

The Effect of Explicit Teaching of Online Metacognitive Strategies on EFL Learners' L2 Reading Comprehension

Amir Mahdavi-Zafarghandi

Associate Professor of TEFL, English Department, University of Guilan, Iran

Jaleh Hasaskhah

Associate Professor of TEFL, English Department, University of Guilan, Iran

Fereshteh Taghi Montaghmi *

MA in TEFL, English Department, University of Guilan, Iran

Abstract

With the rapid development of technology, online reading has become an important issue for research in the educational field (Anderson, 2008). This study reports on an investigation into the effect of explicit teaching of online metacognitive strategies on reading comprehension. To this end, the study was carried out on 30 male intermediate level EFL learners, who received 12 hours of instruction in a language center in Tonekabon, Iran. The participants were assigned into the experimental and control groups. Before giving the instruction, the Online Survey of Reading Strategies (OSORS) was administered in order to find out the online reading strategies used by EFL learners. Then, in the experimental group, the researcher explicitly taught online metacognitive strategies through modeling whereas the method used for the control group was implicit and lecture-based. A pre-test post-test design was followed and the data were collected through online reading tests. The results revealed that online reading comprehension by the experimental group improved significantly. The findings show that explicit teaching of online metacognitive strategies could be beneficial in EFL intermediate classes.

Keywords: reading comprehension, metacognitive strategies, online reading

INTRODUCTION

When a learner intends to succeed in learning a foreign language, s/he should master reading skills. As Anderson (2003) noted, "reading is an essential skill for learners of English" (p. 2) in which there are so many factors involved, such as the reader, the reading materials, vocabulary skills, and L1 reading ability that the teachers should consider when helping students to improve their reading comprehension. Moreover, learners have to master some specific strategies to handle comprehension of L2 reading materials.

In recent years, with the increase of internet use, online reading has become an important source of input and has influenced learners' reading skills (Anderson, 2003). Therefore, it is necessary for the learners to be able to cope with the new challenges of online reading. Teaching learning strategies is one way which is claimed to be useful for improving learners' performance (Anderson, 2003).

O'Malley and Chamot (1990) describe learning strategy as "the special thoughts or behaviors that individuals use to help them comprehend, learn, or retain new information."(p.1). However, finding effective materials to support students' reading comprehension in digital environments has been a critical issue for educators. Also, there are gaps in the knowledge of both teachers and students about how to deal with digital texts and the effect of using metacognitive online strategies on the reading comprehension skills. Therefore, the purpose of this study is to examine the online reading strategies that EFL learners use in learning English and the effect of explicit teaching of metacognitive online strategies on reading comprehension.

LITERATURE REVIEW

Online Reading Practices and Research

Nowadays, as the reading platform has changed from traditional texts to digital texts, online reading is rapidly being accepted by many learners. Besides, the Internet has become a useful tool in the language classrooms to expose students to authentic language related to their lessons, and hence this technology has changed the mode of reading. That is, non-linear, multi-media, and interactive texts have appeared as three types of online texts that learners are encountered with, and each has brought new challenges to the readers (Coire, 2003 cited in Anderson, 2003). Therefore, teachers should familiarize readers with new skills and strategies to face such challenges. In order to fulfill this purpose, teachers need to be aware of effective online reading strategies that L2 learners use. Anderson (2003) argues that knowing the mental process of reading online texts would inform researchers about 'what happens during online reading and would lead to stronger learning skills' (p.6). Kang (2014) explains that online texts have various options such as images, audio, and videos which help learners to comprehend online reading; thus, online reading texts make the process of reading comprehension easier. On the other hands, learners need to be aware of special skills, and strategies specific to this context (p.3).

