



The Relationships between Cognitive and Metacognitive Strategies and EFL Reading  
Test Performance of Thai University Learners

Lingqing Zhang

A Thesis Submitted in Partial Fulfillment of Requirements for  
degree of Master of Education in English Language Teaching

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### ABSTRACT

This study investigated the relationship between cognitive and metacognitive strategy use and EFL reading test performance among EFL university learners in Thailand. A total of 199 non-English major students voluntarily participated in this cross-sectional research design. The five-point Likert Scale questionnaire was employed to collect learners' test-taking strategies after they had completed the EFL reading test. The semi-structured interview was then used to gather qualitative information from ten volunteers to better understand strategy use during an EFL reading test. Descriptive and inferential statistics were applied to analyze the data. The results showed significant relationships between the applications of cognitive strategies and metacognitive strategy executions. However, the analysis of the results indicated no significant correlations between cognitive and metacognitive strategy use and their reading test performance. Concerning qualitative data analyses, the results showed that learners' strategy use varied depending on test items. These findings could yield fruitful information for pedagogical practices and implications and the roles of strategy training among university students. Detailed discussions in relation to pedagogy and further research are addressed.

Keyword : Cognitive strategies, metacognitive strategies, reading test performance, Thai EFL learners

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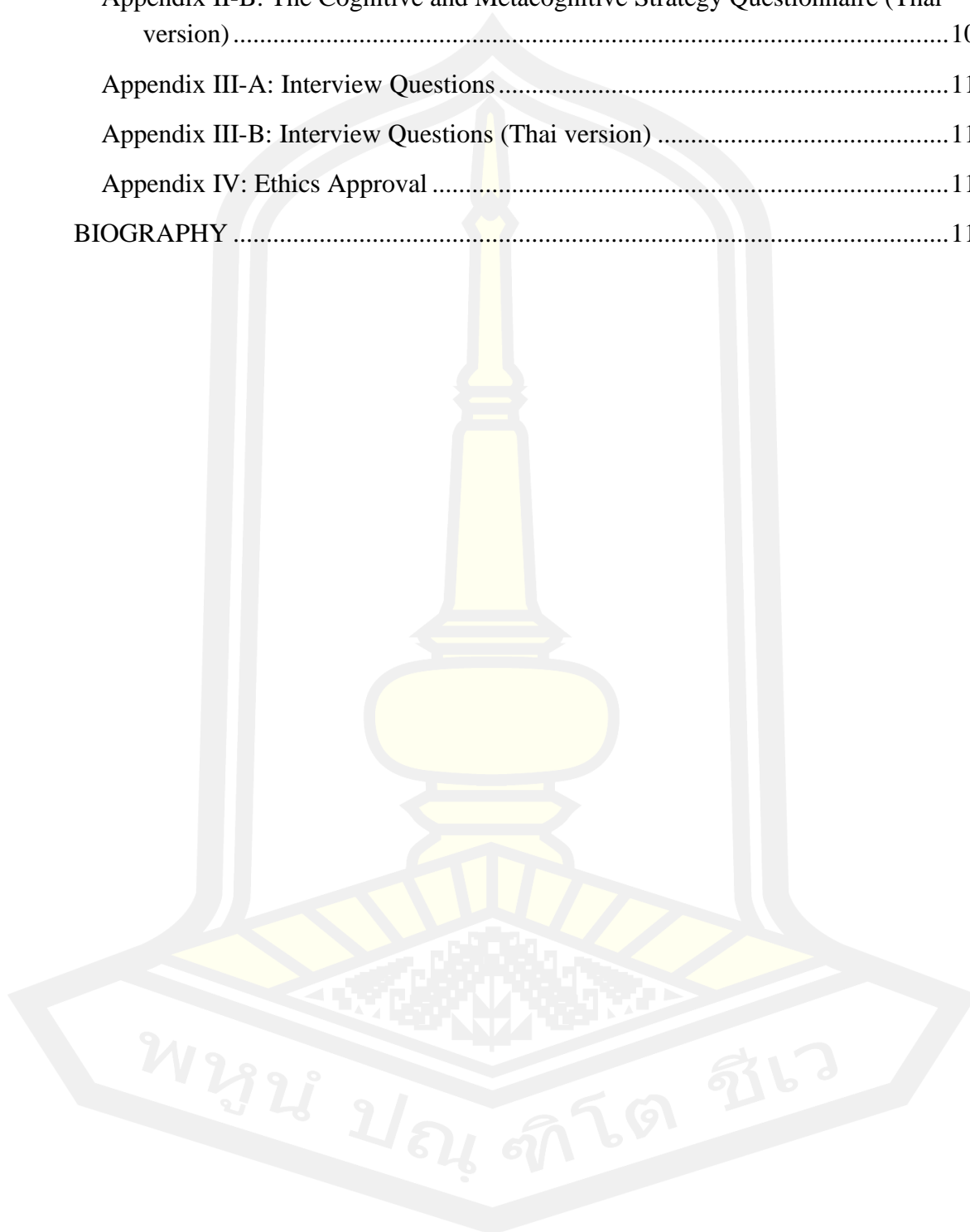
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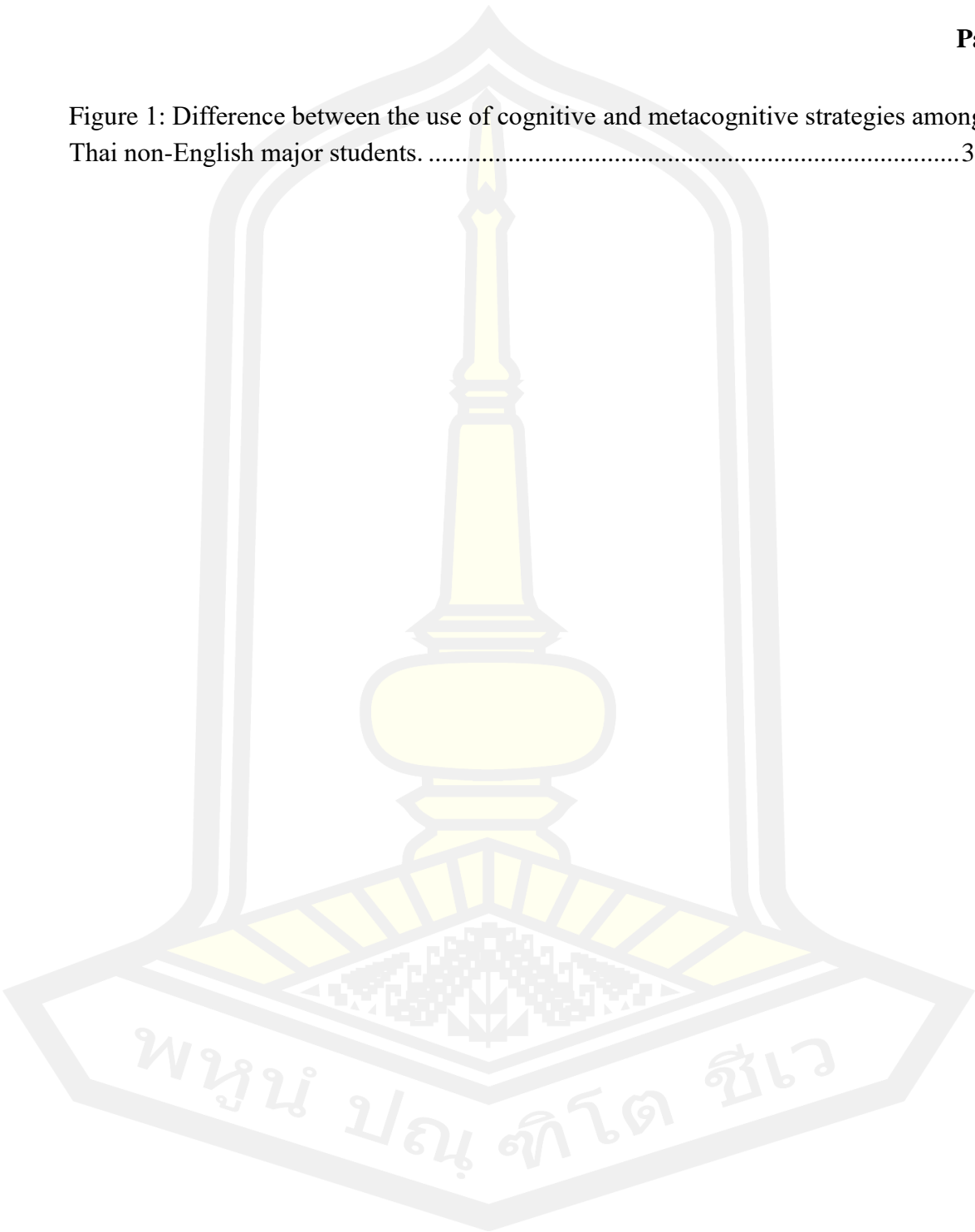
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# **CHAPTER I**

