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The Effect of Explicit Training of Metacognitive Reading Strategies on Online Reading Comprehension

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Abstract
Few studies have investigated the detailed procedure of systematically delivering and teaching metacognitive strategies in higher education. This study investigates whether explicit training in metacognitive strategies could improve undergraduates' online reading comprehension over the pandemic. The results of this study contribute to teacher education programs to teach and apply regularly metacognitive reading strategies. In a quasi-experimental design, the experimental group and control group underwent 14 sessions of training. Semi-structured interviews and a Metacognitive Reading Awareness Strategy Assessment were conducted among experimental students. The data were collected using the reading test, Metacognitive Reading Awareness Strategy inventory, and semi-structured interviews in Malaysia.The results of Repeated Measure ANOVA showed the mean scores of students in the metacognitive group were significantly higher than the mean score of the students in the conventional reading group ($F= 1.3,82.3) = 215.973$. $p <0.001$). The results of the Metacognitive Reading Awareness Strategy Assessment showed that students had more awareness of global reading strategies ($M= 3.511$), followed by supporting reading strategies ($M=3.468$) and problem-solving strategies ($M= 3.427$). The thematic analysis result supported that students were moderate users of planning and monitoring strategies while evaluative ones were less frequent. The results also revealed that students perceived that lack of vocabulary knowledge, heavy dependence on their teachers, and lack of strategy training were the main causes of their reading difficulties. The findings implied that EFL teachers should introduce metacognitive reading strategies through appropriate and systematic instructions to enable the students to implement them in their academic reading.
Keywords: metacognitive reading strategies, online teaching, reading comprehension

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Introduction

A growing body of literature recognizes the importance of reading in a higher education context (Miller & Merdian, 2020; Yapp, de Graaff, & van den Bergh, 2021). The academic success of university students depends on their reading proficiency, as they require to read textbooks and resources to acquire the content and procedural knowledge of fields of specializations. Reading entails successful interactions between writer, context-specific, and text-based factors, including fluency and automaticity in text processing, lexical resource, background knowledge, motivation for reading, and metacognitive reading strategies (Ghaith, 2019; Kung & Aziz, 2020). Some researchers maintained that a significant number of EFL learners might reach tertiary education without being well-prepared for the reading requirements of their academic programs (Cabinda, 2016; Aghajani, 2019). Despite the need for continued support in reading, maintaining a structured focus on the reading process is commonly ignored by university instructors to provide more direct instruction in writing. Instructors often assume that students have developed sufficient reading skills from previous academic experiences (Andrianatos, 2019; Amir, Hasanuddin, & Atmazaki, 2019).

The last two decades have seen a growing trend toward investigating the importance of reading and teaching different reading strategies to enhance students' reading comprehension (Susanto, 2020; Amir et al., 2019). The issue of reading strategies classification has received considerable critical attention, with different scholars proposing different classifications. Though there is little consensus on how many learning strategies are exactly used by learners and how they should be named or grouped, Chamot and O'Malley (1987) and Oxford (2011) have suggested some useful and specific category types: cognitive, metacognitive, and socio-affective. Specific methods for the classroom delivery of metacognitive reading strategy instruction were used, such as the Cognitive Academic Language Learning Approach (CALLA), first introduced by Chamot and O'Malley (1987). More recently, Anderson and Briggs (2011) have proposed a model for metacognition that is composed of five main components: (1) organizing and planning for learning, (2) choosing and employing strategies, (3) monitoring the use of strategy, (4) organizing variety of strategies and (5) assessing the use of strategy and learning.

A few classifications emphasize 'metacognition' as an essential aspect of strategies, including planning and preparing for reading; and how to monitor, direct and evaluate the use of different reading strategies. Mokhtari and Sheorey (2002) classified metacognitive reading strategies into global, problem-solving, and support reading strategies. *Global reading strategies* are strategies followed to get the main idea or gist of the text. *Problem-solving strategies* help the reader tackle the problem while the text becomes difficult. However, *support reading strategies* are techniques to sustain the reading. Mokhtari and Sheorey (2002) examined ESL students' awareness and use of reading strategies while reading academic texts. They found that ESL students were generally aware of and frequently used various reading strategies, particularly problem-solving strategies, which helped them with reading difficult texts. Another interesting finding was that more proficient readers employed reading reading strategies more effectively and consistently compared to less proficient readers.