In order to recognize the most important online reading comprehension strategies, Anderson (2003) used the Online Survey of Reading Strategies (OSORS) to compare ESL and EFL students' different uses of metacognitive online reading strategies. The OSORS contains 38 items that measure metacognitive reading strategies are subdivided into three categories: global reading strategies (18items), problem solving strategies (11 items), and support strategies (9 items). The results of this survey indicated the only difference between EFL and ESL learners was in the use of problem-solving strategies. In the same vein, Yutdhana (2004) explored EFL graduate students' use of metacognitive online reading strategies, and Taki and Soleimani (2012) investigated

Iranian EFL learners' use of online strategies, and reported that the students used global, problem-solving and support reading strategies at the medium level. Problem-solving strategies and global reading strategies were used the most. Also Hassaskhah and Gaskari (2014) examined the online reading behavior of 270 Iranian EFL college learners according to their strategy use based on a 46 item Online Reading Strategy Inventory (ORSI). The result showed that these participants use three major types of online reading strategies: General reading strategy, Online Specific Reading Strategy and Metacognitive strategy. Admitting that strategies are effective in online reading, some researchers argued for the necessity of strategy instruction for improving metacognition of the proficient readers (Dreyer and Nel, 2003; Anderson, 2008; Aghaie and Zhang, 2012; Kim and Cha, 2015). They maintained that metacognition is an important element which affects reading through evaluation of thinking processes. William and Atkins (2009) too claim that among different materials and strategies, metacognition has been known as a significant factor for comprehension of text. In addition, Atkins (2013) believes explicit instruction in reading comprehension strategies would be more useful in helping readers transfer their knowledge to novel texts. Teaching strategies, through modeling and guided practice can help them use the right strategy when they encounter difficulties while reading any text and would allow them to eventually use these strategies independently (Liang and Dole, 2006 cited in Atkin, 2013).

Metacognitive online strategy instruction

Lan, Lo, and Hsu (2014) categorize the metacognitive strategies studies into the following groups: regulation, strategy cues, comprehension aids, and paper versus digital texts. Metacognition has two basic aspects: 'the first one is knowledge of cognition and the second one is self-directed thinking' (Johnson-Glenborg, 2005, p.158). Johnson-Glenborg's study focused on the effect of web-based training of metacognitive strategies on text comprehension. In this research students first read texts with anagrams and then read texts with supported visual and verbal tools. The results showed that participants' reading comprehension improved significantly when reading digital texts with embedded support.

Similarly, Kim and Cha (2015) that used think-aloud procedures with a focus on regulation of cognition to improve Korean learners' metacognition. Four Korean university students were chosen. English was not their major and based on TOEFL test, their scores indicated that all were intermediate readers and the research instrument of the study was think-aloud protocols during the 15-week reading strategy training. The students were trained using explicit reading strategy instruction based on the CALLA model. The results showed that there were marked changes in the frequencies of their regulation processes over time. This research suggests that students would benefit from being provided with sufficient time for practice to build effective regulation of cognition in reading processes and that the teacher should understand the complex nature of the regulation processes that students go through.

Hathorn and Rawson (2012) investigated the role of embedded monitoring requests and questions in improving mental models of computer-based scientific texts. They were interested to find out whether global monitoring questions or specific monitoring questions improved the concept memory or not. Participants were individually tested in two experiments. They had to answer global and specific monitoring questions. Based on this research, teaching global monitoring strategies were effective strategies for improving the mental models of readers of scientific text. In addition, the learners made their own monitoring questions and searched for their own questions. Thus, learners monitor their own understanding. According to the study by Hathorn and Rawson (2012), asking global monitoring questions would increase the ability of learners to make the concept maps of digital texts (such as: In the page, you have just made, was anything different to what you thought?). Also, strategy cues like glosses, annotations that may help learning to comprehend better. These glosses include translation, definitions and pictures and have different types such as textual glosses, pictorial glosses, and mixed glosses.

In another similar study, Yanguas (2009) examined the multimedia glosses and their effects on L2 text comprehension and vocabulary learning. This study compared textual glosses, pictorial glosses and mixed glosses with no glosses. The experimental group that received mixed glosses performed better in comprehension and vocabulary recognition than the control group who received no glosses.

