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The Relationships between Metacognition and Reading Strategies: The Case of English-Majored Students at a Private University in Vietnam

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Abstract: Many studies have pointed out a proportionate relation between metacognition and reading strategies. This study advances such an understanding by arguing that this relation is comprised of several sub-relations. Metacognitive Awareness Inventory and Reading Strategies Inventory were conducted among 92 English as Foreign Language students at a Vietnamese university. This study highlights 3 major findings. First, metacognition processes do not merely mean “cognition about cognition”. Second, while previous studies tended to portray metacognition as a whole, it is argued in this study that it is constituted by two main clusters (knowledge of cognition and regulation of cognition) which can be further specified into eight sub-components. Third, there seem to be some sub-linearities that underpin students’ metacognition and that influence their uses of reading strategies. These findings are hoped to shed light on preserving spaces and autonomy in curriculum/syllabus development for students to exercise their own metacognition.

Keywords: Bloom’s taxonomy, critical reading, metacognitive awareness inventory, metacognitive awareness, reading strategies.

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Introduction

Metacognition, or knowledge of cognition, is among the most mentioned terms in the field of language acquisition. Some studies (e.g. Händel et al., 2014; McNamara, 2011; Metcalfe & Finn, 2013; Pressley & Gaskins, 2006) have proven that students possess metacognition and are able to utilize it well in their learning processes. It is believed to be a key factor that makes students successful learners. For instance, metacognition helps students to make judgments and employ various strategies such as monitoring and questioning. Even though these studies have found that students possess different metacognitive levels that affect their distinctive learning performances, they generally collapse the students’ metacognition into a generic term without unpacking if being metacognitive is always what it is. If this were the case, we would wonder why some of us are good at doing certain things, e.g. remembering facts and/or being able to make critical questions to our friends’ essays but unable to compare two sets of opinions. Speaking of metacognition or cognition, we seem not to be good at everything. This grasps our attention to exploring what lies behind these differences and students’ metacognition in separate (sub)components.

Research related to tertiary education has shown that effects of the inter-relational aspects between teachers’ and students’ awareness of metacognition and their practices of teaching and learning seem to contribute to how students can perform reading strategies. Although there is a plethora of research on this area, most focuses on metacognition and reading comprehension among English as second language (ESL) students. Metacognitive awareness and reading strategies of English as foreign language (ESL) students, in contrast, seem to receive scant attention. In this vein, this study is a timely response to calls for research that unpacks the relationships between metacognition and practices of reading strategies (see also Jacobs & Paris, 1987; Phakati, 2003; van Kraayenoord, 2010) in a Vietnamese context. It is hoped to add further nuance to this current body of research that tends to focus on either children’s metacognitive awareness and reading strategies, or ESL students instead of students in an EFL context.

This study was conducted at a private university in Vietnam. The researchers in this study explored how the students’ awareness of metacognition influences the ways they perform reading strategies. Most of the courses provided at this

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university include certain degrees of metacognitive skills and knowledge. In this study, two corpuses that involve metacognitive skills: Critical Reading Skills (ECR201) and Reading Summit 1 (ENT403) were examined. The ECR201 Syllabus claims to provide English-majored students with reading strategies as well as developing their metacognitive skills and knowledge. Similarly, the course ENT403 aims to develop students' reading skills and metacognition. The objectives to teach and enhance students' metacognition are elaborated in uses of verbs that collate with Krathwohl's (2002) revised version of Bloom et al.'s (1956) taxonomy.

In contrast with the hierarchical order of Bloom et al.'s (1956) taxonomy which depicts learners as logical thinking subjects who are consciously able to move stepwise to gain their learning outcomes, the learning objectives of ERC201 show disorders of cognitive levels. For example, its Learning Outcome 1 expects students to first apply various reading strategies, then recognize whether they are able to think critically or not, comprehend texts, interrogate why they think that they are critical thinkers, and finally distinguish their uses of reading strategies from others. The ENT403 course aims to help students develop their fluency in using English language and enrich learning experience through interactive lessons and enhance their language skills for the advanced level. Students are expected to show their comprehension of reading texts by responding to questions and demonstrating understandings of grammar rules taught through exercises. These arrangements of (meta)cognitive development create a demand to problematize the order in Bloom et al.'s taxonomy. Doing this can echo what Anderson et al. (2001) and Pring (1971) have extensively argued against the order in Bloom et al.'s taxonomy.

This study employed the Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994) that measures the extent of metacognition individuals are aware of. Then the relations among the various aspects of metacognition and two main types of reading strategies were analyzed. The following questions were formed to unpack these relations:

1. What EFL reading strategies do students use or not use?
2. How metacognitive are students?
3. What can be the relationships between their metacognitive awareness and uses of the reading strategies?

Literature Review

This section discusses two primary aspects: metacognition and reading strategies. Each aspect is elaborated into sub-components before the researchers conceptualize the relations that are explored in this study.

Cognition: First-order Thinking Level

Since metacognition has been known as one's knowledge about cognition, in this section we first explain what cognition is. According to Biehler and Snowman (1993), cognition refers to ways in which information is processed. For example, it includes how information is encoded, stored in memory for various lengths of time, retrieved from storage and used for specific purposes. These approaches include skills and knowledge that belong to different levels of human cognition. Bloom et al.'s (1956) taxonomy explains the operation of these cognitive levels. This taxonomy is used to classify educational objectives into levels of complexity and specificity. In this study, we follow the revised version of Bloom's taxonomy which is modified by Krathwohl (2002). In this revised Bloom's taxonomy, the six original categories are changed to gerunds in order to fit the ways they are used practically. According to Anderson et al. (2001), the process of creating is more complex than that of evaluating. While evaluating involves breaking the whole into parts for criticizing, creating refers to finding separate things that can fit together, evaluating their relevance, and then assembling them to make a new whole. In this revised version, synthesis is changed into creating. Then creating comes into place for evaluating. That means evaluating comes after creating as illustrated in Figures 1 and 2.