Numerous researchers identified the major role of metacognition in text comprehension and differentiated between good and poor readers (Takallou, 2011; Meniado, 2016; Montaghami & Mahdavi-Zafarghandi, 2016; Bećirovic et al., 2017; Lee & Mak, 2018; Dardjito, 2019; Ajideh & Pouralvar, 2018; Hapsari, 2019; Deliany & Cahyono, 2020; Kung & Aziz, 2020; Manh Do & Le Thu Phan, 2021). Some studies suggest a positive correlation between the use of metacognitive

reading strategies and reading scores (Alıcı & Serdaroğlu, 2016; Memiş & Kandemir, 2019; Memiş & Kandemir, 2019). Studies investigating online metacognitive reading strategies were similar to those cited in printed materials (Azmuddin, Nor, & Hamat, 2017; Rianto, 2021). It has been reported that students used problem-solving strategies the most, although global reading and support reading strategies were the least used. However, some studies found no significant relationship between teaching metacognitive reading strategies and student reading improvement (Meniado, 2016; Surlitasari & Premini, 2018).

It is now well established from various studies that explicit teaching of metacognitive strategies would improve reading comprehension scores. However, the results of some studies are questionable as there has been no one specific way of conducting the instruction of metacognitive reading strategies. To the best knowledge of the researcher, few studies explained the detailed procedure of systematically delivering and teaching metacognitive strategies in a higher education context.

Based on the researcher's teaching experience, some students often complain about how difficult it is for them to read an academic article that includes many unknown and complex words—reading needs much more than recognizing written words in a text and decoding information at this level. Some students might decode the written texts; however, they cannot comprehend what they have decoded due to a lack of comprehension skills. These students encounter difficulty comprehending academic text and this weakness adversely influences their academic performance.

To understand the current practice of teaching reading metacognitive reading strategies at the ELS institution, the researcher observed three reading sessions taught by instructors. The researcher has observed most instructors used conventional teaching practices while teaching reading comprehension. She has noticed that instructors used only planning strategies. One source of the learners' difficulty despite their satisfactory language proficiency might be their lack of knowledge of reading metacognitive strategies.

In addition, the existing body of research suggests that explicit teaching of metacognitive strategies would improve reading comprehension scores. However, such studies have failed to clarify how they systematically teach metacognitive strategies in practice. A considerable lack of standardization of instrumentation and lack of specification with teaching metacognition was identified in the current literature. Few studies have investigated the detailed procedure of systematically delivering and teaching metacognitive strategies in higher education (Ajideh et al., 2018; Hapsari, 2019). To fill the gap in the existing literature, the researcher described the systematic implementation of teaching metacognitive strategies over the pandemic to international undergraduate students and examined their effects on their reading comprehension.

Moreover, previous research only administered the Metacognitive Awareness of Reading Strategies Inventory (MARSI) to measure students' metacognitive reading awareness. Some studies skeptically questioned this assessment method for identifying students' degree of awareness of metacognitive reading strategies. (Hong-Nam & Page, 2014; Alıcı & Serdaroğlu, 2016; Dardjito, 2019; Ulu, 2019; Deliany & Cahyono, 2020). To better understand students' awareness and perception of metacognitive strategies, the researcher interviewed students in the experimental group to identify their problems while applying these strategies. The general purpose of the study is to investigate the effect of explicit online teaching of metacognitive strategies on the reading comprehension of undergraduate international students in Malaysia. The second aim is to identify undergraduate international students' most commonly used metacognitive reading

strategies. The third aim is to identify undergraduate international students' perception of metacognitive strategies in their reading comprehension. The findings have contributed to higher institutions in general and the Ministry of Education in Malaysia to emphasize teaching reading comprehension strategies and inclusion of reading efficiency so that students taking the proficiency courses will be well-equipped with general academic reading skill. Based on the research objectives mentioned above, the present study attempts to achieve answers to the following research questions and their related hypotheses.