## **INTRODUCTION**

Reading is critical in L2 instruction, especially in higher education at non-native English-speaking universities or in other programs where English is widely used. It is also a well-known fact that some people are better at taking tests than others. Indeed, there are various factors that together, or individually, affect test performance. This includes factors specifically related to the reading process as well as individual factors related to how readers process text during the test. This study investigates the relationship between English as a Foreign Language (EFL) learners' cognitive and metacognitive strategies and reading test performance on the Test of English for International Communications (TOEIC) reading test.

### **1.1 Rationale for the study**

Tests are one of the most common assessment tools in almost all educational contexts due to their practical and time-saving features. In this regard, a learner's academic success has been tightly linked to their test performance. Research on language testing (LT) has shown that test performance can be influenced by cognitive, metacognitive, and psychological factors. It has also been previously shown that test achievement can be improved by teaching subject-related test-taking strategies to the learners (Brown, 1999; Gray, 2011; Phakiti, 2003). As such, tutoring test-taking strategies may be considered a practical approach to enhancing learners' performance and lessening their apprehension.

Research on LT has focused on providing a model of language ability. Its primary aim has not only been to describe and assess the language ability of a learner but also to construct a comprehensive theory of variation in language testing performance and its correspondence with non-test language use. Researchers have expressed growing concern about the role of test-taking strategies in validating language tests (Purpura, 1997; Phakiti, 2003, Koda, 2007) and others have attempted to identify learner characteristics that may influence variation in performance on language tests (Bachman, 1991, 1996; Phakiti, 2003, 2006, 2007). Indeed, researchers in language testing have long been interested in investigating the influence of individual

characteristics on language test performance (Kunnan, 1995; Phakiti, 2003, 2008, 2016; Purpura, 1997, 1999). This research has revealed that strategy use can affect test performance in second language (L2) contexts (Damankesh & Babaii, 2015; Phakiti, 2003, 2008, 2016; Purpura, 1997, 1999; Song, 2005; Song & Cheng, 2006; Zhang, Goh, & Kunnan, 2014).