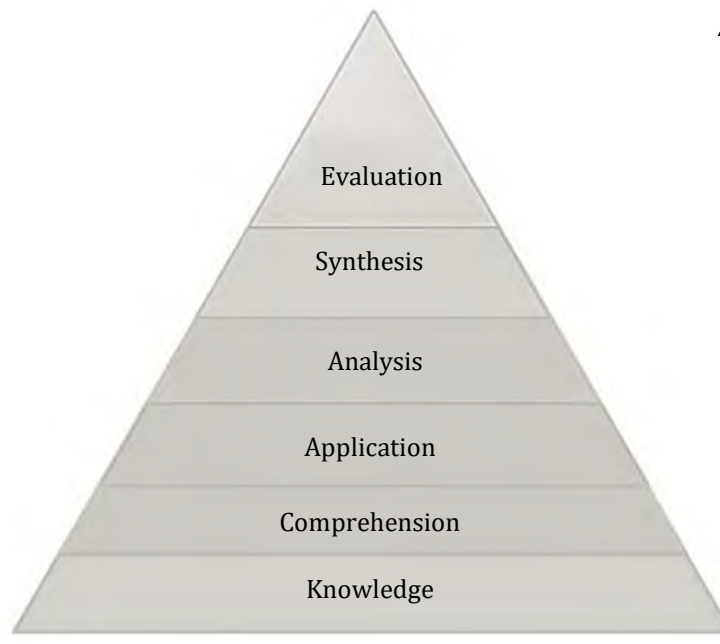


Figure 1. The original Bloom et al.'s taxonomy (Bloom et al., 1956, as cited in Krathwohl, 2002, p. 213)

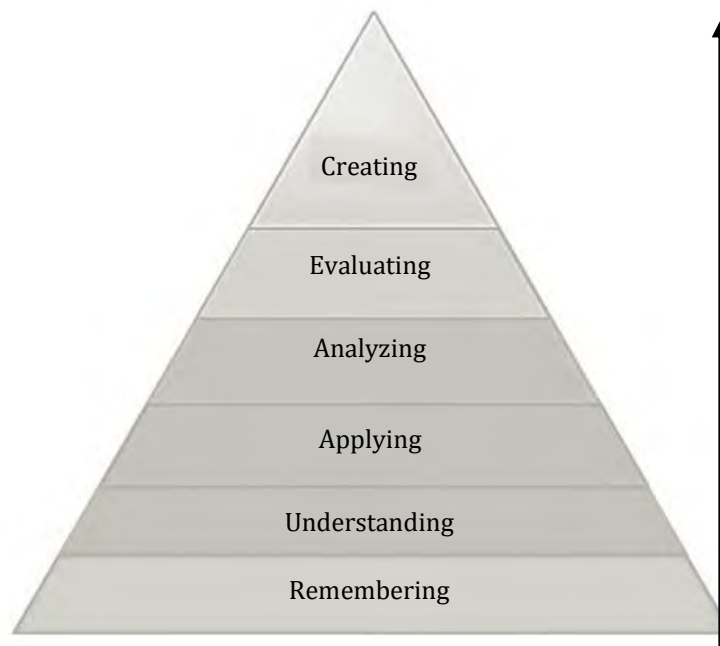


Figure 2. The revised Bloom's taxonomy (Krathwohl, 2002, p. 215)

According to this revised taxonomy, students move step by step to gain educational learning objectives. However, they may “jump” from the first level to the third, fourth, and even the last level depending on their personal objectives and surrounding conditions. Students sometimes reverse or change the order of these levels. Metacognitive knowledge fosters students’ uses of cognitive levels in various ways. Their awareness of selecting and ordering these levels of cognition is, in fact, seen as an example of the operation of their metacognition.

Metacognition: High-order Thinking Level

Metacognition refers to our knowledge about cognitive processes and how they might best be used to achieve a learning goal. Flavell (1979) defined metacognition as a process of cognition about cognition. Nelson and Narens (1994) added that metacognition is a metacognitive system in which cognition serves at a meta-level and is represented by metacognition at an object-level. The object-level refers to basic information processes such as remembering, rehearsing, and encoding. The meta-level monitors those object-level processes and then control them in a top-down regulation. Christoph (2006) explained that the meta-level is informed by the object-level as the flow of

information moved from the object-level to the meta-level, and one's confidence when retrieving an answer would be an example. In contrast, metacognitive control is information flowing from the meta-level to the object-level, which means that the meta-level modifies the object-level, for example, the control of one's self-paced learning.

Schraw and Dennison (1994) believed that metacognition includes two processes: knowledge of cognition and regulation of cognition. Knowledge of cognition indicates individuals' knowledge about their own cognition. Generally, students possess at least one of three kinds of knowledge: declarative, procedural, and conditional knowledge. Declarative knowledge refers knowing about, what, or that. It is factual knowledge that learners should be able to use for their critical thinking. Procedural knowledge is known as the application of knowledge that is directed and exercised to complete a learning process. It is knowledge about how students deploy specific strategies to achieve a concrete task. Conditional knowledge supports learners to know when and why they use these strategies.

Regulation of cognition is often performed through five activities that help control learners' thinking or learning. Planning involves goal setting and selecting appropriate strategies and allocable resources prior to learning. Information management strategies include the ones helping learners focus on organizing, elaborating, summarizing, and processing information. Comprehension monitoring refers to assessing learners' uses of strategies to achieve task comprehension and performance. Debugging strategies help learners correct comprehension and performance errors if any. The evaluation process enables learners to analyze their task performance and evaluate the strategies' effectiveness that they have used.

Metacognition is usually found to have three main facets: metacognitive knowledge, metacognitive experiences, and metacognitive skills (Efklides, 2008, 2009). Metacognitive knowledge is knowledge or beliefs about diverse cognitive tasks, goals, actions and experiences. These knowledge and beliefs are formed by and exercised around the three major categories (person, task, and strategy) that interact with and affect the outcomes of cognitive acts (Flavell, 1979). Metacognitive experiences tend to appear in the contexts that require high conscious thinking. They are people's conscious experiences and feelings when they are progressing toward a set goal (Efklides, 2008). Metacognitive experiences are also said to have an impact on metacognitive knowledge "by adding to it, deleting from it, or revising it" (Flavell, 1979, p. 908). Metacognitive skills are actually embedded in procedural knowledge that is required to evaluate if strategies which a person is using are effective. These skills are an inclusion of orientation, planning, monitoring, checking, and recapitulating strategies (Veenman & Elshout, 1999). While metacognitive knowledge and experiences relate to self-awareness, metacognitive skills refer to strategy use for the control of cognitive activities.

If students can evaluate either mind-mapping or taking notes strategies that they have used in previous lessons to help them acquire the present lessons better, they are said to be metacognitive. With metacognitive knowledge, they are aware of what they do and what they do not know yet. When students feel that it is too difficult to memorize historical events, for example, they may choose to employ their own metacognitive experiences. To memorize those events, students develop a plan which they will follow both subconscious and conscious knowledge and skills until they can obtain their goals, though it is admitted that not all goals can be achieved fully or satisfactorily. After that, they will evaluate the quality of their plans and outcomes. This process involves uses of metacognitive skills.

Relationships between Cognition and Metacognition

As mentioned above, cognition is one's awareness to form learning processes and information whilst metacognition refers to being aware of and knowing how to observe, develop, and evaluate those processes and apply knowledge in new circumstances (Gourgey, 1998). Some studies have been conducted (e.g. Haribhai, 2012; Phakati, 2003) to clarify the relations between cognition and metacognition. These researchers attempt to examine the interactions between cognitive and metacognitive strategies. For example, Phakati (2003) conducted a qualitative study in which the participants are required to take a reading exam and retrospective interviews. Phakati (2003) found that most cognitive strategies exist together with metacognitive strategies. To use cognitive strategies (e.g. elaboration, inferring, and transferring), test-takers need to be metacognitive first. This means that cognition is controlled and subject to metacognition.