1. What differential effects do metacognitive strategies have on international undergraduate learners' reading comprehension?
2. What are the most commonly used metacognitive reading strategies by participants?
3. What is the students' perception of using metacognitive strategies to improve their reading comprehension?

Ho 1: There is no significant difference between mean scores of reading comprehension among students who attended reading lessons using metacognitive strategy and those who used the conventional approach in pre-test?

Ho 2: There is no significant difference between mean scores of reading comprehension among students who attended reading lessons using metacognitive strategy and those who used the conventional approach in post-test?

Ho3: There is no significant difference in reading comprehension performance in using metacognitive strategy in pre-and post-tests after the treatment?

Literature Review

Metacognition is defined as awareness or analysis of one's own learning or thinking processes. Chamot and O'Malley (1987) define metacognitive strategies as planning, prioritizing, setting goals, and self-management. Metacognitive strategies are the activities in which students become conscious of their thinking process while doing the reading task. Metacognitive reading strategies is defined as a series of mental activities and processes in which students are triggered to think and monitor their improvement in accomplishing a cognitive task; these mental activities are planned, goal-directed, and future-oriented. According to Iwai (2011), planning, monitoring, and evaluation are three steps in metacognition processing.

Numerous research has identified the major role of metacognition in text comprehension, and they claim that metacognitive abilities differentiate between good and poor readers (Meniado, 2016; Montaghami & Mahdavi-Zafarghandi, 2016; Bećirovic et al., 2017; Gangl et al., 2018; Ajideh et al., 2018; Hapsari, 2019; Muhid et al., 2020; Deliany & Cahyono, 2020; Kung & Aziz, 2020; Manh Do et al., 2021). Some studies suggest a positive correlation between the use of metacognitive reading strategies and reading scores (Alıcı & Serdaroğlu, 2016; Memiş & Kandemir, 2019). However, some studies found no significant relationship between teaching metacognitive reading strategies and reading improvement among students (Meniado, 2016; Surlitasari & Premini, 2018).

Some studies investigated the effect of teaching metacognitive strategies on reading comprehension in high school students and school contexts (e.g., Mokhtari & Sheorey, 2002 & Mokhtari, Dimitrov, Reichard, (2018). However, few studies have concentrated on explicitly teaching metacognitive reading strategies for international students in Malaysian tertiary education. Gaining insights into the English reading language of L2 International learners majoring in different majors in Malaysia is crucial since it may provide us with closer perspectives regarding obstacles encountered in reading texts. Most related studies have been conducted in the socio-

cultural, multilingual, and educational contexts of the Asian sub-continent (Alhaqbani & Riazi, 2012). To comprehensively view the effect of teaching metacognitive strategies on reading comprehension in college and university contexts, the researcher summarized all past studies.

Some studies were carried out in EFL contexts. They found relatively positive effects of teaching metacognitive strategies on reading comprehension scores such as Salataci and Akyel (2002) in the Turkish context, Ikeda and Takeuchi (2006) in the Japanese context, Cubukcu (2008), Ismail and Tawalbeh (2015), Montaghami and Mahdavi-Zafarghandi, 2016; Bećirovic et al., 2017; Gangl et al., 2018; Ajideh et al., 2018; Hapsari, 2019; Muhid et al., 2020; Deliany and Cahyono, 2020; Kung and Aziz, 2020; Manh Do and Le Thu Phan, 2021; Manh Do et al., 2021; Hasaskhah, Taghi Montaghami, 2016 and Ajideh et al., 2018). Much of the current literature on teaching metacognitive reading strategies in university contexts failed to explain the procedure of teaching metacognitive strategies in the classroom.

The underlying theories of this study are schemata theory and constructivism theories. A schema is theoretically defined as a mental structure of generic concepts stored in memory. Schemata is considered organized background knowledge, leading readers to predict text aspects (Duke & Pearson, 2017 & Jian-ping & Zang Li-sha, 2016). Constructivism theory considers cognitive development and learners' deep understanding (Rao, 2018). Hence, students' degree of comprehension and their ability to construct meaning is a fundamental aim of the learning process in the current study. Metacognition has its roots in the constructivism theory of learning which was proposed by Piaget (1963) and Vygotsky (1978). In schemata theory, reading is an active process in which the reader reconstructs meaning from text by connecting old knowledge to the new information they gained.