In addition, comprehension supports as instruction may have positive effects on learners' comprehension of digital texts. Gegner, Mackey, and Mayer (2009) investigated whether computer-supported aids influence comprehension of scientific articles and vocabulary or not. Comprehension aids could be audio, visual, and background knowledge that, based on this research, had significant effects on reading comprehension. Gegner et al. (2009) investigated high school students because of their difficulty in understanding scientific research articles on the internet. Thus, the authors developed a computer-based prototype for helping student's comprehension of scientific articles, which was presented on a computer screen with computer-based comprehension aids or without aids. Thus, the experimental group received computer-based comprehension such as (background texts, animations). The comprehension aids group performed better than the control group on a comprehension test. Also, the experimental group reported more positive motivational beliefs towards scientific articles than the control group.

There are also some other studies which investigated the difference between reading on paper and reading in digital environment. All of the researchers (Chapelle, 1998; Wallace, 2004; and Kober, 2005) agreed that using the Internet and its environment can be an effective strategy for improving language skills and showed positive results among students (cited in Al Farhan, Momani, and Qarni, 2015). Therefore, the discussion has changed recently from a research on the effect of computer in the classroom to a research on internet environment and online-learning.

Kramarski and Feldman (2000) aimed to examine the effect of internet on reading comprehension, motivation and metacognitive awareness. A sample of 52 students studying in two eighth-grade classes, was randomly selected from one high school. The experimental group received the metacognitive strategy training in the digital environment, while the control group received the same instruction in a regular classroom. As a result, the experimental group did not outperform the control group in reading comprehension.

Dreyer and Nel's study (2003) suggested an academic course that offered reading strategies instruction through technology environment over 13 weeks in a university South Africa in 2003. The experimental group outperformed the control group (who did not have access to computer-based environment) in reading comprehension and standardized tests.

In these two studies, the results were greatly different. Kramarski and Feldman (2000) concluded that reading in computer environment only improved learners' motivation, while Dreyer and Nel (2003) concluded that technology environment influenced reading comprehension measures. Dreyer and Nel (2003) and Gegner et al. (2009) used self-monitoring/ self-check questions to help students' reading comprehension whereas Yanguas (2009) focused on giving definition and picture. According to Lan et al. (2014), 'these three studies had large effects on reading comprehension' (p.198).

Another similar study was conducted by Hassaskhah and Farhang Asa (2014) about whether or not reading fluency of EFL Iranian learners significantly differs in these two text types (paper and digital based). Moreover, the study intended to assess the participants' preference for either types, and investigate whether gender has any significant impact on the participants' reading fluency. To this end, causal comparative design was used. First, the reading fluency of 30 English major students doing their MA was examined in two types of reading environments. Then, their preference for either of the text types was assessed using a self-assessment checklist. The results of data analyses revealed that not only were the reading fluency scores in paper texts higher, but also the majority of participants had a higher preference for the traditional paper-based texts. Moreover, the study indicated that male participants outperformed their female counterparts in their reading fluency.

Also, Mahdavi Zafarghandi and Rezapour (2016) investigated the effect of mind mapping and summarizing on Iranian upper-intermediate learners. 60 students were randomly assigned into three groups of two students. The result of study revealed that the difference between the two treatment groups was not statistically significant. Due to the necessity of metacognitive skills in L2 reading, some researchers have categorized these skills. Researchers like Mokhtari and Sheorey (2002, p. 4), categorize metacognitive strategies into the following:

1. Global reading strategies - readers carefully plan their reading by using techniques such as having purpose in mind and previewing text.

2. Problem solving strategies - readers work directly with text to solve problems when reading such as adjusting speed of reading, guessing meaning of unknown words and rereading text.

3. Support strategies - readers use basic support mechanisms to help reading like using dictionary, highlighting and taking notes.

Online reading strategies are under investigated broadly from different point of views, but few studies have been conducted which exam EFL learners' online reading strategies. Since EFL learners are reported to be overwhelmed with English online materials on the Internet (Chen, 2003) therefore, there is a need to have a research on their use of online reading strategies and the possible effect of metacognitive strategies instruction on reading comprehension. The following are the two research questions addressed in the study:

The study aims to answer the following questions:

- What are the most used metacognitive online strategies employed by Iranian EFL learner?
- Does teaching metacognitive online reading strategies improve Iranian EFL learners' reading comprehension?

