skilled and less skilled readers in terms of their actual and reported reading strategies, their use of global reading strategies (such as underlining, guessing, reading twice and etc), their metacognitive awareness, their perception of a good reader, and their self-confidence as readers. Therefore, it seems that training in metacognitive language learning strategies help learners develop their reading skills and raise their language proficiency levels (Carrell, Gajdusek & Wise; 1998; Çubukcu, 2008; Iwai, 2011; Palincsar, 1986; Green & Oxford, 1995; Wernke et al., 2011).
Considering the body of research conducted which support the positive effect of MLS on language learning and specially the positive effect of teaching such strategies on students’ gains in reading, the present study seeks to investigate whether students at different proficiency levels equally benefit from teaching such strategies. More specifically the paper seeks to find the answers to following questions and their respective null hypotheses:

1. Does teaching cognitive and metacognitive strategies have any effect on the reading comprehension of elementary learners?
2. Does teaching cognitive and metacognitive strategies have any effect on the reading comprehension of intermediate learners?
3. Does teaching cognitive and metacognitive strategies have any effect on the reading comprehension of advanced learners?
   A. Teaching cognitive and metacognitive strategies has no effect on the reading comprehension of elementary learners.
   B. Teaching cognitive and metacognitive strategies has no effect on the reading comprehension of intermediate learners.
   C. Teaching cognitive and metacognitive strategies has no effect on the reading comprehension of advanced learners.

3. Methodology
   3.1. Subjects

   The subjects of the study were 180 undergraduate EFL students from different universities in Hamadan, Iran. These were randomly selected from among 1400 students (both male and female, between 18 to 31 years old) at three proficiency levels. These were randomly divided into three proficiency levels, namely, elementary, intermediate, and advanced, according to their performance on the Michigan test. Those obtaining scores ±1 SD from the mean were considered to be intermediate; those getting scores +2 SDs or above the mean were considered as advanced, and those with the scores -2 SDs from the mean were regarded as elementary. Finally, the subjects at each proficiency level were randomly divided into two groups, one experimental and the other control 30 students each.

   3.2. Procedure

   To do the study a pre-test, post-test true experimental design was adopted in which 180 students at 3 proficiency levels were assigned to 3 experimental groups and 3 control groups, 30 students each. Those in the experimental groups received the treatment in form of some training on metacognitive strategies while those in the control groups were given some general instructions on grammar and vocabulary, paraphrasing or negotiating meaning. This involved a total of ten 90-minute sessions of reading instruction in which different reading strategies, both cognitive and metacognitive, were taught to the students in the experimental groups. These included 20 strategies such as monitoring, evaluating, skimming, scanning, planning, etc presumed to have direct bearings on the students’ reading comprehension skills.

   3.3. Data collection

   Two kinds of tests were administered to the subjects of this study; first, the Michigan test as a kind of proficiency test to decide about the proficiency level of the participants, and second, three reading comprehension tests to serve as post-tests. The difficulty level of each set of the reading comprehension tests was geared to the level of language proficiency of the subjects who were supposed to take the test at the end of instruction period. Each reading comprehension test consisted of four passages, each followed by five factual and conceptual questions. This provided 20 comprehension questions on each test. The difficulty levels of passages were calculated through the use of Fog Index Formula and
were geared to students’ proficiency level. Table 1 below summarizes difficulty level estimations which appear to be quite compatible with that of Michigan test.

Table 1: The average difficulty level of the selected reading passages

<table>
<thead>
<tr>
<th>Tests for different levels of proficiency</th>
<th>Readability index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>14.3</td>
</tr>
<tr>
<td>Intermediate</td>
<td>24</td>
</tr>
<tr>
<td>Advanced</td>
<td>33.7</td>
</tr>
</tbody>
</table>

3.4. Data analysis

Since, there were two groups of subjects in each language proficiency level, i.e., the control and the experimental groups, and each group had taken a different type of test, i.e. tests with and without reading strategies, independent samples t-tests were administered at every proficiency level, the results of which are tabulated in tables 2-4 below.

3.4.1. The results of data analysis for the first hypothesis

The first null hypothesis stated that teaching cognitive and metacognitive strategies has no effect on the reading comprehension of elementary EFL students.

Table 2. Independent-samples t-test for the elementary level

<table>
<thead>
<tr>
<th>Group</th>
<th>( \bar{X} )</th>
<th>S</th>
<th>d.f.</th>
<th>t-obs.</th>
<th>t-crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>15.23</td>
<td>2.34</td>
<td>40</td>
<td>0.48</td>
<td>2.02</td>
</tr>
<tr>
<td>Experimental</td>
<td>15.61</td>
<td>2.71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As the data in table 2 show, the t-observed is lower than the t-critical at a level of significance of \( \alpha \leq 0.05 \). This confirms the first null hypothesis implying that teaching cognitive and metacognitive strategies does not have any significant effects on students’ reading comprehension at an elementary level.