Methods

Research Design

The present study employs a quasi-experimental design, a nonrandomized control group, a pre-test, and a post-test to examine the effect of using online instruction of metacognitive strategies on reading comprehension. In this design, experimental and control groups received pre-test and post-test, but the groups did not require pre-experimental sampling equivalence (Ary et al., 2010). The sampling method was convenient sampling, a non-probability sampling where the sample is taken from a group of undergraduate students who were studying in the same university, so collecting data would be convenient.

Population

The population for this study was international undergraduate students who intended to improve their general English and academic literacy skills to meet the language proficiency requirement at the University Putra Malaysia. The study was conducted in September 2019. According to their placement test results at ELS, participants' level of language proficiency was 106 or B1 intermediate level. In every research design, determining sample size is a fundamental step requiring appropriate planning. For this study, the experimental group participants were 35, and the control group was 35.

Research Instruments

This study selected IELTS reading tests from the Cambridge IELTS academic module (Volume nine) as pre-test and post-test because they are standard and reliable. There are two reasons why the researcher has chosen IELTS reading to measure students' reading comprehension. The

rationale for choosing the IELTS academic reading tasks is that these texts are standardized reading tests, and their level of difficulty had been meticulously measured before testing. Another reason is that IELTS reading tests are chosen from academic, scientific, and authentic texts. Therefore, the researcher ensures that these reading comprehension texts are validated in terms of authenticity and degree of difficulty. The IELTS reading section includes three different passages and 40 questions designed to test a wide range of reading skills. These include reading for gist, reading for main ideas, reading for details, skimming, understanding the logical argument, and recognizing writers' opinions, attitudes and purpose.

The second instrument in the present study is the Metacognitive Awareness of Reading Strategies Inventory (MARSI), developed by Mokhtari and Sheorey (2002) to identify students' awareness of metacognitive strategies in academic reading. They developed the metacognitive awareness inventory based on the input received from experts, an in-depth review of the literature, and identifying strategies used by skilled readers. Exploratory factor analysis was used to select 60 items. Subsequently, the researchers narrowed the number of items to 30, administering the inventory to an experimental group. The reliability test revealed that the MARSI has an overall reliability of 0.89. Other subscales had high reliability: .92 global reading, 87 support reading strategies, and .79 problem-solving. The expert judges examined and measured validity by comparing it with students' self-reported reading ability. Therefore, the MARSI is a reliable and valid instrument. The inventory has three subscales: global reading strategies, support strategies, and problem-solving strategies. This questionnaire is appropriate for use in college setting based on Mokhtari and Reichard (2004). The MARSI consists of 30 items using three individual subscales; global reading, problem-solving, and support strategies.

The final instrument was the semi-structured interview to understand students' perceptions of using metacognitive strategies to support the quantitative data. The reason for using a semi-structured interview is the flexibility to modify the format and sequence of the questions during the interview. Moreover, the interview questions were reviewed and modified by the panel of TESL experts to ascertain that the questions were clear and appropriate. The interview questions can be found in Appendix 1.

Treatment

The students in the experimental group participated in 14-session strategy training. Every session was held twice a week and took 45 minutes. The researcher used the Complete IELTS textbook as this book includes different academic texts. The researcher trained students based on the CALLA teaching strategy model consisting of five stages: A) **Preparation:** At this stage, the teacher introduces metacognitive strategies such as global reading strategies, problem-solving, and supportive strategies developed by Mokhtari and Reichard (2002).

B) **Presentation**: This phase focused on modeling the learning strategy. The preparation and planning, the selection of reading comprehension strategies, monitoring of strategy selection and use, orchestrated use of several strategies, and evaluation of the effectiveness of metacognitive strategies were illustrated through several examples.

C) **Practice**: In this phase, students had the opportunity to practise the learning strategies with an authentic learning task in breakout rooms. The students became aware of multiple strategies available to them.