METHOD

Participants

The survey was conducted on 100 students studying at intermediate level at the Shokouh English Language Institute, Tonekabon branch, Mazandaran. From these 100 participants, 30 students selected through purposive sampling were chosen to be treated as the experimental group of the study. Purposive sampling is a form of sampling in which the selection of the sample is based on the judgement of the researcher as to which subjects best fit the criteria of the study (Patton, 1990). Three predetermined features for the participants guided the sampling decision: The participants had to have prior reading courses at academic level, had to be in need of using digital texts for their studies, and had to be computer literate. Considering these assumptions, it was decided that students who were internet users, with intermediate level of proficiency, be the participants of this study.

Instruments

Online Reading Strategies (OSORS)

The Online Reading Strategies (OSORS) questionnaire was used to test students' metacognitive online reading strategies awareness, adapted by Anderson (2003). OSORS is an adaptation from the Survey of Reading Strategies (OSORS) (Mokhtari and Sheorey, 2002). OSORS consists of statements of description of behaviors or preferences while reading online (Anderson, 2003). The survey has 38 items (18 items on Global Strategies, 11 on Problem Solving Strategies and 9 items on Support Strategies).

According to Anderson, the Cronbach's alpha for the overall OSORS is 0.92, and the reliabilities for each subsection are: Global Reading Strategies 0.77, Problem Solving Strategies, 0.64, and Support Strategies, 0.69.

Pre- and Post- Reading Tests

All 30 participants, who were selected from the total students, answered the pre-digital test conducted online. After training, the post-digital test was administered to the groups. Each participant in either group had pre-online comprehension test at intermediate level that was available in the site. The participants read a passage and then answered the questions. They could download this test "English intermediate Reading Comprehension Test 001" for offline use. The passages included 10 questions. According to the readability formula, the result shown that the reading passages were significant enough to show readability. After the instruction was given, both groups had online post-test for reading comprehension at intermediate level enclosed in the site, English intermediate Reading Comprehension Test 002.

Procedure

The first step was to find a valid and reliable instrument to measure learners' use of metacognitive online reading strategies in Iranian academic contexts. The questionnaire which was used for this purpose was Online Survey of Reading Strategies (OSORS) adapted by Anderson (2003). Therefore, it examined participants' metacognitive online reading strategies while reading academic materials such as text books.

During the administration of the questionnaire to 100 students studying at the language institute, the researcher was present while distributing the questionnaire in order to answer any questions which the respondents might have asked. While distributing the questionnaires among them, the researcher explained the aim of the questionnaire to the participants. The questionnaires were distributed either before the starting of the class or at the end of the class. The instructions were provided in the participants' first language i.e. Persian. The completion of the questionnaire took about ten minutes for each participant. All of the surveyed students were asked to complete the 38-item OSORS with the five point Likert scale items ranging from 'always or almost always' to 'never or almost never'. This survey measured three subcategories of metacognitive online reading strategies: global strategies, problem solving, and support strategies. At the final step, these 30 students were in two classes and their level was Top Notch 2 all of whom were male whose age ranged from 16 to 25.

The experimental group was trained in the digital environment and received a four-week period of instruction consisting of metacognitive strategies through modeling and giving examples related to the topics of their books. After practicing these strategies in seven sessions through modeling, the researcher consulted them when they read digital texts. Also, some strategies were introduced to the experimental groups such as how to use online dictionaries, Text Aloud software, and how to change the font and font size of the text. Moreover, they could look words up in the online dictionary or search key

words in Wikipedia. In contrast, the control group consisting of 15 male English learners was trained in a regular classroom without any explicit strategy instruction. They just overviewed the categories of metacognitive online strategies. Both groups participated in the online survey; hence, all of them were moderate strategy users. Before training began, the pre-online reading texts were taken and the scores were recorded.

Data analysis

The data from the survey was analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows version 20.0. Descriptive statistics were used to answer the first research question. In order to determine the most used strategy, descriptive statistics of mean and standard deviation were used. To interpret the mean score of the strategy used, the study used and Mokhtari and Reichard's (2002) and Anderson's (2003) scoring guide which indicates high use of strategy if the mean is 3.5 or higher, moderate use if the mean is 2.5 to 3.5, and low use if the mean is 2.4 or lower. Finally, for the second research question, which is to determine the significant difference between the two groups of learners, ANCOVA was used.