Moreover, some strategies might be switched in other occasions. This depends on students' purposes of achieving a task. A translating strategy could be cited here as an example. If students translate a passage to remember the general idea, translating is a cognitive strategy. Nevertheless, if they translate this passage to ensure whether their understanding is accurate or not, translating becomes a metacognitive strategy. Nonetheless, it is difficult to determine when cognition or metacognition appears, since they usually occur as a continuum. Hence, the researchers in this study acknowledge an overlapping relation between cognition and metacognition.

There are certain relations between metacognition and cognitive levels in the revised Bloom's taxonomy. Metacognitive control and self-regulation refer to these levels in support of students' monitoring, controlling, and regulating their cognition and learning (Pintrich, 2002). While metacognitive and self-regulatory processes correspond with the six levels of cognition, metacognitive knowledge, as aforesaid, only involves knowledge of cognition. It helps students know when, why, and how to employ cognitive processes. Thus, students need to develop their metacognition, especially metacognitive control and knowledge, for activating their knowledge in deploying their cognitive strategies.

Overall, metacognition links to students' awareness and uses of cognitive processes. By exercising metacognition, students create more complex and unique ways to select appropriate tactics and strategies. They may subconsciously rearrange the order in the revised Bloom's taxonomy to better suit their learning, and sometimes to unintentionally form their own metacognition.

To sum up, cognitive and metacognitive strategies in particular, and cognition and metacognition in general, have intertwined, dependent and interactive relations. This means examining one individually without acknowledging the other will lead to an inadequacy (see also Haribhai, 2012; Veenman et al., 2006).

Components in Reading Strategies

Reading strategies reveal readers' understanding through the ways they manage their interactions with texts, and how they use strategies to obtain and enhance reading comprehension (Carrell, 1998). In this section, we differentiate skills and strategies.

Skills refer to information-processing techniques that are applied to a text unconsciously and automatically for many reasons including expertise, repeated practice, and compliance with one's intentional directions. In contrast, strategies are mental processes or behaviors that readers actively employ and control to achieve their desired objectives such as comprehending a text. Examples of some common reading strategies are scanning for details, guessing the meanings of unknown words, and activating prior background knowledge. Some researchers (e.g. Montgomery et al., 2007; Pearson, 2004) consider these strategies as reading skills. Others (Alexander & Jetton, 2000; Carrell, 1989), conversely, state that they are strategies since a reading skill becomes a strategy when readers can use it independently, as well as understand what it is, how it works, and when they apply it to new texts.

In this study, Block's (1986) classification of reading strategies was used. Accordingly, reading strategies are divided into two main categories: general and local strategies. General strategies, occasionally called global strategies (GLOB), include comprehension-gathering and comprehension-monitoring strategies. They comprise ten specific sub-strategies: anticipate content, recognize text structures, integrate information, question information in the text, interpret the text, use general knowledge and associations, comment on behavior or process, monitor comprehension, correct behavior, and react to the text. The second type is local strategies (LOC) that refer to attempts to comprehend specific linguistic units. They have four precise strategies: paraphrase, reread, question the meaning of a clause or sentence, question the meaning of a word, and solve vocabulary problems.

These strategies are believed to be the most common ones that EFL learners use. However, few studies have explored if the number of strategies used manifest readers'/learners' proficiency. In the same vein, some researchers have risen a controversy that good and bad learners prefer a particular type of reading strategies to the other. The next section is going to discuss both arguments.

Relationships between Metacognition and Reading Strategies

Reading strategies themselves are not intrinsically useful or useless, but they can be utilized efficiently or inefficiently in different settings by different people (Zhang & Wu, 2009). Metacognitive awareness, a manifestation of metacognition, plays a vital role in guiding EFL learners how to employ these strategies effectively.

Zare-ee (2007) explored the field of exploring relations between metacognition and reading strategies and showed that there are significant and positive relations between those two variables. However, Zare-ee did not explain or describe how both of them interact with each other and what affects the other. Instead, he tended to indirectly illustrate the relations between metacognitive awareness and reading comprehension. Zhang and Wu (2009) constructed a study of metacognitive awareness and reading-strategy use among Chinese senior school students who learned English as a foreign language. A questionnaire comprising 28 items representing three categories of reading strategies: global reading strategies (GLOB), problem-solving strategies (PROB), and support strategies (SUP), was used to collect data. The students, in general, were reported to use the available reading strategies at a high-frequency level. They were conscious of their comprehension processes and able to take actions when they were getting confused with comprehending the texts. They were also capable of planning for reading and of utilizing possible aids to enhance understanding and memorizing. These findings suggested that these students were flexible in selecting appropriate reading strategies. By employing their metacognitive awareness, they recognized and used a multitude of reading strategies.

In the same vein, Lahuerta Martínez (2011) conducted a study on the relationship between metacognitive awareness and reading strategies in an EFL context. She invited 66 second-year Spanish students who were of an intermediate proficiency level in English to complete a questionnaire. The quantitative data analysis allowed Lahuerta Martínez to conclude that there was no distinction in the students' uses of LOC and GLOB. The participants considered both LOC and GLOB equally effective. This means that metacognition did not enable them to prioritize a particular strategy over others. If the students had been aware of their reading ability and reading strategies' effectiveness, their reading

comprehension would have earned them better results. It can be assumed that metacognition helped students acknowledge the efficiency of reading strategies and apply these tactics in reading.

Many extant studies have portrayed the proportionate relationships between metacognition and effective uses of reading strategies (e.g. Burin et al., 2020; Rastegar et al., 2017). They have generally agreed that the higher metacognitive level students have, the more effectively they can use specific reading strategies. For example, Rastegar et al. (2017) found that GLOB and LOC strategies are predominantly and effectively used by students with high metacognition awareness. However, they tended to collapse the students' metacognition as a whole. This is repeatedly mentioned in earlier works (e.g. Phakati, 2003; Pintrich, 2002; van Kraayenoord, 2010). These researchers collectively consider the facets and processes of metacognition as a whole when they explore the relations between metacognition and reading strategies. In contrast, human beings' thinking skills can be seen as neither a whole nor separate parts. Our study aspires to delve into examining how particular aspects of metacognition interact with each sub-strategy of reading strategies.