In language teaching, tests are regarded as an essential tool to measure the learner's ability (Cohen, 1984; Hughes, 2003). Pike (1978) described test-taking strategies as a combination of skills and knowledge of test-taking, which allow learners to perform at their best. Test-taking strategies can vary depending on the different testing formats; some strategies might be specific to a reading test while others might be used for a listening test (Bruch, 1981; Woodley, 1975). In the domain of language assessment, test-taking strategies have been shown to be positively correlated with language-test performance, and also help respondents understand what they should do during reading tests (Huang, 2016; Phakiti, 2003; Zhang et al., 2014). Test-takers with high scores also use strategies significantly more often than test-takers with low scores (Lee, 2011). And teaching reading strategies via direct and integrated instruction of cognitive and metacognitive reading strategies contributed to learners' reading test scores (Du Plooy, 1996; Lee, 2011; Singhal, 1999).

Several studies have examined the effects of test-taking strategies on learners' achievements. For example, Scharnagl (2004) demonstrated the positive impact of teaching learners test-taking strategies on academic performance, which suggests that test-taking strategies should be integrated into the curriculum to increase test awareness. By contrast, Janowicz (2007) found that the test scores of adolescent students did not differ between students who received test-taking instruction and those who did not. More recently Gebril (2018) concluded from the literature that test-taking strategies can indeed help students achieve better test scores. However, there are still relatively few studies exploring specific guidance on test-taking strategies in the context of foreign language reading (Chalmers & Walkinshaw, 2014; Cohen, 2006; Plonsky, 2011).

An L2 reading test is a means to infer a learner's L2 reading ability and identify methods to improve an individual learner's performance (Anderson, Bachman, Perkins, & Cohen, 1991; Cohen, 1994; Nikolov, 2006; Purpura, 1997). Test-takers need to perform as accurately and quickly as possible in a language testing situation, often under time pressure. Strategies used in L2 learning or SLA tasks may be distinct from those used in language tests. L2 test takers use strategies to solve problems, compensate for comprehension deficiency and enhance comprehension in the reading test (Pearson, 2009). In the L2 reading test domain, most empirical studies have examined the interaction between test takers' cognitive and metacognitive strategies and their performances on reading tests (Phakiti, 2003, 2008; Zhang et al., 2014; Zhang & Zhang, 2013).

Several studies have examined the nature of cognitive and metacognitive strategies that influence language test performance. For example, Purpura (1999) investigated the relationship between cognitive and metacognitive strategy use and language test performance. It was found that metacognitive processing was a unidimensional construct consisting of a single set of assessment processes, for example, goal setting, planning, monitoring, self-evaluating and self-testing. Yet, cognitive processing was a multi-dimensional construct, including comprehension, memory, and retrieval strategies. Overall, it was shown that metacognitive processing directly and positively impacts the three components of cognitive processing, which directly affect language performance. Song (2004) also examined the degree to which cognitive and metacognitive strategy use can explain Chinese university test takers' performance. The results showed that cognitive and metacognitive strategies explained only 8.6% of the test score. A follow up study also showed that the relationship between cognitive and metacognitive strategy use and performance on the Michigan English Language Assessment Battery (MELAB) was weak, accounting for 12.5 to 21.4% of the score variance (Song, 2005).

A few studies have explored the relationship between test-taking strategies and reading performance in the Thai context. One study conducted by Phakiti (2003) examined the relationship between Thai university students' cognitive and metacognitive strategy use and their reading test performance using a questionnaire,

retrospective interviews, and reading achievement tests. The results revealed a positive correlation between the use of metacognitive and cognitive strategies and a positive correlation between the use of these strategies and reading test performance. It is expected to provide insights into the use of test-taking strategies by EFL university learners, especially in the Thai context.

In summary, the literature shows that cognitive and metacognitive strategies are correlated and relevant to language test performance (Phakiti, 2003, 2006; Purpura, 1999; Song, 2004, 2005). However, little is known about the nature of using strategies or the actual use of strategies in real-time processing. The present study aimed to address this gap in the literature by examining the relationship between the cognitive and metacognitive reading strategies used by Thai EFL university learners and their reading test performance, and determining if differences in strategy use are related to their reading test performance. According to Bachman and Palmer's (1996) perspectives of strategic competence, difficulty should be viewed as an interaction between test-task characteristics and a given test-taker's communicative language ability. Bachman (2002) argues that, to advance our understanding of how test-task characteristics affect test performance, we need to obtain empirical evidence of how test-takers strategically respond to test tasks. It should also be noted that cognitive and metacognitive strategies differentially contribute to language test performance. That is, metacognitive strategies directly control cognitive strategy use, which, in turn, impacts the success of communicative language use (Sari, 2016). Thus, understanding the nature of cognitive and metacognitive strategies will shed light on language test performance among English as a foreign language (EFL) learners.

## **1.2 Purposes of the research**

The purpose of the current study was to identify the test-taker's cognitive and metacognitive strategy use as a possible cause of variation in their reading test performance. Specifically, the study attempted to explore the type and frequency of test-taking strategies and their possible link to the EFL learners' performance on the reading test. Based on the established objectives, this study sought to address the following research questions:

- 1 What are the patterns of strategy use in reading test performance among Thai non-English major students?
- 2 What is the relationship between cognitive and metacognitive strategies and reading test performance?

### **1.3 Scope of the research**

This study investigated the relationship between cognitive and metacognitive strategies of EFL learners in Thai universities and English reading test performance, as well as the pattern of strategy use during reading tests. It also investigates how the use of cognitive and metacognitive strategies are related to each other in the context of the EFL reading test. While several studies have been conducted on the use of cognitive and metacognitive strategies, studies within the Thai EFL context are lacking. As such, the current study focused on Thai university EFL learners. This study used SPSS statistical software to calculate descriptive statistics, t-tests, effect sizes, and Pearson product-difference correlations.