RESULTS

In order to answer the first research question, the Means (M) and Standard Deviations (S.D.) for Each OSORS item was calculated. Table 1 indicates the results and lists the strategies used by the learners.

Table 1. The Means and Standard Deviations for Each OSORS strategy (N = 100)

Strategies		M	S.D.
GRRS	Global Reading Strategies	3.18	.654
PRS	Problem-solving Reading Strategies	3.30	.594
SRS	Support Reading Strategies	3.21	.714

Table 1 demonstrates the means and standard deviations for each OSORS strategy. The value of the mean refers to the frequency of use which ranged from 1 (never or almost never) to 5 (always or almost always) with 3 as sometimes (50% of the time). The students' responses were examined in terms of the individual strategies as well as the three categories or subscales identified (i.e. global strategies [GLOB], problem-solving strategies [PROB], and support strategies [SUP]). As Table 1 shows, the means of individual strategy items ranged from 3.5 (using context clues) to 2.66 (live chatting with native speakers) for the students (overall M=2.54), indicating an almost moderate overall use of reading strategies according to established strategy usage criteria described previously: high (mean of 3.50 or higher), medium (mean of 2.5–3.49), and low (2.49 or lower). It is found that the learners mostly used problem solving strategies followed by support reading strategies and global reading strategies. The following section addresses the answers to the research questions of the study.

The present study showed that EFL online readers tend to use more problem solving strategies when they read online texts which is line with previous studies

showing that EFL learners' use more problem solving (Anderson, 2003). Additionally, the results of the present study showed that foreign language learners use metacognitive strategies to boost their reading comprehension. The result revealed that intermediate Iranian students were moderate users of metacognitive online reading strategies. This result was consistency with Taki and Soleimani, (2012) findings which proved the moderate use of online metacognitive reading strategies by MA Iranian students. Additionally, Najwa Alsayed (2014) found that postgraduate Libyan students used problem solving strategies most frequently and support strategies least frequently.

The result revealed that the high use of metacognitive online strategies were the problem solving strategies such as guessing the meaning of unknown words by contexts clues, re-reading online text and paying closer attention which lead to better reading comprehension. And these results are in line with finding of Taki and Soleimani (2012). Also, the least frequency use strategies were global strategies such as chatting with native speakers because of the limited interacts with native speakers' that result found by few other researchers (such as Taki and Soleimani 2012).

Furthermore, the strategy of taking notes and considering the online text's length and reading aloud were the less frequently used strategies. This finding was supported by Mesgar et al. (2012) and Najwa Alsayed (2014) who confirmed that taking notes and reading aloud were the least frequently used strategy among postgraduate students because the participants considered them as time consuming.

Some Basic Assumptions of ANCOVA

In this section, only two key assumptions for ANCOVA, namely Linearity for each group and Homogeneity of Regression Slopes, are discussed. If these assumptions are not violated, the ANCOVA will be conducted appropriately.

Linearity for each Group

ANCOVA assumes that the relationship between the dependent variable and each of your covariates is linear (straight-line).