Particular Aspects of Metacognition in Uses of Reading Strategies

There have been constant research efforts put into exploring how metacognition and reading strategies relate to each other. However, it seems that not many researchers focus on the relations between particular reading strategies and specific types of metacognition. For instance, Zhang and Wu (2009) and Lahuerta Martínez (2011) used reading strategies questionnaires in order to untangle these relations. These questionnaires were divided into distinctive categories of reading strategies (i.e. GLOB, SUP, LOC, and PROB). These researchers, still, did not measure how metacognitive their participants were. They collapsed their researched groups into one typical cohort that was supposed to possess the same level of metacognition. In contrast, students may have different levels of metacognitive thinking skills as they are potentially strong at specific domains of metacognition. Therefore, the ways each individual deploys reading strategies when he/she is at different level of metacognition have not been sufficiently explored. In addition, Gayo et al.'s (2014) study aimed to analyze the impact of metacognitive instruction on reading comprehension and strategies by using the Learning to Understand program in their pretest-intervention-posttest-follow-up design. Yet, they did not demonstrate their participants' metacognition level or how metacognition appears in the process of deploying reading strategies. Their study seemed not to determine specific strategies that are expected to enhance reading comprehension effectively.

Other studies focus on exploring EFL students' metacognitive awareness (e.g. Hong-Nam & Page, 2014; Yau, 2009; Yüksel & Yüksel, 2012). These studies generally employ the authors' self-designed questionnaires that combine a mix of Metacognitive Reading Strategies Inventory (MARSİ) and normal reading strategies. While these results can be applauded for being able to shed light on the relations between these variables, we raise some concerns about the validity of these studies. For example, when exploring the relations between students' metacognition and how they use reading strategies, these researchers presuppose that their researched students are always metacognitive. Do they mean these researched participants possess the same level of metacognition awareness and knowledge? This may not be completely true among every of us and student.

Chutichaiwirath and Sitthitikul (2017) adapted the MARSİ to explore the metacognitive awareness of reading strategies among Thai EFL learners. They noticeably concluded that previewing to predict, underlining and circling to remember, and rereading to understand were the most frequently used strategies that metacognitive awareness learners employed while reading. However, before that, they skipped determining the participants' metacognitive awareness. This may cause confusion because it might have influenced their uses of reading strategies. Conversely, Öztürk and Şenaydın (2019) applied the MAI to measure their participants' metacognition after asking them to take three reading tests. The findings of their study showed that metacognition and EFL reading performance had positive correlations. Specifically, metacognitive knowledge had a relation with the second and the third reading test results while metacognitive regulation only related to the second reading exam. These two reading tests were almost similar in structure, but the content of the questions requiring the participants to use higher-order thinking skills was different. Nonetheless, these researchers did not explain what caused the difference.

Instead, knowledge about cognition comprises three components: procedural, declarative and conditional knowledge. Some people may possess a higher level in one aspect but a lower one in others. No one possesses these three components on the same level. These two flaws in the current literature have urged us to use the MAI to initially screen how metacognitive our researched participants were before we examined the relations between the students' metacognition and their uses of reading strategies. Generally, using the MAI allows us to identify students' specific aspects of metacognition. In particular, this inventory enables us to explore how students' procedural/declarative/conditional knowledge in metacognition is used in their exercise of specific reading strategies.

Metacognition is basically one's knowledge and awareness about reversing and selecting a specific cognitive level. It is a system in which cognition and metacognition serve at distinctive points in the learning process. In particular, cognition accounts for basic information processes like remembering, rehearsing, and encoding at the object-level. Metacognition presents itself as a meta-level which allows individuals to manage these processes in a top-down regulation.

Metacognition also consists of knowledge and regulatory strategies used to monitor one's cognition. In this sense, metacognition and cognition seem to overlap. Furthermore, metacognitive knowledge, metacognitive experiences, and metacognitive skills are the three main facets of metacognition. These facets tend to occur as a continuum in one's learning processes. Therefore, being metacognitive enables learners to select reading strategies and know how to and/or when to apply them to obtain reading comprehension. We call for studies that focus on profoundly exploring the relations between the certain types of metacognition and reading strategies by using the MAI to measure learners' metacognitive awareness as a point of departure.

Methodology

Research Goal

A quantitative method was used in this study. Students were asked to respond to two inventories (MAI and RSI) that helped determine how metacognitive they were and how they deployed reading strategies. The researchers aimed to get an insight into the relationships of metacognition and reading strategies. The data collected from the inventories were analyzed descriptively.

Sample and Data Collection

A purposive sampling technique was applied to select only English-majored students who had studied ECR201 and ENT403 at this university. The total population was 117. Random sampling techniques were used to select 80% of the population for the sample size. Because students were busy with their classwork, only 92 responses were recorded. The participants had a (post)intermediate level of reading proficiency (presumably at this level as indicated in the learning outcomes in the Syllabi of these two courses).

Schraw and Dennison's (1994) MAI was used to measure the participants' metacognitive awareness. This MAI has a reliability index of .90 and a highly correlated factor index of .54. The MAI consists of measurement (self-report), cost-effectiveness and practicality for students who probably have limited resources and access to lecture time (Harrison & Vallin, 2017). This inventory is based on the theory of metacognition and includes 52 questions appertained to two components of metacognition: knowledge of cognition and regulation of cognition. However, in the original version of the MAI, Schraw and Dennison (1994) used a visual analogue scale or a 100-mm bipolar scale ranging from false to true from the left end to the right end respectively. Respondents answer by marking a slash on a line between two ends. Schraw and Dennison (1994) argued that they used the continuous scale instead of a Likert scale for better approximation to interval data and increase in response variations in order to enhance the reliability of the MAI. Yet, other studies (e.g. Kleitman & Stankov, 2007; Young & Fry, 2008) employed the MAI of 52-item questionnaires. These studies generally used a table with two column responses where respondents give an extreme true or false answer, which is different from the original MAI. They used Likert scales, or so called fully-labelled scales. Response scales are constructed distinctively, varying from false to true or degree of agreement. These studies provided little explanation for relinquishing the original scale (for a full critique, please refer to Harrison & Vallin, 2017). In other words, the MAI has appeared to be a controversial instrument regarding its scaling constructs and validity.

For these reasons, the researchers used Terlecki and McMahon's (2018) revised version of MAI, Terlecki and McMahon (2018) modified the MAI from the original continuum scale to a 5-point Likert-type rating scale. Each point in the response scale indicates the frequency of performing the item prompts. It includes I never do this; I do this infrequently; I do this inconsistently; I do this frequently; and I do this always. This Likert-scale response helps participants self-report on how often they become metacognitive with more open-ended options. This revised version of the MAI opens up an opportunity for respondents to be able to choose a middle rating point in case it reflects their choices.