### **1.4 Significance of the study**

This study provides new insights into the relationship between cognitive and metacognitive strategies in L2 reading tests, especially in the Thai EFL setting. Insights gained from this study will help English teachers understand the role of cognitive and metacognitive strategies in improving reading test scores and provide references for future English teaching.

### **1.5 Definitions of terms**

***Learner strategy use*** is broadly defined as operations and procedures employed by learners to facilitate the acquisition, storage, retrieval, and use of information in their learning.

***Cognitive strategies*** refer to the specific processing methods learners adopt in a learning activity or particular activities that help learners acquire knowledge and understand concepts.

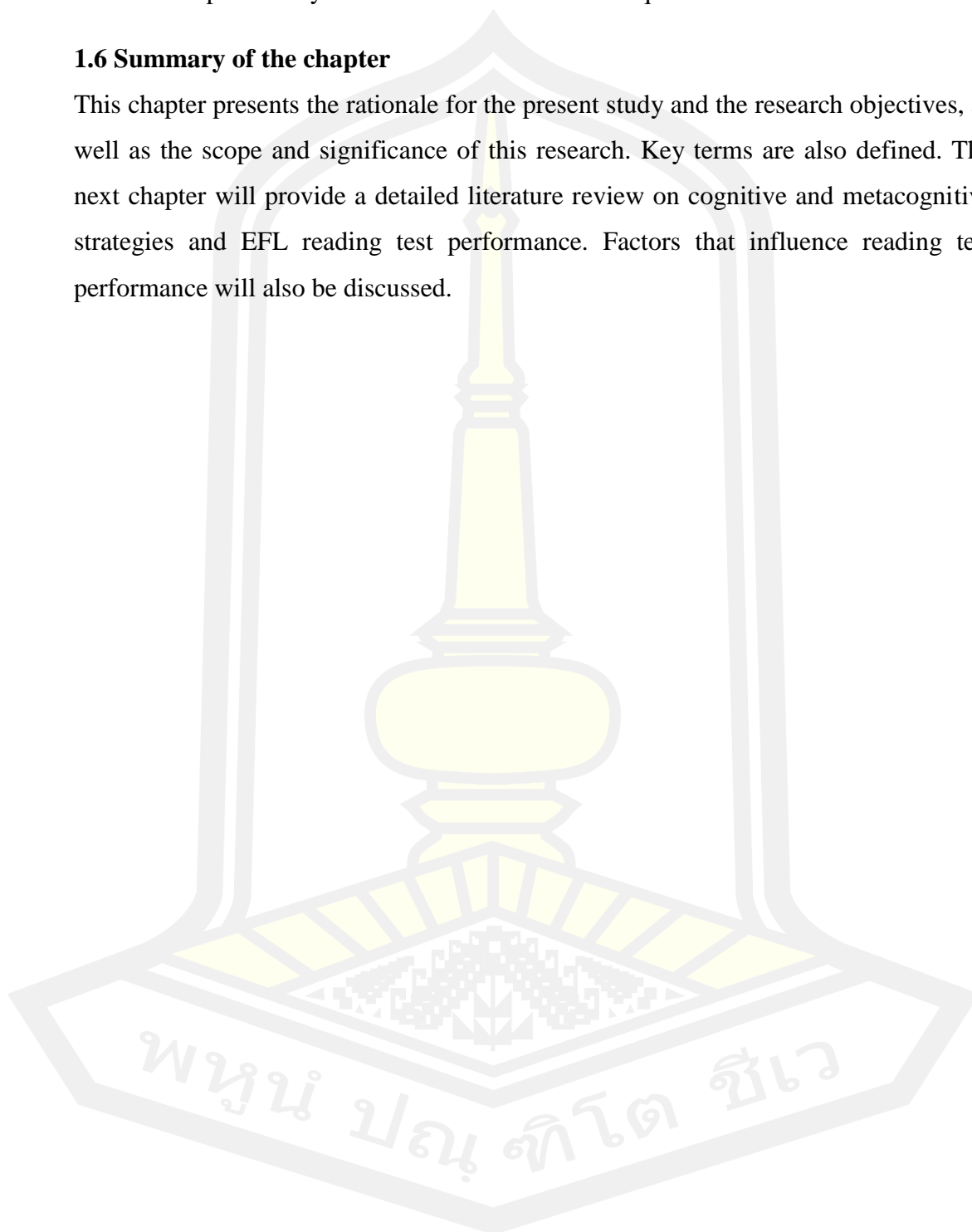
***Metacognitive strategies*** refer to knowledge about cognitive processes and strategies that regulate language learning through planning, monitoring and evaluation.



*Test-taking strategies* refer to any discontinuous strategy, rule, or procedure that can increase the probability of successful answers to test questions.

### **1.6 Summary of the chapter**

This chapter presents the rationale for the present study and the research objectives, as well as the scope and significance of this research. Key terms are also defined. The next chapter will provide a detailed literature review on cognitive and metacognitive strategies and EFL reading test performance. Factors that influence reading test performance will also be discussed.



## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Introduction to EFL reading**

Reading is one significant means by which new information is gained and skills are learned. English as a foreign language (EFL) reading is viewed as a complex, multifaceted cognitive skill. Indeed, EFL reading utilizes many sources of knowledge and processes, ranging from lower-level processes, such as decoding, to higher-level processes, including text comprehension and the integration of textual ideas with the reader's prior knowledge (Koda, 2007). Moreover, reading is an interactive process between the text and the reader (Carrell, 1988; Hudson, 1998; Psaltou-Joyce, 2010). The reader also employs various strategies to achieve comprehension, which is the primary goal of reading. In this context, successful comprehension occurs when the reader extracts information from the text and integrates it with existing knowledge (Koda, 2005). While reading was once considered a simple receptive skill, it is now defined as a highly complex and interactive process in which readers use a variety of resources to construct meaning from text (Grabe, 2009; Urquhart & Weir, 2014). In this process, "understanding occurs when the reader extracts and integrates various [pieces of] information from the text and combines it with what is known (Lee, 2018, P, 3)." This framework emphasizes the role of readers, who are portrayed as actively constructing meaning from the text by interpreting the information created by the author.

Second language (L2) academics and researchers have revealed the substantial role of reading in second language acquisition, especially in an academic setting (Anderson, 1999; Grabe, 2009; Urquhart & Weir, 2014), and learners also consider reading the most important among the four language skills (Carrell, 1988). Reading ability helps learners develop language and academic skills quickly and more proficiently. For example, in tertiary education, students need to build and expand their knowledge of specific topics independent from the classroom guidance of their teachers. Reading ability in English is also essential because much of the available professional and academic materials relevant to their chosen professions are written in English (Anderson, 1983).

## **2.2 Reading construct**

### **2.2.1 Defining reading**

Although reading is an essential skill in language learning, several aspects are inherent in the reading process, making reading difficult to define. As such, there is still no consensus on a comprehensive definition of reading. Alderson and Urquhart (1984) considered reading a dynamic exchange between a text and a reader. Texts do not have meaning, but they have potential meaning. The reader interacts with the text to realize the possible meaning and uses their existing linguistic and schematic knowledge and input from the text to achieve meaning. Later, Anderson (1999, p.1) argued that “reading is an active process which involves the reader and the reading material in building meaning”.

Reading has also been defined as a cognitive process that involves decoding symbols to acquire meaning and as an active process of constructing word meanings. It allows the reader to use what they may already know, also known as prior knowledge. In processing information, readers use strategies to understand what they are reading, use themes to organize their thoughts, and use text clues to discover the meaning of new words. Purposeful reading also helps readers target information to a goal and focuses their attention. Although the reasons for reading may differ, the main purpose of reading is to understand the text.

Reading is a basic form of language input, a psycholinguistic process of actively reconstructing information from written language, and is critical for academic learning in school and lifelong learning (Dole, Duffy, Roehler & Pearson, 1991; Durkin, 1993). Reading comprehension is considered one of the most important academic skills learned in school because it is a marker of the subject's meaningful interpretation of selected passages in the read text (Mstropiere & Sruggs, 1997).

In current theories of L2 reading, readers are assumed to apply the same process as when they read in their L1 (Cohen, 1994; Grabe, 1999). However, second language reading may be somewhat slower and less successful than L1. The success of second language reading depends on factors such as the reader's second language level, text type, and task requirements. L2 reading is known to be complex, dynamic, and

multidimensional (cf. Alderson, 2000; Koda, 2005) as it involves interactions between the reader's mediated language (e.g., incomplete and fragmented language skills), personal characteristics (e.g., learning and cognitive styles, gender, motivation and volition, socioeconomic status, educational level), and the external environment (e.g., topic, text features, reasons for reading, stakes of reading, time constraints).

### **2.2.2 Types of reading**

The reading processes engaged by EFL learners can range from low to high levels (Alderson, 2000; Kinstch, 1998; Pressley & Afflerbach, 1995). According to Li et al. (2005), who reviewed the research on reading over the past decades, reading models can be broadly classified into three types: bottom-up models, top-down models, and interactive models.

#### **Bottom-up model**

According to this model, reading begins with spelling words, then identifying them and understanding their meaning. Each step is relatively independent, and the latter step builds on the previous one. Readers are considered to be passive during the reading process; they simply complete a series of decoding actions from word structure to semantics. Low-level processing includes automatic recognition of word meaning, syntactic structure, and lexicality. The bottom-up reading process suggests that individuals may read with a minimum of alertness. For example, readers can understand texts without much thought. Thus, the success of second language reading depends to some extent on the degree of automation (Segalowitz & Cohen, 2003).

#### **Top-down model**

This model emphasizes the importance of the reader's own knowledge to reading. It is based on schema theory and considers reading as the process of activating the relevant knowledge structures stored in the brain, reflecting the input information into the knowledge structures, and understanding the information. Thus, this model considers that the reader is active in the reading process.

#### **Interactive model**

The interactive model proposes the interaction between various factors in the reading process. Thus, the reading process is not serial but parallel, which means that readers

should choose different reading skills according to different situations in order to achieve effective reading. Specifically, the reading process is an interactive process between the content written by the author and the reader's own background and experience. That is, readers use their prior knowledge and cultural background to interact with the text (Carrell & Eisterhold, 1983; Carrell, 1987; Pritchard, 1990; McNamara & Kintsch, 1996; Huang, 1997). According to Rumelhart's reading interaction model (1994), reading is an interactive process and a comprehensive activity, which includes both sensory information (graphic information, visual information) and non-sensory information (spelling knowledge, vocabulary knowledge, syntactic knowledge, semantic knowledge and pragmatic knowledge), all of which are gathered in one place. The reading process is the product of the joint application of all these knowledge sources at the same time. The success of reading comprehension depends on the type of text, the type of text structure, the reader's language proficiency, text difficulty and task requirements (Alderson, 2000).

In most conventional EFL reading contexts, EFL learners are likely to meet unfamiliar words, syntactic structures, or topics that require them to assess and examine alternative sources or use contextual clues consciously or intentionally. Thus, higher-level processes, such as assessing the situation and monitoring current comprehension, are required when reading difficulties arise. Although this metacognitive processing may slow down reading speed, it helps to improve reading performance.