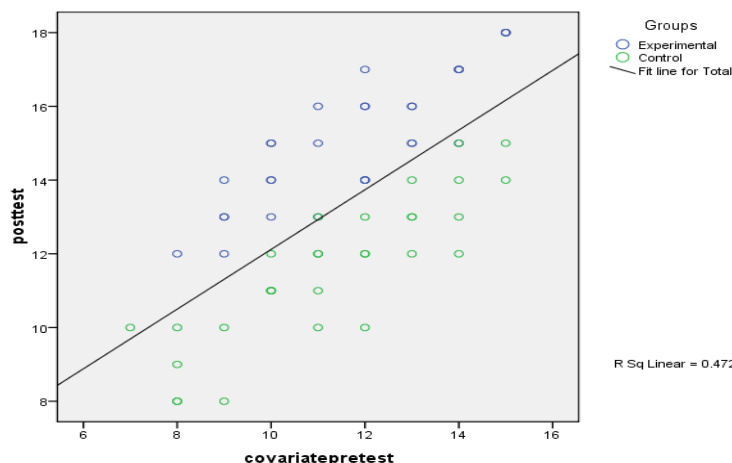


Figure 1. Linearity for each group

Figure 1 shows the linearity for each group. It is easily noticed that the relationship between the dependent variable and covariate is linear for both groups. Therefore, the assumption of linearity was not violated, and, as far as this assumption is concerned, conducting ANCOVA is not problematic.

Homogeneity of regression slopes

The next assumption is called the Homogeneity of regression slopes. That is, the relationship between the dependent variable and the covariate is the same for each group. It is checked to show that there is no interaction between the covariate and the treatment.

Table 2. Tests of Between-Subjects Effects for the Homogeneity of Regression Slopes

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	323.769 ^a	3	107.923	108.768	.000
Intercept	47.638	1	47.638	48.011	.000
Groups	5.220	1	5.220	5.260	.030
Covariate	141.425	1	141.425	142.533	.000
Groups * Covariate	.012	1	.012	.012	.904
Error	55.565	26	.992		
Total	11046.000	30			
Corrected Total	379.333	29			

a. R Squared = .818 (Adjusted R Squared = .835)

In the Table 2, the only value that needs to be checked is the significance level of the interaction term (shown above as groups * covariate). The significant value is *greater* than .05 indicating that the assumption of the Homogeneity of Regression Slopes has not been violated. Therefore, the Analysis of Variance can be properly conducted to explore the differences between our treatment groups.

Descriptive Analysis of the Data

This section of the data analysis has to do with the interpretation of the descriptive analysis of the data. The results of the groups' descriptive statistics are summarized and tabulated in tables 2, 3, and 4. Table 2 presents the result of the descriptive statistics of the control group on both pretest and posttest measures.

Table 3. Descriptive Statistics of the control group

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	15	5	14	11.15	1.17
Posttest	15	6	16	12.14	1.05
Valid N	15				

According to the above table, it is revealed that the pretest mean value of the control group for reading comprehension was 11.15 with the standard deviation of 1.17. With regard to its performance on the posttest, the control group showed some degree of improvement on reading comprehension measure [Mean= 12.14, SD= 1.05].

Table 4. Descriptive Statistics of the experimental group

	N	Minimum	Maximum	Mean	Std. Deviation
pretest	15	8	15	12	2.03
posttest	15	12	18	14.21	1.18
Valid N	15				

Table 4 indicates the result of the descriptive statistics of the experimental group on reading comprehension measures before and after the treatment. Prior to the instruction, the experimental group had a mean value of 12 with the standard deviation of 2.03. However, it is revealed that its performance on the reading comprehension measure improved after the treatment. It can be inferred that the online strategy instruction was effective in enhancing learners' reading comprehension [Mean= 14.21, SD= 1.18].

Table 5. Descriptive Statistics of both groups on the posttest

Groups	Mean	Std. Deviation	N
Experimental	14.21	1.18	15
Control	12.14	1.05	15

Table 5 illustrates the descriptive analysis of the experimental and control groups for the posttest scores of reading comprehension measures. Findings reveal that the mean value of the experimental group on the posttest measures of reading comprehension was 14 with a standard deviation of 1.18. However, the mean value of the control group of the study in the posttest was lower than that of the experimental group (Mean= 12.14., SD= 1.05). Thus, it can be claimed that the experimental group outperformed the control group on the posttest of reading comprehension despite the initial difference in their pre-test mean values. Yet, in order to investigate whether the difference between groups is significant, the results of ANOVA should be presented and discussed. What follows in the next section is a discussion of the inferential statistics of the research.

Inferential Analysis of the Data

A one-way between-groups analysis of covariance was conducted to investigate the possible effect of Online Reading Strategy Instruction on Iranian EFL learners' reading comprehension performance. Participants' scores on the pre-intervention administration of reading comprehension were used as the covariate in this analysis. Before taking the main results of ANCOVA in Table of Tests of Between-Subjects Effects, another assumption of ANCOVA needs to be checked. It is essential to check the Levene's Test of Equality of Error Variances table to see if the assumption of equality of variance is violated.