The researchers followed some procedures to maintain and improve the reliability and validity of our research. We used the MAI because it has been used successfully in previous research (see also Sperling et al., 2004; Young & Fry 2008). These studies have also shown that the convergent and criterion validity of the MAI was met sufficiently in the sense that the components in the questionnaire were related. Further, to improve the face validity in this research, we tried to contact the participants first to get their consent to join the research. The English language in our revised MAI was proofread by a native speaker at our university. It was then carefully translated into Vietnamese. We wanted to ensure that our participants thoroughly understood what each question meant and how they could respond to it. For instance, item 22 of the MAI *I ask myself questions about the material before I begin the course* was translated into Vietnamese as *"Tôi tìm hiểu về tài liệu học tập trước khi tôi bắt đầu học"*. This version was considered plainer than the original version *"Tôi tự hỏi bản thân những câu hỏi về tài liệu trước khi tôi bắt đầu"*. Moreover, we did not force or interfere with the participants' responses in any case. They were able to withdraw at any time unless they felt comfortable, but none was reported to withdraw from the research process. Participation was voluntary and was not remunerated. Also, our sampling technique, as aforesaid, allowed us to choose the participants purposively and randomly to avoid biases. Doing this helped ensure the face validity in our study.

To explore how frequently the participants deployed reading strategies (GLOB and LOC), the researchers designed a reading strategies inventory with 15 items. This inventory was adapted from Block's (1986) reading strategies classification. The first ten items belong to cluster one (GLOB) that refers to reading comprehension achievement. The five remaining items represent LOC that can be used to deal with language problems. This inventory follows a 5-point Likert scale ranging from *I never do this* to *I always do this*.

We were aware that common method biases might have occurred when the respondents could agree or disagree with the attitude statements without properly interpreting the content (see Podsakoff et al., 2003; Podsakoff et al., 2012) that would cause "scrupulous relationships between two or more constructs" (Podsakoff et al., 2012, p. 882). To make sure that the participants correctly understood the questionnaires, we translated them into plain Vietnamese as mentioned above. We tried to make the wording in every item in the questionnaires clear and precise. A pilot study was conducted with 10 voluntary participants from our university. Afterwards, some of the language was corrected to make it read more smoothly. After collecting the data, we ran Statistical Product and Services Solutions (SPSS) to check common method variance. We detected common method biases in the questionnaires by calculating the Harman's single factor tests for MAI and RSI as indicated in Tables 1 and 2 below.

Table 1. Harman's single test factor: The MAI result

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.149	23.363	23.363	11.404	21.931	21.931
2	3.109	5.979	29.342			
3	2.743	5.276	34.617			
4	2.682	5.158	39.776			
5	2.215	4.260	44.035			
6	2.104	4.046	48.081			
7	1.898	3.649	51.730			
8	1.746	3.358	55.088			
9	1.645	3.164	58.252			
10	1.611	3.097	61.349			
11	1.474	2.835	64.184			
12	1.428	2.747	66.930			
13	1.308	2.515	69.445			
14	1.206	2.319	71.764			
15	1.176	2.261	74.026			
16	1.058	2.035	76.060			
17	1.026	1.973	78.034			
18	.893	1.717	79.751			
19	.861	1.655	81.406			
20	.802	1.543	82.949			
21	.703	1.351	84.300			
22	.639	1.228	85.529			
23	.637	1.226	86.754			
24	.539	1.037	87.792			
25	.524	1.008	88.800			
26	.491	.943	89.743			
27	.476	.916	90.659			
28	.444	.855	91.514			
29	.440	.847	92.361			
30	.399	.767	93.128			
31	.370	.712	93.840			
32	.344	.661	94.501			
33	.286	.551	95.052			
34	.264	.508	95.560			
35	.263	.505	96.065			
36	.238	.458	96.524			
37	.232	.446	96.969			
38	.209	.402	97.372			
39	.189	.364	97.736			
40	.174	.335	98.071			
41	.152	.292	98.363			
42	.123	.237	98.600			

Table 1. Continued

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
43	.119	.229	98.829			
44	.105	.202	99.031			
45	.093	.178	99.209			
46	.081	.155	99.365			
47	.075	.145	99.510			
48	.068	.130	99.640			
49	.063	.120	99.760			
50	.048	.093	99.853			
51	.047	.090	99.943			
52	.030	.057	100.000			

Table 2. Harman's single test factor: The RSI result

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.013	33.418	33.418	4.325	28.835	28.835
2	1.491	9.937	43.355			
3	1.319	8.795	52.150			
4	1.047	6.977	59.127			
5	.937	6.248	65.375			
6	.826	5.508	70.882			
7	.715	4.769	75.651			
8	.646	4.308	79.959			
9	.611	4.076	84.035			
10	.546	3.639	87.674			
11	.463	3.086	90.760			
12	.436	2.908	93.668			
13	.354	2.360	96.028			
14	.300	2.003	98.031			
15	.295	1.969	100.000			

The variance scores of both MAI (21.9%) and RSI (28.8%) were lower than 50%, meaning that the instruments we used were not biased.

Due to the social isolation caused by COVID-19, the researchers were unable to conduct in-depth face-to-face interviews and the participants opted to decline having online interviews because of their class work. The researchers delivered the Google Forms links to the revised MAI and the RSI to the students. Once the students had finished, their data were stored in a Google Sheets platform automatically for the analysis and interpretation.

Analyzing of Data

SPSS (version 20) was used to analyzed the collected data. The general statistical information consists of the reliability, means, standard deviation scores of the MAI and RSI as well as the correlations among them. We concentrate on two broad categories: the general data analysis of the MAI and RSI survey results and the specific discussion on their correlations. In general, it is showed that the results obtained from the two inventories were reliable. Also, the standard deviation index was high (mostly higher than 1).

The revised MAI in this study obtained a Cronbach's Alpha at .930, showing that this inventory was reliable. Its two main clusters (knowledge of cognition and regulation of cognition) also obtained great internal consistency when their Cronbach's Alphas were .804 and .905 respectively. Meanwhile, the Cronbach's Alpha of the RSI was a little lower: .853, but it was an acceptable inventory to measure the participants' reading strategies use. The two categories, GLOB and LOC, in this inventory showed an acceptable internal consistency with Cronbach's Alphas at .776 and .795 respectively.

Table 3. Reliability scores of the MAI

Cluster	Cronbach's Alpha
Knowledge of Cognition	.804
Regulation of Cognition	.905
Metacognitive Awareness	.930

Table 4. Reliability scores of the RSI

Cluster	Cronbach's Alpha
GLOB Strategies	.766
LOC Strategies	.795
Reading Strategies	.853

The MAI's mean scores reached above 3, showing that most of the participants were aware of their metacognition while learning. They were knowledgeable about their cognition and able to regulate it. Its standard deviation was higher than 1, which shows that the participants' responses dispersed over a large range of values. Regarding the results of reading strategies, all the mean scores were greater than 3, but below 4. As a result, it can be concluded here that the participants deployed reading strategies in a metacognitive manner.