D) **Self-evaluation**: Activities to develop students' self-evaluation insights included self-questioning and debriefing discussions after strategy practice. In learning logs, students recorded

the results of their learning strategies applications, checklists of strategies used, and open-ended questionnaires.

E) **Expansion**: In this final phase, students were encouraged to a) use the strategies that they found most effective, b) apply these strategies to new contexts, and c) devise their own individual combinations and interpretations of metacognitive learning strategies.

Research Procedure

Once students signed the consent forms, the researcher administered the reading IELTS test as a proficiency test to 70 students to measure students' reading comprehension performance in experimental and control groups. Afterward, the researcher played the teacher's role and started teaching IELTS academic reading texts to both groups of control and experimental groups over 14 weeks. The researcher modeled using different kinds of reading strategies online using Microsoft Teams. The control group received a conventional method of teaching reading strategies such as activating background knowledge, skimming, scanning, identifying main ideas and supporting ideas, etc. The only difference between the two groups was the experimental group's planning, monitoring, and evaluation of metacognitive strategies. After completing the intervention, the post-test of IELTS was administered to both groups of students to measure their reading comprehension performance.

Data Analysis

To address the research question regarding investigating the effect of explicit teaching of metacognitive strategies on reading comprehension of undergraduate students, the researcher ran the normality test using the graphical method and statistical parameters such as skewness and kurtosis. The researcher used the inferential method to evaluate the main research hypotheses, including a two-way repeated measure analysis of variance followed by the Bonferroni test for mean comparison between the control and experimental group (pre and post-tests).

The interviews were audio-recorded, transcribed, summarized and coded, and discussed. Qualitative content analysis was deemed suitable for the current study, as it considers the context in which the interview was produced. In the current qualitative content analysis, structuring and filtering the related content and analyzing and defining them into certain categories were deemed appropriate. The interviews were filtered to find statements that fit into the categories. The categories were developed inductively. The data were coded using a structured category system. (Mayring, 2000).

Findings

The first assumed null hypothesis to address the first question of the study was as follows:

There is no significant difference in reading comprehension performance in using metacognitive strategy in pre-and post-tests after the treatment. RM ANOVA was applied to compare students' reading comprehension mean scores on pre-test and post-test in the metacognitive experimental group to test this hypothesis.

Descriptive statistics for the total IELTS reading score were done prior to the statistical analysis. As it can be seen (Table one), The mean IELTS reading scores were improved after the intervention for both control and experimental groups. To evaluate these changes, a two-way RM-ANOVA was

Table 1.*Descriptive statistics of IELTS reading score in both groups*

Variable	Group	N	Mean	SD
PRE.READING	Experimental	33	3.833	0.608
	Control	32	3.672	0.518
POST.READING	Experimental	33	3.754	0.567
	Control	32	5.333	0.525

The findings for within-subjects effect of repeated measures of time were significant (F (2, 126) = 269.445. p <0.001, h2= 0.810). These results revealed that the interaction between groups and time was significant (F (2, 126) = 6.504. p =0.002. h2= 0.094). It is indicated that the changes in IELTS reading scores in the two groups were significantly different across times (pre-test and post-test). The researcher conducted a post-hoc test (Bonferroni) to test the related hypothesis to measure and compare the mean scores.

Table 2. *Summary of RM-ANOVA for IELTS reading*

Source	Df	MS	F	p-value	η2
Test	2	46.326	269.445	<0.001	0.810
Group	1	9.41	21.451	<0.001	0.254
Test * Group	2	1.118	6.504	0.002	0.094

According to the result of the Bonferroni test, the difference in IELTS reading scores between pre-test and post-test was statistically different (p<0.05) in both control and experimental groups. These results also revealed that the effect size of time in the experimental group (h2=0.852) was larger than the control group (h2=0.760).

Table 3. *Pairwise comparison between pre-test and post-test for IELTS reading in both control and experimental groups*

Group	(I) Test	(J) Test	Mean Difference (I-J)	SE	p-value	η2
Experimental	1	2	-1.500*	0.093	<0.001	0.852
Control	1	2	-1.188*	0.094	<0.001	0.760

***** The mean difference is significant at the .05 level.b Adjustment for multiple comparisons: Bonferroni

Regarding the second research question, "What are participants' most commonly used metacognitive reading strategies?" The results (Table five) show that all mean scores were above three (median of scale), indicating that the level of using these strategies among students was more than moderate level (Mokhtari & Reichard, 2004).