Table 6. Levene's Test of Equality of Error Variances

Total	df1	df2	Sig.
.136	1	28	.421

Table 6 summarizes information about the result of the Levene's Test of Equality of Error Variances. In this case, the assumption has not been violated because the significant value of .42 is much larger than the cut-off of .05. The main ANCOVA results are presented in the Table 4.6, labeled Test of Between-Subjects Effects.

Table 7. Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	323.757 ^a	2	161.878	166.024	.000	.853
Intercept	48.247	1	48.247	49.483	.000	.465
Covariate	143.490	1	143.490	147.164	.000	.721
Group	144.852	1	144.852	116.431	.000	.711
Error	55.577	27	.975			
Total	11046.000	30				
Corrected Total	379.333	29				

The findings of the Table 7 indicate that after adjusting for pre-intervention scores, there was a significant difference between the two intervention groups on post-intervention scores on reading comprehension, $F(1, 57) = 116.431$, $Sig = .000$, partial eta squared = .71. Hence, the ANCOVA reveals statistically significant difference between the two groups on the reading comprehension when the potential differences at pre-test are taken into account. In short, it can be concluded that the experimental group performed significantly better than the control group in the posttest which is indicative of the great effectiveness of the metacognitive strategy instruction for the enhancement of Iranian EFL learners' reading comprehension.

DISCUSSION

This study focused on the possible effect of Strategy Instruction on Iranian EFL learners' online reading comprehension. For this reason, a survey was conducted to figure out the overall use of online metacognitive strategies and explore which metacognitive strategies were used in the instruction. Therefore, the participants were the moderate users of metacognitive strategies.

Also, the students' pretest and posttest scores on reading comprehension were analyzed to see if there was a statistically significant difference between the two groups in terms of reading comprehension. The results of the descriptive statistics of the groups indicated that the experimental group outperformed the control group on the posttest measure of reading comprehension.

In order to test whether this difference between the groups is large enough to reject the null hypothesis at the significance level of .05, a one-way Analysis of Covariance (ANCOVA) was conducted. Upon reviewing the results of the one-way ANCOVA data analysis procedure concerning reading comprehension of two groups, the experimental group turned out to significantly outperform the control group after the intervention, indicating that the metacognitive strategy instruction was successful in enhancing Iranian EFL learners' reading [$F(1, 57) = 116.431$, $Sig = .000$, partial eta squared = .71]. Hence, the null hypothesis of the study that "There is no significant relationship

between reading comprehension and teaching online metacognitive strategies was rejected at .05 level of significance.

The finding gave some useful guidance for reading instruction. According to previous studies such as Anderson (2003) and Chen (2015) the high proficiency learners used more global strategies to raise their reading comprehension. Therefore, it is concluded that global strategies are more useful than the two others. The finding indicated the same result. After explicit teaching these strategies such as using contextual clues, predicting the context of the text, reading purposefully, their reading comprehension score increased.

There has been little research on the influence of explicit instruction of metacognitive strategies on the EFL learners' online reading comprehension. The previous studies have concentrated on the effect of reading strategy paper-based format or the comparison between the internet and traditional environment (Kang, 200; Singhal, 2001; Theodorou, 2006). Also, some researchers investigated the attitude of learners towards online learning/teaching (e.g., Aydin, 2002; Slate, Manuel, and Brinson, 2002; Usun, 2003). Thus, it is hard to find evidence to support the findings of the present study. This study initially investigated the L2 learners' frequent use of online reading strategies, and then tried to find out whether the explicit instruction affects learner' online reading comprehension or not. In order to support its effectiveness, the pre-test and post-test of online reading were both analyzed. The results of the first aim of the study are in line with the findings of previous research (Anderson, 2003).