Results

As stated in the research questions, this study aimed to explore the reading strategies the students used, the levels of their metacognition and the relationships between their uses of the reading strategies and metacognition. The researchers found that the participants were metacognitive in general, but the levels of their metacognition varied. Most of them were highly aware of metacognition. They possessed the highest level of metacognitive conditional knowledge while their comprehension monitoring metacognition remained the lowest among the eight aspects. Tables 5 and 6 describe the mean and standard deviation scores of the MAI and RSI respectively.

Table 5. Mean and standard deviation scores of the MAI

Variable	N	Mean	Std. Deviation
VAR1	92	3.74	1.166
VAR2	92	3.64	1.115
VAR3	92	3.78	1.067
VAR4	92	3.79	1.144
VAR5	92	3.78	1.194
VAR6	92	3.71	1.064
VAR7	92	3.27	1.028
VAR8	92	3.68	.994
VAR9	92	3.82	1.109
VAR10	92	3.52	1.064
VAR11	92	3.62	1.057
VAR12	92	3.11	1.000
VAR13	92	3.61	.994
VAR14	92	3.54	.965
VAR15	92	4.04	.913
VAR16	92	3.47	1.094
VAR17	92	3.01	1.143
VAR18	92	3.82	.913
VAR19	92	3.57	1.225
VAR20	92	3.14	.967
VAR21	92	3.08	1.071
VAR22	92	3.20	1.102
VAR23	92	3.85	1.016
VAR24	92	3.27	1.130
VAR25	92	4.02	1.027
VAR26	92	3.76	1.142
VAR27	92	3.39	1.069
VAR28	92	3.13	.997
VAR29	92	3.29	1.115
VAR30	92	3.49	1.209
VAR31	92	3.90	1.049
VAR32	92	3.65	.988
VAR33	92	3.09	1.034
VAR34	92	3.29	1.075
VAR35	92	3.35	1.053
VAR36	92	3.54	.954
VAR37	92	2.90	1.318
VAR38	92	3.30	1.146

Table 5. Continued

Variable	N	Mean	Std. Deviation
VAR39	92	3.76	1.152
VAR40	92	3.71	1.115
VAR41	92	3.04	1.167
VAR42	92	3.73	1.178
VAR43	92	3.74	1.078
VAR44	92	3.62	1.025
VAR45	92	3.55	1.009
VAR46	92	4.17	1.173
VAR47	92	3.36	1.182
VAR48	92	3.47	1.133
VAR49	92	3.60	1.110
VAR50	92	3.64	1.075
VAR51	92	3.96	.994
VAR52	92	4.04	.913

Notes: VAR = Variable, followed with an item number; N = Number; Std. Deviation = Standard Deviation

Table 6. Mean and standard deviation scores of the RSI

Variable	N	Mean	Std. Deviation
VAR1	92	3.38	.993
VAR2	92	3.43	.964
VAR3	92	3.45	1.123
VAR4	92	3.63	1.013
VAR5	92	3.62	1.036
VAR6	92	3.80	1.019
VAR7	92	3.28	1.072
VAR8	92	3.65	.966
VAR9	92	3.42	1.008
VAR10	92	3.45	.999
VAR11	92	3.79	1.054
VAR12	92	3.88	.900
VAR13	92	3.68	.864
VAR14	92	3.70	1.024
VAR15	92	3.80	1.102

Notes: VAR = Variable, followed with an item number; N = Number; Std. Deviation = Standard Deviation

Figure 3 below describes the particular aspects of metacognitive. Figure 4 shows the number of the participants in deploying reading strategies. Most of them were equally competent at using GLOB and LOC.

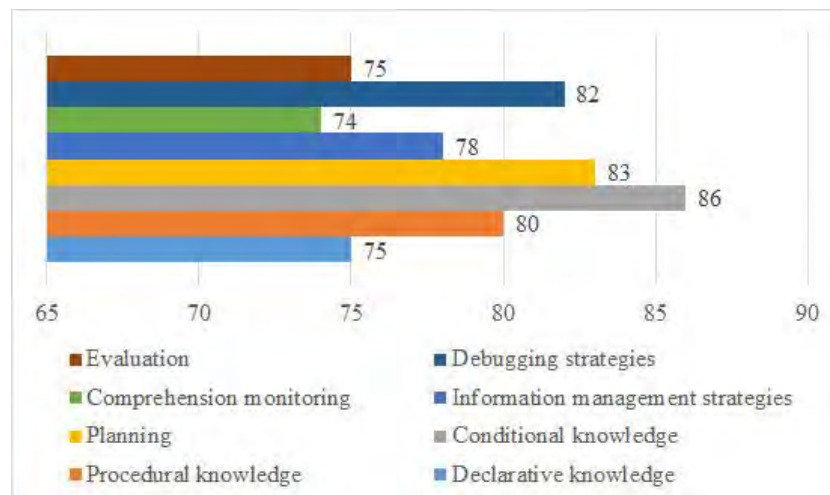


Figure 3. The number of students being good at each category of the MAI

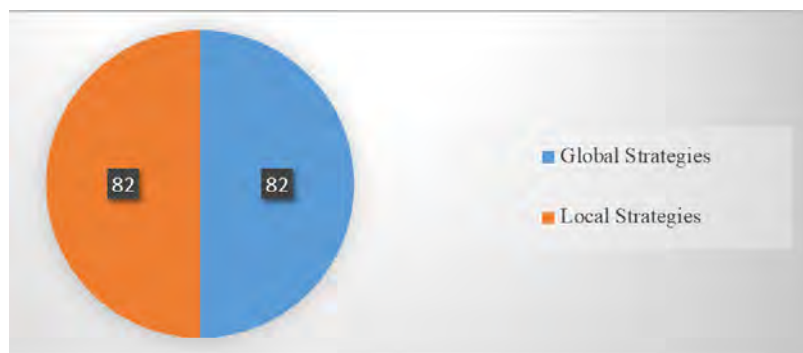


Figure 4. The number of students being competent at each category of the RSI

As shown in these two figures, the participants were skillful and good at each category of the MAI and RSI. The mean scores in those categories were all above 3. Figure 3 illustrates that a majority of the participants were proficient in both knowledge about cognition and regulation of cognition. The aspects of conditional knowledge, planning, debugging strategies, and procedural knowledge respectively received higher positive responses than the other four categories. However, the disproportion between them was very minor. For example, the gap between comprehension monitoring and conditional knowledge was only 12. Figure 4 demonstrates that nearly 90% of the participants were aware of utilizing reading strategies to deal with comprehension-gathering, comprehension-monitoring, and specific linguistic units.