Table 5. *Descriptive statistics of reading strategies among students*

	Minimum	Maximum	Mean	Std. Deviation
Global strategies	2.780	4.220	3.511	0.478
Support reading strategies	2.500	4.380	3.468	0.378
Problem-solving strategies	2.310	4.460	3.427	0.580
Overall	2.570	4.350	3.469	0.427

To measure the differences in the mean scores of these three subscales, the researcher conducted a one-way repeated measure ANOVA to evaluate the differences among strategies. Mauchly's test results showed that the assumption of Sphericity was not violated (χ^2=1.171, p=0.557). Based on the results of repeated measure ANOVA, differences among these three strategies were not statistically significant $F_{(2, 64)}$ = 0.733, P>0.05, η2= 0.022). These results showed that the highest mean score belonged to global reading strategies (M= 3.511, SD=0.478), followed by Support

reading strategies (M=3.468, SD=0.378) and problem-solving strategies (M= 3.427, SD=0.580). According to Kouider Mokhtari and Carla Richard (2002), all the mean scores were categorized as 3.5 or higher = High, 2.5 – 3.4 = Medium, and 2.4 or lower = Low.

According to these results, 9.1% of respondents had a low frequency of problem-solving reading strategies. These results indicated that 63.6% of respondents used it at the medium level for global reading strategies, and only 36.4% of respondents used it at a high level. The results for supporting strategies indicated that 60.6% of students used this strategy at a high level, while only 39.4% of respondents used those strategies at a medium level.

Findings of Interview with Experimental Groups

In this study, almost all the interviewees confirmed that they are concerned about their lack of knowledge in lexical resources and grammar in reading comprehension. A summary of the findings on the research question is demonstrated in Table 6. Therefore, the first theme that emerged was a lack of vocabulary and grammatical knowledge. Initially, the way EFL students learned English vocabulary seemed to be isolated and de-contextualized. That is to say, a new word is learned as "a word with one meaning." Characteristically, English teachers directly tell the meaning of new words, and then EFL students would write the word, which means down, and then memorize it. This kind of vocabulary learning method has made EFL students forget new vocabulary as they don't know how a word is used in the context. For example, student B mentioned,

"I forget the words soon after the quizzes. And I cannot recognize them whenever I come across them in reading English books."

Student D commented:

"A lot of time I feel so frustrated in reading, sometimes I spend so much time looking up vocabulary and …sometimes you don't have much time for that. When I was in high school, I would rather give up and leave it to the English teacher and wait for their explanation or translation".

Table 6. *Coding scheme for students' problems in reading academic texts*

Participants	Q1 What are your problems while reading academic texts?	Coding scheme
B	I forget the words meaning soon. And I cannot recognize them whenever I encounter them in reading English books."	Lack of exposure to new vocabulary in different contexts
D	'When I was in high school, I would rather give up and leave it to the English teacher and wait for their explanation or translation".	Too much dependence on EFL teachers
E	'But I think my vocabulary knowledge is too less. I think I might start to read when my vocabulary is built up".	Lack of vocabulary

The second question was related to students' awareness of reading strategies: "what strategies did you use before reading, during, and after reading**"**?

When asked about what they might do in the planning stage of reading, students listed activities such as setting the purpose for reading, using prior knowledge, previewing text before reading, skimming to note text characteristics, and checking how text content fits the purpose and making predictions. Almost all six students mentioned they preview the text and set a goal for reading. The additional planning strategies were predicting topic range and predicting information location.

Regarding monitoring strategies, students reported that underlining, circling, or highlighting information in the text (100%) and pausing for a break to think when needed (80%) were cited most often as important activities by participants. They used reference materials (dictionary, textbook, etc.) to resolve comprehension problems (90%), checking if the text made sense to them. They use available features such as tables, charts, section titles, etc., or typographical aids (italics, bold, different word colors, etc.) (60%) and try to maintain their focus during reading.m 60% of the interviewed students also used other monitoring strategies such as trying to guess the meaning of unfamiliar words by contextualizing them (using familiar words, pictures, other sentences, etc.). They tend to visualize the information by imagining and drawing images. However, students C and F were unable to use other strategies, such as trying to guess the meaning of unfamiliar words and visualizing the information by imagining and drawing images.