### **2.3 Language learner strategies**

Language learner strategies are processes and actions that language learners intentionally use in order to help them learn or use the language more effectively. Language learning strategies (LLS) are conscious behaviours used by language learners to foster the acquisition, storage, and use of new information (Sukying, 2021). In general, these strategies can be categorized into three types: language learning strategies, language use strategies, and language testing strategies (Cohen 2011). Language learning strategies include cognitive strategies (e.g., memory and recall skills) and metacognitive strategies (e.g., pre-planning, monitoring, and assessment of learning) that learners use when learning a language. By contrast,

language use strategies include the strategies that learners adopt when using the language and often include coping strategies (e.g., bridging gaps in language knowledge) or more general communicative strategies (e.g., adapting and modifying the language to fit different speakers and contexts).

A trend has occurred in language testing research as researchers have expressed increasing interest in investigating test takers' cognitive characteristics that may influence language test performance (LTP). However, this theoretical interest in the cognitive processes of language learning, testing and use is not new. Testing researchers have long held an interest in the relationship between cognitive background variables and language use, both from investigating the factors other than language ability that affect LTP and from attempting to describe the nature of L2 proficiency. Although these recent advances are encouraging, researchers have just begun to investigate the interaction between cognitive processing and SLTP. In fact, only a handful of researchers have considered the extensive literature in learner strategies and cognitive psychology for inspiration in investigating cognitive processing's role in LTP. Clearly, the interaction of L2 learner strategy studies, cognitive psychology, and testing research could greatly augment knowledge of cognitive processing and L2 ability.

### **2.3.1 Cognitive and metacognitive strategies**

Cognitive strategies are considered popular and necessary for language learners as O'Malley and Chamot (1990) view them as the first step in learning. Cognitive strategies as direct language learning strategies, are preferable to help students form and revise internal mental models and receive and produce messages in the target language with a conscious manner. Cognitive strategies refer to the strategies that require specific actions and goal oriented cognitive steps that learners invoke when reading an L2 text. They are, according to Phakiti (2006), composed of three strategies: comprehending (understanding a text, identifying main ideas in the text and making inferences), memory (storing information), and retrieval (recalling information, such as relating the information from a text to prior knowledge, guessing meanings from a context, and applying grammatical rules). Beside these cognitive strategies, L2 learners also seem to use metacognitive strategies to understand a text.

By the help of cognitive strategies, learners can interact with the new information in a variety of ways (Hedge, 2000). In the context of language learning, the basic concept of metacognition is the notion of thinking about thinking (Hacker, 1998). Metacognitive knowledge refers to one's knowledge or beliefs about the factors that control cognitive (knowledge) processes. It is divided into three types: person variables, task variables, and strategy variables. The person variables are the individual's knowledge and beliefs about himself as a thinker or learner, and what he believes about other people's thinking processes. For instance, you believe that you can learn better by doing than by listening to lectures. The task variables refer to knowledge or all the information about the nature of a proposed task. This knowledge guides the individual in the management of a task, and provides information about the degree of success that he is likely to produce. As an example, you are aware that it will take you more time to write an essay on a political issue than an essay narrating your birthday party. The strategy variables include knowledge about both cognitive and metacognitive strategies, as well as conditional knowledge about when and where it is appropriate to use such strategies. For instance, you recognize that you need first to figure out the main idea of the text before you can answer inference questions to a reading selection (Thamraksa, 2005). Metacognition is a deliberate, planned, intentional, goal-oriented and future-oriented psychological processing, which can be used to complete cognitive tasks (Flavell, 1971). In cognitive theory, individuals are thought of as "processing" information. Cognitive processes are "sequences of internal states in which a series of information processes are successively transformed" (Ericsson and Simon, 1993, P.2). Cognitive theory suggests that all individuals have the ability to control language but controlled processing places an additional burden on attentional processes. It requires managing all stages of information processing with awareness of the purpose of learning a language. Thus, in addition to the operational cognitive processing function, the reading process contains executive or metacognitive functions.

Brown et al. (1983) defined metacognitive strategies as an action taken by a person to plan learning, monitor one's own understanding (output), or assess the extent to which a learning goal has been achieved. In the classification of learning strategy systems by



O'Malley and Chamot (1990), metacognitive strategies are higher than cognitive strategies and social (affective) strategies, thus controlling the use of cognitive strategies. Cognitive strategies refer to learners' specific processing methods and techniques in learning activities, which are all specific activities to help learners acquire knowledge and understand concepts, such as taking notes, looking up dictionaries, analytical reasoning, and induction. Cognitive strategies relate to the psychological processes readers use to obtain, store or extract information. These strategies help to integrate old and new information and are an indispensable tool in the learning process.

Metacognition consists of a set of beliefs, thoughts, understandings, behaviors, and strategies for current and future actions that are often dynamic and systematic (Dunlosky & Lipko, 2007). Thus, an essential component of metacognitive knowledge systems refers to the cognitive and socio-cognitive dimensions of human development and learning. In contemporary cognitive psychology, research findings corroborate earlier ideas such as Flavell's (1979) that metacognitive knowledge systems typically require thinking or cognitive cognition and the regulation and execution of cognition through the deployment of students' behaviors and problem-solving strategies. These administrative processes provide students with rich metacognitive experiences that enable them to do similar things more effectively and clearly understand what they do and why they do it (Paris, 2002).