The researchers then analyzed the students' metacognition against the backdrop of the revised version of Bloom's taxonomy as shown in Figure 2. The participants selected and deployed cognitive strategies in disordered ways, not in a way-up direction as depicted in Krathwohl's (2002) revised version of Bloom et al.'s (1956) taxonomy. For example, the responses from Participant 1 reported that he/she would frequently try to use strategies that have worked in the past. This means his/her metacognition encompassed remembering about applying. Also, he/she was able to use at least two levels of metacognition at the same time, while the first level encompassed the third level instead of the second level of understanding. Another example can be cited from the case of Participant 9, who would always correct errors in a text by relating new and old information, and assessing his/her understanding. He/ She was able to combine several levels of metacognition at the same time: remembering (level 1), evaluating (level 5), and creating (level 6).

With respect to the relations between the MAI and RSI, the researchers noticed that there were 16 pairs that had the strongest relationships. This means an increase or decrease of one variable led to an increase or decrease of another variable. In particular, these pairs are shown in Table 7 below:

Table 7. The relationships between MAI and RSI

No.	The relationships between MAI and RSI
1	Global reading strategies and declarative knowledge
2	Global reading strategies and procedural knowledge
3	Global reading strategies and conditional knowledge
4	Global reading strategies and planning
5	Global reading strategies and information management strategies
6	Global reading strategies and comprehension monitoring
7	Global reading strategies and debugging
8	Global reading strategies and evaluation
9	Local reading strategies and declarative knowledge
10	Local reading strategies and procedural knowledge
11	Local reading strategies and conditional knowledge
12	Local reading strategies and planning
13	Local reading strategies and information management strategies
14	Local reading strategies and comprehension monitoring
15	Local reading strategies and debugging
16	Local reading strategies and evaluation

Table 8. The most significant correlations between each pair in the RSI and MAI

RSI	MAI	Sig. (2-tailed)	Pearson's correlation	Correlations
Glo3	Pro3	0.00	.384**	Medium
Glo3	Cond29	0.00	.416**	Medium
Glo3	Plan8	0.00	.462**	Medium
Glo3	Debug51	0.00	.510**	Strong
Glo5	Dec32	0.00	.438**	Medium
Glo5	Eva24	0.00	.446**	Medium
Glo6	Info43	0.00	.523**	Strong
Glo6	Com28	0.00	.447**	Medium
Lo12	Cond15	0.00	.368**	Medium
Lo13	Dec16	0.00	.437**	Medium
Lo13	Plan23	0.00	.396**	Medium
Lo15	Pro3	0.00	.449**	Medium
Lo15	Info31	0.00	.516**	Strong
Lo15	Com49	0.00	.447**	Medium
Lo15	Debug51	0.00	.464**	Medium
Lo15	Eva19	0.00	.441**	Medium

Notes: Glo = Global Reading Strategies; Lo = Local Reading Strategies; Dec = Declarative Knowledge; Pro = Procedural Knowledge; Cond = Conditional Knowledge; Plan = Planning; Info = Information Management Strategies; Com = Comprehension Monitoring; Debug = Debugging Strategies; Eva = Evaluation, all followed with item numbers.

All of the items obtained a positive Pearson's r value, and some of the items in the RSI and MAI had considerably strong correlations. This means that if one variable from the RSI increases in value, its related variable from the MAI too increases in value, and vice versa. Please note that we selected these pairs based on their most significant Pearson's correlation index. Their Sig. (2-tailed) and Pearson's correlation are described below.

Our data showed that GLOB and clusters in the MAI had 228 correlated pairs of items with Sig. (2-tailed) of under .05. There were medium and strong positive correlations between each items in the GLOB and the items in the MAI (from .384** to .523**). LOC and clusters in the MAI included 156 correlated pairs of items with Sig. (2-tailed) of under .05. However, their Pearson's correlations were only from .368** to .516**.

Discussion

This study aims to unpack the relationships between metacognitive awareness and reading strategies in EFL context through 3 research questions, and it culminates in 3 major findings. First, students' metacognition forming processes are active and disordered. This finding is slightly different from the conclusions drawn in previous studies (e.g., Flavell, 1979; Nelson & Narens, 1994; Rastegar et al., 2017)). By following Krathwohl's (2002) revised version of Bloom et al.'s (1956) taxonomy, these studies have shown that a metacognitive system includes cognitive processes that follow a fixed order: From the bottom to the higher levels or from a low-order to higher-order thinking set. For example, by employing a large-scale survey of 120 Iranian EFL students at two universities in Iran, Rastegar et al. (2017) have found that there is a significant positive relationship between the use of overall metacognitive reading strategies and the students' reading comprehension achievement. In contrast, many students in this study recalled (remembered) the strategies that they had used in the past to use them in the current reading task (e.g. *I try to use strategies that worked in the past*). Also, our data showed that they were able to evaluate their comprehension by making critical questions for themselves (e.g. *I ask myself questions about how well I am doing while learning something new*). According to the revised Bloom's taxonomy, these metacognition forming processes were interpreted as remembering about applying and evaluating about understanding.

With regards to the RSI, the participants were able to correct text errors and identify true/false statements by relating new and stated information to the current ask. They were also able to evaluate their understandings of the strategies they used for comprehension (e.g. *I correct errors in the text by relating new and old information, and assessing my understanding*). Moreover, they could decide whether to reread a part of the text or not after their evaluation of their uses of evaluation (e.g. *I will reread a portion of the text when I misunderstand some information*). The metacognition formation and exercise processes in those students seemed to be a combination of remembering and evaluating about creating and evaluating about remembering. In this sense, their metacognition tended not to follow the fixed order in the revised Bloom's taxonomy. This means that these participants consciously selected any metacognitive levels to use to deal with reading tasks without automatically working in a way up order. This finding suggests that educators, teachers and/or lecturers need to design syllabi and exercises for students depending on their metacognitive development at each stage. The space for students' autonomous development in metacognition can create more chances for them to deploy strategies in their own ways, which somewhat supports them in better obtaining reading objectives.

Second, students' metacognition is not made as a whole as indicated in some previous research situated in ESL settings (e.g. Baker, 2002; van Kraayenoord, 2010). Instead, the strongest aspects of the participants' metacognition were conditional knowledge and procedural knowledge. According to Schraw and Dennison (1994), conditional knowledge is the determination under what contexts and by what reasons specific strategies should be applied. In line with this definition, our research results show that most of the participants were competent at ascertaining when and why to use specific reading strategies. Additionally, procedural knowledge is the application of knowledge for the aims of implementing reading strategies (Schraw & Dennison, 1994). In this vein, our study showed that the EFL students at this university were able to know how to apply strategies in various settings. They, however, did not possess a high level of declarative knowledge in metacognition. It seemed that these students did not prioritize uses of GLOB over those of LOC. They did not tend to consciously distinguish one set of reading strategies from another. This finding shows that these participants did not concentrate on activating their declarative knowledge. The students were also reported a lack of factual knowledge (i.e. knowledge of self-learners' skills, abilities, and intellectuality). These findings here suggest that students in EFL classes should be encouraged to conduct more tasks relating to presentations and discussions as indicated in Schraw and Dennison (1994). The researchers believe that group discussions are also contributive to activating and developing students' critical thinking and learning skills.