3.4.2. The results of data analysis for the second hypothesis

The second null hypothesis of the study stated that teaching cognitive and metacognitive strategies has no effect on the reading comprehension of intermediate EFL students.

Table 3. Independent-samples t-test for the intermediate level

<table>
<thead>
<tr>
<th>Group</th>
<th>( \bar{X} )</th>
<th>S</th>
<th>d.f.</th>
<th>t-obs.</th>
<th>t-crit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9.68</td>
<td>2.96</td>
<td>68</td>
<td>*3.41</td>
<td>2.00</td>
</tr>
<tr>
<td>Experimental</td>
<td>12.31</td>
<td>3.53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P < .05
A the data in table 3 reveal, the t-observed is much higher than the t-critical at α<0.05. This points to a significant difference between the mean scores of the control and the experimental groups at this proficiency level. Therefore, the second null hypothesis is rejected, implying that teaching cognitive and metacognitive strategies can have positive effects on the reading comprehension of intermediate EFL students.

3.4.3. The results of data analysis for the second hypothesis

The third null hypothesis predicted no effect for teaching cognitive and metacognitive strategies on the reading comprehension of advanced EFL students.

<table>
<thead>
<tr>
<th>Group</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13</td>
<td>2.29</td>
</tr>
<tr>
<td>Experimental</td>
<td>13</td>
<td>2.07</td>
</tr>
</tbody>
</table>

As the table shows, surprisingly the t-value obtained, stands at 0 at α<0.05 which implies equal means for both experimental and control groups. This confirms the third null hypothesis and implies that teaching cognitive and metacognitive strategies has no effect on the reading comprehension of advanced EFL students.

4. Discussions and Conclusion

On the basis of the results of this study, it can be claimed that teaching cognitive and metacognitive strategies affect different readers differently regarding their level of language proficiency. What follows presents an attempt to interpret the results.

the study shows that the elementary students were not able to benefit from the cognitive and metacognitive strategies they were taught and thus, were not able to improve their comprehension of the reading passages. There are theoretical reasons in the literature for this. Beginners may be considered as unpracticed readers who according to Malcolm (1980) "show excessive veneration for each word and treat a passage as a quarry for vocabulary." Such readers are so blinded by words that they fail to differentiate between the relevant and the irrelevant, and they cannot consider the purpose of reading, or use the wider context to interpret what they do not know. By concentrating on words, and on word-by-word reading, they miss the general meaning of reading passages. Anderson also (1984) believes that "constant attention to the surface of language will interfere with the development of a persistent tendency to read deeply."

Elementary readers mainly attend to the factual information in the text, and fail to relate such information to the general content. This was evident in the present study as the elementary students responded factual questions more frequently than interpretative ones.

Another factor for beginners to fail to use reading strategies might be due to the fact that they are too submissive. Such readers according to Widdowson (1984) "run the risk of accumulating information without subjecting it to the critical discrimination necessary to incorporate it into the schematic structure of existing knowledge."

Concerning the intermediate level, the use of cognitive and metacognitive strategies was found to result in a considerable improvement on the comprehension of the students when reading general texts. The causes of such improvement must be searched for in the learners' skill, strategy and approach towards reading comprehension. The results obtained here are in line with what Duke and Pearson (1998) claim for explicit teaching of strategies, where such teaching develops an acceptable language competence beyond the "threshold level." Naturally, they have
passed beyond the stage of skill-oriented reading to the stage of strategy-oriented reading. These groups of readers do not pay constant attention to the surface of language, instead they are conscious of the purposes of reading. They have developed the ability to guess at meaning, to fill in the gaps, and predict the important points and also to control their pace of reading. Such readers are not language bound as they do not look only for factual details, rather they are able to identify the significance and relevance of fact, using strategies consciously.

The intermediate students can safely be called efficient interactive text processors since they do not process in a totally bottom-up fashion. They have proved, in the present study, that they attempt to use the relevant background knowledge and take the advantage of the larger context, and cognitively to activate their schemata to analyze and interpret texts. Moreover, they feel a sense to use the previous strategic knowledge they have already developed.

More importantly, the students in the intermediate level of language proficiency demonstrated a sensitivity towards wholistic concepts as they were able to answer the interpretative questions on the reading passages.

As to the third group, those in advanced proficiency level the findings can be justified if we consider their abilities in filling in the gaps and using any textual cue as a prompt to activate their schemata. As competent readers, they can recognize the factual details and their significance to get at meaning, and even move beyond the information available in the text. Having passed many stages of reading, advanced students must have become autonomous readers in the foreign language, and thoroughly familiar with the needed strategies through studying various types of materials on different topics. Through an extensive reading of text books, and reading materials, such students must have developed a sense of understanding of a text as well as an awareness of how writers organize and convey what they intend to mean.

In short, the study reported here has revealed that when it comes to reading comprehension, the degree of linguistic knowledge plays a crucial role in students’ ability and capability to take benefit from an instruction in cognitive and metacognitive skills, and that a mere introduction of such strategies into reading comprehension courses without other relevant factors may prove, if not counterproductive, but ineffective.

References