Student C mentioned:

"When the teacher asked us to guess the meaning of unknown words, I hardly ever can guess the correct meaning from the context. I think I need to learn more vocabulary to understand the text better."

Students used monitoring strategies to different degrees. Male students tend to use guessing meaning more often than female students. However, females used more reference materials such as dictionaries, pausing strategies, typographical aids, and visualizing more than their male counterparts.

Students A reported:

"I visualized the information, especially in reading academic texts, because it helped me to understand it better. So, I often imagined the situations where certain things happen and how or why that happen."

Student F commented:

"I thought it was fascinating to me because I'd never done that before by visualizing your thinking. It encourages me to do more thinking like this. Besides, I feel like reading something not in the textbook. I think I am a better reader now because I found that I understand more by constantly thinking about my reading process, and I remember the content of that article longer. It stays in my mind longer".

When it comes to evaluating strategies, almost all students mentioned that if they don't understand the passage, they reread it to understand it better. %50 percent of students mentioned they usually summarize or paraphrase the key information. %60 of students mentioned that they assess their understanding by reflecting critically and evaluating the information on the test. %60 percent of them reported if one strategy doesn't work, they may try other strategies. % 45 of them reported that they check if they accomplished their reading objective set at the beginning of the reading.

Students used evaluation strategies moderately compared to planning and monitoring strategies. Male students mostly used rereading, checking prediction, and summarizing, whereas female students used rereading and summarizing more. While they use checking prediction, checking reading objective accomplishment, judging strategies, and making reflection and evaluation moderately. It is worth mentioning that students used evaluation strategies to recapitulate the information they got and recheck things they did not understand.

Of six students interviewed, they cited planning strategies most frequently (eight times), followed by monitoring strategies (six times) and evaluating strategies (four times). They regarded planning strategies as the easiest and most frequently used (eight times), whereas they found

evaluating strategies the most difficult to apply. All students were able to express, in some form, increased awareness of the various stages of their reading process and attempt to comprehend various expository academic materials. A sample of coding of students' frequently used strategies is illustrated in Appendix 2.

When asked how participating in the study had affected their reading skills, participants replied that the process had had positive results and caused them to change what they did when they read academic materials. One participant stated:

"It has helped me with my finals. Now, I'm not worried about reading everything. I'm jotting down important points and becoming more efficient and effective."

Another participant also remarked that it changed how he approached the assigned reading for one of his courses.

"Now, I'm not just going through the reading. The first thing I do is look at the title and sub-title. I make predictions about the passage I'm about to read in my textbook."

The importance of pausing when needed during reading to reflect briefly on the material was also highlighted by another participant, who remarked:

"I don't sit too long on one passage…I give myself a break now and then. It energizes me. The information becomes new, and maybe ideas begin to flow at that point."

The participants appeared to have altered their normal reading routines to include at least one, if not more, of the metacognitive reading strategies introduced by the study. It is important to note that four out of six participants remarked that they could not recall their instructors discussing any type of reading strategies during their courses. "The instructors don't have the time to go into strategic reading," said one participant. Another remarked, "Instructors think we know. They should review planning, monitoring, and evaluation with us. That's encouraging and helps us get interested in reading."

It appeared that students recognized the time constraints for covering many materials in many college-level courses and the frequent assumption on the part of instructors that students could read and comprehend text easily on their own. However, 100 percent of the participants in the study expressed interest in receiving at least a small amount of guidance from their instructors at all stages of the reading process, especially related to specific types of academic reading. The interview findings suggest that participants perceived learning metacognitive strategies benefited them and needed direct metacognitive strategy training.