The third contribution made in this study is the proportionate relations between metacognition and reading strategies. Despite this linearity in forms, these relations are indeed constituted by sub-linearities, as being evident in the results of our study. This finding accords with a number of other studies (e.g. Burin et al., 2020; Jacobs & Paris, 1987; Jang et al., 2020; Phakati, 2003; Pintrich, 2002; Ramadhanti et al., 2019; van Kraayenoord, 2010). For example, Burin et al. (2020) examined the influences of self-reported metacognitive regulation of reading on students' digital text comprehension in an e-learning environment. This study reported that global/monitoring reading strategies can positively influence the students' achievements of task purposes as they tend to re-read the texts and pay close heed to difficult sections. Their problem solving ability allowed them to follow text sequences when they face disorientation or lack of understanding. The more verbal ability the students have, the more global/monitor metacognitive skills they are reported to employ. The study by Jang et al. (2020) similarly showed that the better metacognitive ability students have, the more likely they can get correct answers in tests. In other words, the less metacognition students have, the more difficulties they may face in their learning processes (see also Ramadhanti et al., 2019).

This study adds that these sub-linearities make one's performances of reading strategies not remain at the same level of achievements in tests. Rather, this finding helps explain why the same student cannot achieve the same test result over different tests (though these tests are claimed to be at the same level of difficulty) in different contexts and times. One's metacognition is not considered as a whole, but it is made of several components which do not work in tandem. It may change over time in different places. Therefore, students' metacognitive awareness does not remain the same. This causes differences in their reading performances.

Specifically, these sub-linearities include GLOB and LOC in relation to each components of the MAI (i.e. declarative knowledge, procedural knowledge, conditional knowledge, planning, comprehension monitoring, information management strategies, debugging strategies, and evaluation). Items number 3, 6, and 15 in the RSI show the highest correlations with the metacognition components in the revised MAI. For example, the participants were aware of how new and old information could link to each other (item number 3 in the RSI) by stopping and going back to new unclear information (item number 51 in the MAI). In some cases, those who frequently questioned themselves if what they read was related to what they knew (item number 43 in the MAI) tended to use their own knowledge and experiences to reflect on the text (item number 6 in the RSI). The students who were able to create examples for themselves to make the information in a reading text understandable to them (item number 31 in the MAI) knew how to utilize the context and synonym(s) in the text (item 15 in the RSI). This enabled them to solve vocabulary problems. Here, it could be concluded that when deploying each reading strategy, the participants were affected by their awareness of utilizing many metacognitive components (e.g. debugging strategies and information management strategies) at the same time. Furthermore, the medium and strong positive relations between reading strategies and metacognition prove that the higher metacognitive students are, the more effectively they tend to use a variety of reading strategies. This finding is similar to the proportionate relationship between metacognition and reading strategies that Burin et al. (2020) and Jang et al. (2020) have discussed. However, students can be good at all the components or sub-components in metacognition in deploying reading strategies to achieve reading comprehension successfully. This finding can partly help explain why EFL students' performances in different contexts at different times may not be always the same; and why some of them perform well in reading activities even though their metacognitive awareness is at a moderate or even low level.

Conclusion

These findings have captured the various ways in which EFL students use their knowledge of metacognition and regulation of metacognition to deploy reading strategies. With regards to the research questions, the study found that the students were aware of their metacognition, but the levels of their awareness were not the same and disordered. The participants were reported as being most competent at conditional knowledge and procedural knowledge. These

types of knowledge refer to how, when, and why. Conversely, they were not meta-cognitively aware of declarative knowledge. This study has also revealed some sub-linearities that exist in the relations between metacognitive awareness and reading strategies. Their metacognition was not constituted by a whole or as a whole. Several components (knowledge of cognition and regulation of cognition) that shaped their metacognition did not always work consistently. They appeared not to prioritize uses of GLOB over those of LOC as they were not conscious of distinguishing a set of reading strategies from the other ones. The lack of concentration on deploying their declarative and factual knowledge resulted in a difference in the various achievements in their reading comprehension.

There are some pedagogical implications in TESOL. During instruction, EFL educators and teachers/lecturers should encourage students to participate in presentations and discussions to improve their declarative knowledge as well as other regulatory strategies and mechanisms. Curriculum developers are supposed to design flexible syllabi that allow students to freely form their metacognition instead of depicting the rigid fixed order as indicated in the revised Bloom's taxonomy.

In the final note, the researchers would like to emphasize that every student seems to be metacognitive before they go to a lecture and even after they have left the lecture. It is teachers'/lecturers' tasks to realize their potentials and offer them chances and spaces to develop their own metacognition. In doing so, teachers'/lecturers can become even more metacognitive.

Recommendations

We propose that further studies should be expanded to other settings either in Vietnam or a similar EFL context. Researchers who focus on this topic need to ensure their neutralities in analyzing data by asking for a third party to conduct in-depth interviews. We also suggest a supplementary instrument (e.g. MARS) that other researchers may like to use to measure both participants' metacognitive awareness and their reading strategies. Finally, the correlation values in our study were not extremely strong. We assume that there may be cases where such relations could be negative. This is why we are calling for studies that should be situated in various geographical and academic settings that may generate external influences on students' metacognitive awareness and uses of reading strategies.

Limitations

Despite our attempts to explore the relations between metacognitive awareness and reading strategies, there are some limitations in this study. First, our participants may not be always the exact representatives of all EFL learners although our sample reached 80% of the whole population (92/117) at the researched context. Even if we could reach the ideal percentage of 100, next cohorts of EFL students at this institution may not have the same levels of metacognitive awareness. Looking beyond the researched context, we cannot ensure the external transferability of the results as our collected data did not replicate the generic features of other EFL students in other settings. Second, an interview needs to be organized to deeply explore specific surrounding factors that may affect learners' metacognition forming processes. Due to the constraints posed by the MAI, we did not investigate possible influences from cultural aspects on metacognition. Finally, although we picked out the most significant correlations between the MAI and RSI, they were not extremely strong (an extremely strong correlation should be above .500). The current correlation indices depict that metacognition may have some influences on the participants' uses of reading strategies, but these influences may not be extremely significant.

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Authorship Contribution Statement

Nguyen: Concept and design, data analysis/interpretation, critical revision of the manuscript, technical and material support, supervision, final approval and revision. Phung: Data acquisition, data analysis, drafting the manuscript, statistical analysis

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