Metacognitive awareness has produced a more constructive and responsive reading tradition. Pressley & Afflerbach (1995) found that highly efficient and constructively responsive readers are those with a high level of metacognitive awareness. Such awareness is central to output-based learning because it involves preparation and planning, monitoring, assessment, and the appropriate use of selected reading strategies (Anderson, 2005). Planning strategies are test-takers' actions of previewing or overviewing a task and making decisions about how or when the task should be done and the order of steps to be taken to accomplish the task. They also involve setting a speed at which the task should be done in order to be able to accomplish the task within the limited time frame. This in turn supports learners to perform the task successfully (Yayli, 2010). Monitoring strategies refer to test-takers' deliberate



actions to monitor their own performance and to ensure that tasks are properly executed; these strategies are used for “checking and regulating performance” (Zhang, Goh, & Kunnan, 2014, p.78), whereas evaluation strategies are the strategies that L2 learners use to reflect on or respond in some way to a reading task. The learners use these strategies to check or evaluate how well they have completed the task. Furthermore, metacognitive reading strategies stimulate one's thinking and enhance learners' academic performance (Anderson, 2002). Indeed, metacognition is an essential factor in determining learning outcomes (Hattie, 2009; Veenman & Alexander, 2011) and plays a strategic role in the construction of various assessment methods and tools. Thus, effective and efficient learners are those who develop metacognitive skills that enable them to manage and utilize their learning.

Chamot and O'Malley (1996) distinguished between cognitive and metacognitive strategies in EFL reading. Cognitive strategies are strategies that help students to complete reading tasks, including note-taking, summarizing, reasoning, using prior knowledge, predicting, analyzing, and using contextual cues (Oxford, 1990). Metacognitive strategies refer to strategies for self-reflection and reflection on reading and learning. The three aspects of metacognition include: declarative knowledge, such as knowing what the strategy is; procedural knowledge, such as knowing how the strategy works; and conditional knowledge, knowing why the strategy is used (Paris, Cross, & Lipson, 1984). However, the use of strategies often varies from student to student. For instance, Block (1992) found that readers at different reading levels, monolinguals, and bilinguals differed in the frequency and type of cognitive and metacognitive strategies used.

Both cognitive and metacognitive strategies are involved in information processing activities. Research on metacognitive and cognitive language learning strategies suggests that failure to transfer learning strategies to new tasks may be largely due to a failure to integrate metacognitive information with cognitive strategies. In addition, research has shown that students without metacognitive strategies do not have the ability to review their progress, achievements, and future directions for learning (Alexander & Jetton, 2000; Pressley, 2000; Pressley & Afflerbach, 1995).

### 2.3.2 Reading strategies

Much of our understanding of reading strategies depends on studies of expert reader behavior (Bazerman, 1985; Pressley & Afflerbach, 1995). These studies suggest that successful comprehension does not occur automatically. Instead, successful comprehension relies on a directed cognitive effort known as metacognitive processing. Through metacognitive strategies, readers focus on controlling, monitoring, and evaluating the reading process (Pressley, 2000; Pressley, Brown, El-Dinary, & Afflerbach, 1995).

Reading strategies are used to help learners solve reading problems (Yan & Cai, 2021; Pan, 2010; Zhang, 2004) and knowledge of learners' reading strategies aids the development of reading programs and also helps to improve reading levels and abilities (Shorey & Mohktari, 2001; William & Burden, 1997). As such, the study of reading knowledge and strategy processes in EFL contexts can help improve reading instruction and help reconstruct alternative models of proficient reading. Indeed, reading strategies are intentional, conscious behaviors that can be recognized by agents and others through intentions and chosen targets (Paris, Lipson, & Wixson, 1983) and constitute methods to circumvent difficulties encountered during reading (Urquhart & Weir, 1998). Readers often use reading strategies to improve comprehension of a specific reading task (e.g., skipping raw words) via a conscious process (Birch, 2002). In this sense, strategies represent conscious responses to specific problems that arise, such as the inability to understand the meaning of words or find the information when interacting with a written text (Dole, Duffy, Roehler, & Pearson, 1991; Urquhart & Weir, 1998).

According to Carrell, Gasdusek, and Wise (1998), reading strategies can improve reading comprehension. Indeed, previous studies on reading strategies of native and second language readers at different levels of proficiency in different learning environments have shown that reading strategies play a crucial role in developing reading skills (Alfassi, 2004; Mokhtari & Sheorey, 2008; Pressley & Afflerbach, 1995). For example, studies of reading strategies used by skilled and unskilled readers have shown that skilled readers are more concerned with textual meaning and monitoring of comprehension than unskilled readers, who are highly concerned with

details, lexical issues, or decoding (Block, 1986; Sheorey & Mokhtari, 2001). Moreover, Al Melhi (2000) found differences between skilled and unskilled readers in terms of actual and reported reading strategies, the use of global reading strategies (e.g., underlining, guessing, reading twice, etc.), metacognitive awareness of readers' perceptions, and self-confidence as readers. Therefore, inexperienced students should be instructed to adopt the strategies used by more successful students to improve their reading comprehension (Carrell, Pharis, & Liberto, 1989; Kern, 1989; Macaro & Erler, 2008; Song, 1998). Strategies can also be taught directly through strategy training to help students understand what they are doing when they are doing it, why they are doing it, and how they are doing it (Oxford, 1990). Typically, strategy training follows a cycle of direct explanation of strategies, modeling, and guided practice that gradually shifts responsibility from teachers to students, leading to more independent practice (Duffy, Roehler, & Rackliffe, 1986; Duke & Pearson, 2002; Pearson & Gallagher, 1983).