The participants had applied general reading strategies such as skimming and contextual clues to read online materials. During the training, the participants learned how to use these strategies; for example, guessing the meaning of unknown words, supports the outcomes by Ganderson (1998), Anderson (2003) and Dail (2004). Also, the second focus of the study was on the effect of explicit instruction of online metacognitive strategies on the participants' reading. Studies investigating the effect of explicit teaching of online metacognitive strategies on L2 learners' reading comprehension (Suwanabubph 2002; Simthamnimit 2004; Naphadorn 2007; Pookcharoen 2009) also found that learners' online reading comprehension scores remarkably improved in their post-test and they were able to do better after training.

This study investigated how the use of online metacognitive reading strategies has a significant effect on EFL students' reading comprehension. Accordingly, an experimental study is conducted to find out the relationship between using metacognitive strategies when reading online English academic texts and reading comprehension.

Many of the educators and researchers such as Atkins (2013) and Pressley (2006) confirmed that explicit instruction led to better reading comprehension. Some scholars believes that metacognitive reading strategies transfer from L1 to L2 which may have quite an impact on reading comprehension (Mokhtari and Rwachard, 2004; Taki, 2015). Due to Iranian instruction atmosphere, the metacognitive strategies that they used most

are problem-solving and support strategies; however, learners' approach to reading can change by reading strategy instruction (Taki, 2015).

The findings revealed that there was a relationship between metacognitive online strategies and reading comprehension which are consistent with those of other studies that indicated the positive correlation between metacognitive reading strategies awareness and reading scores such as (Sheorey and Mokhtari, 20001; Taki, 2015).

There are some strategies that are specific to online reading such as clicking on hyperlinks to other sites, using online dictionaries that proved useful for readers. For instance, when readers encountered unknown words or concepts instead of looking up dictionaries, they could use Google and followed the link to Wikipedia that gave them some useful information in a short time. On the other hand, these skills and strategies were not practiced in classroom instruction.

Teachers can encourage students by introducing the usefulness of online texts. The study revealed that participants become better online readers after understanding how to use strategies. This can change the negative view of readers towards online materials. Additionally, teachers should consider the way of helping students automatically use those reading strategies when they encounter with online English materials through instruction before they are overwhelmed in online reading materials.

CONCLUSION

Considering the outstanding growth of Internet use among students, the present study aimed at investigating the possible effect of explicit teaching of metacognitive online reading strategies on reading comprehension among intermediate EFL learners. Also, using different metacognitive online strategies in teaching reading comprehension is efficient and matches modern teaching techniques. In addition, this study highlighted the importance of teacher training on the effectiveness of using metacognitive online strategies in teaching reading comprehension to EFL intermediate students.

However, this study examined one specific category of language learners. Therefore, the population of the study was limited to the intermediate EFL students. As a result, the findings cannot be generalized for all EFL students. According to the findings shown in previous parts of this study, it is clear that the frequency of using internet in teaching reading comprehension is relatively high among the intermediate students.

Based on the finding of the study of Lan et al. (2014), there are some elements that have strong effects on training metacognitive strategies such as student's background, the features of content areas, also the contexts of digital reading. Therefore, teachers should be more aware of the role of these variables. Furthermore, the results of this study positively confirm the research questions and confirm the researchers' hypotheses about the use of online strategies and the positive effects of explicit teaching of metacognitive online strategies. Consequently, this study generates important pedagogical and managerial implications.

The findings obtained from this study could be used as a guideline for teachers to figure out what effective strategies are and whether the explicit instruction of metacognitive online strategies improves the students' reading strategies that would help students' adjustment to the different types of texts they are reading online. In the following are recommendations for further investigation into the use of metacognitive online reading strategies in the EFL context.

First, while there have been several studies on the relationship between L1 and L2, further studies in this area may begin to explore whether there is also a relationship between L1 and L2 in online reading performance such as reading online texts in English and in Persian.

Second, future research can be conducted to explore what similarities and differences exist between the use of strategies among proficient and less proficient readers. Even though reading proficiency level is a major factor influential in the strategy use, other equally important variables like motivation, gender, years of study, academic majors should also be taken into account. Further research might discover to what extent these other variables play a role in students' use of strategies in the online reading environment.

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