Discussion

The finding of this study is consistent with those of Takallou (2011), Ismail and Tawalbeh (2015), Maasum, Maarof, Zakaria, and Yamat (2012), Montaghami and Mahdavi-Zafarghandi (2016), Tavakoli and Koosha (2016), Ajideh, Zohrabi, and Pouralvar, (2018) who found the positive effect of explicit teaching of metacognitive strategies. It is worth mentioning that previous studies failed to demonstrate how they conducted teaching metacognitive strategies, and the duration of treatment in previous studies was between six and eight sessions. While the current study modeled each strategy using the CALLA model and metacognitive reading strategies to raise students' awareness of applying those strategies.

Some researchers have expressed skepticism about the effectiveness of explicit strategy instruction. Ali Gholami and Ahghar (2012) and Pei (2014) showed that teaching metacognitive strategies had no significant effect on reading comprehension scores. There are several possible explanations for this result, as students had a low level of language proficiency and limited

linguistic skills, which can negatively affect their reading. As the participants of this study were at an intermediate level, they seemed to have relatively good linguistic knowledge and consequently benefited from explicit training in metacognitive strategies. It is worth noting that no single strategy is used in isolation but rather in an orchestrated manner with other strategies as part of a process (Wing, 2017). This should not suggest that strategy instruction is not effective but rather give teachers increased insight into the various factors they consider when strategy instruction is undertaken.

The findings of this study are supported by Tavakoli (2014) and Yuksel and Yuksel (2012), who reported moderate awareness and use of metacognitive reading strategies. However, this outcome is contrary to those of Pammu et al. (2014) and Meniado's (2016) findings which found that participants mostly used problem-solving and supporting strategies. They pointed out that metacognitive strategies vary depending on language learners' settings and orientations. The participants in those studies had higher language proficiency, so it is expected that they have lesser language and learning barriers as compared to the respondents of the current study who had an intermediate level of language proficiency (Ahmed & Al-Sohbani, 2013).

When the metacognitive reading strategies are grouped according to sub-categories, the study revealed that the least frequently used are those that fall under the Problem-Solving Strategies (PROB). Considering the linguistic difficulties of the respondents, they have to find strategies that help them unlock the barriers (problems) in comprehending a text. This result supports the findings of Al-Sobhani (2013) and Yuksel and Yuksel (2012), having EFL students in Yemen and Turkey actively use Problem Solving Strategies (PROB) at a high level.

Conclusion:

The aim of the study was to identify the effect of explicit instruction of metacognitive reading strategies on undergraduate students' online reading comprehension. The quantitative and qualitative findings showed that explicit instruction of metacognitive reading strategies could positively enhance learners' reading ability. Therefore, the teachers should teach metacognitive strategies explicitly to raise learners' awareness of strategies and allow students to select appropriate strategies to accomplish their learning goals. Material developers could play an important role by designing and incorporating appropriate tasks and exercises into the reading materials to encourage a wide range of strategy applications in the learning experiences and enhance learner independence and autonomy. They need to consider the individual differences among learners and design tasks with various forms to ensure all students.

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Appendices 1

Interview protocol questions

(1) What are your problems while reading academic texts?
(2) For reading passages assigned to you, what strategies did you apply before reading, during, and after reading?
(3) Over the 14 weeks, what strategies did you apply more when you were reading texts?
(4) Explain a difficult experience while reading the IELTS text this week. What strategies could you use to overcome this difficulty?
(5) Explain a successful experience while reading English text over this week. What strategy did you apply to assist you in comprehending a text? If you did it again, would you do it differently?
(6) Will you use metacognitive strategies in the future? Why?

Appendix 2 (Coding scheme)

Participants	strategy	strategies cited	Types of metacognitive strategies
SA	Use of dictionary Self-knowledge	I utilize dictionaries to help me understand what I read.	(monitoring)
	Deduction	First, I think about what I know about this topic to help me understand	(planning)
	Activating prior Knowledge	what I read. I analyze and assess the information critically in the text	(Evaluating)
SB	Prediction	When I am reading, I guess what the material is about.	(planning)
	Using reference materials	I use dictionaries to help me comprehend what I read.	(monitoring)
SC	Setting purpose	When I am reading, I have a purpose in my mind.	(Planning)
	maintain my focus during reading	When I am distracted, I Get back on track again when I lose concentration during reading, I try to get back on track	(monitoring)