Research has also shown that readers with poor reading skills have less awareness of effective strategies and are less effective in reading monitoring activities. Brown and Palincsar (1985) argued that an effective reading instructional program requires the identification of strategies modelled by experts and acquired by learners in contexts that reinforce the effectiveness of these strategies. EFL learners who show evidence of metacognitive deficits may be unaware or incapable of monitoring their mental processes while reading. Nevertheless, unskilled learners can become skilled readers and whole-text learners if given effective strategy instruction and taught to use cognitive and metacognitive strategies to monitor and check their comprehension during reading (Carrell, Gajdusek & Wise; 1998; Iwai, 2011; Palincsar, 1986; Green & Oxford, 1995; Wernke et al., 2011).

### **2.3.3 Test-taking strategies**

There are many methods to prepare students to take L2 reading tests and to obtain the highest possible score. One of these methods is to use test-taking strategies (Brown, 2007; Cohen, 1992; 1998). Specifically, test-taking strategies are techniques that test-takers adopt in order to obtain correct answers on a given test (Assiri, 2011). These strategies also provide some guidance on how to answer the test correctly within the

given time. However, the successful use of these strategies does not necessarily imply mastery of the test task at hand. Indeed, test takers might answer correctly to a reading task without fully understanding the text (Cohen, 1986). Cohen (1992) also noted that test-taking strategies represent processes that test-takers can control by choosing what they believe will help them answer the test questions, suggesting that test-taking strategies are conscious processes. He added that these strategies could be either short-term (e.g., looking for clues that connect information in the question to information in the read text) or long-term (e.g., reading the entire text after reading the question).

In recent years, an increasing number of researchers have begun to focus on the role of test-taking strategies in validating language tests (e.g., Purpura, 1997; Rivers, 2001; Phakiti, 2003; Koda, 2007). This is due to the numerous test-wise strategies used by test takers to obtain correct answers without completely understanding the text, making the test results potentially misleading. As a result, the field has moved beyond the days of validating tests simply by conducting statistical analyses of correct and incorrect responses. Researchers now ask key questions such as what these tests measure and how respondents arrive at answers to language assessment measures.

Test-taking strategies are strategies used to respond to a test, and these strategies are not necessarily related to one's language ability. In short, "test-taking strategies can simply be seen as applied to the field of assessment. Thus, test-taking learners' strategies are instances of language use processes that respondents have chosen and of which they are at least somewhat aware" (Cohen, 2007: 119). In general, most of the strategies chosen by test takers in language assessment are strategies that they have learned in the language learning process.

It is important to distinguish between test-taking strategies and reading strategies because there is some overlap between the two. They can easily be confused in reading assessments. First, test-taking strategies are not specific to any language skill, although each language skill has some specific test strategies. Second, while reading strategies are typically used when readers are engaged in reading activities and are consequently "related to text comprehension" (Singhal, 2001, p. 1), test-taking

strategies are only used when dealing with test or assessment tasks, which means that they are more "driven by the test questions" (Farr, Prichard, & Smitten, 1990, p. 218). For example, multiple-choice reading tasks require "sustained, deliberate, and linear engagement in problem-solving activities" compared to non-test situations (Rupp et al., 2006). In practice, Cohen and Upton (2006) observed that their sample of 32 test-takers used test-taking strategies much more frequently than reading strategies.

#### **2.3.4 The role of test-taking strategies in reading test performance**

Cohen (2000) states that language test scores depend not only on learners' language knowledge and ability to apply that knowledge, but also on their test intelligence, which is independent of their language skills and knowledge. Test-taking strategies include test-taking strategies and language use strategies. Language use strategies are the steps or actions that learners consciously take to accomplish a language task and include compensatory strategies, repetition strategies, hidden strategies, and social strategies.

Test respondents use certain test strategies differently depending on the type of questions (Anderson et al., 1991) and it has also been found that respondents focus on finding answers to test questions and spend only the minimum amount of effort necessary to comprehend the text (Farr et al., 1990). Allan (1992) examined the explicit training of ESL respondents in test strategies but found that these strategies were only occasionally used by respondents. In the study conducted by Du Plooy (1996), it was shown that teaching reading strategies improved student test scores, particularly in two areas of comprehension; guessing the meaning from the context (vocabulary), and finding the main idea. The findings also indicated that reading strategy instruction would be effective if inserted into lessons by teachers. The results of another study by Singhal (1999) using a web-based reading strategy training program showed that ESL learners learned more effective strategies after the training and their overall reading comprehension scores improved considerably. Bornholt (2002) also examined children's test-taking strategies on a reading comprehension test and demonstrated that effective test-taking strategies are vital to completing and fulfilling the assessment task. Similarly, Damankesh & Babaii (2015) found that the more test-taking strategies students used while taking the test, the higher their scores

were. This suggests that only high English level students use reading test-taking strategies, while average and low-level students cannot adopt appropriate test-taking strategies (Kashkouli & Barati, 2013; Ghafournia, 2012). However, some argue that students with low English proficiency can also use effective test-taking strategies in reading tests (Pammu et al., 2014). This inconsistency may be the result of studies conducted in different contexts with participants from different ages, cultures, and English proficiency levels.

## **2.4 Factors affecting reading test performance**

In recent years, many language learning researchers have been concerned with identifying individual characteristics that may influence differences in language test performance (Bachman, 1991). Determining the factors that affect the reading test performance of EFL learners has been a controversial issue. Some studies have shown that, in developing countries, school factors have a greater impact on student achievement than student and family factors in developing countries (Heyneman, 1976; Heyneman and Jamison, 1980), whereas other studies have found that student and family factors impact achievement just as much as school factors (Lockheed, Fuller & Nyirongo, 1989; Hungi & Postlethwaite, 2009).

Bachman (1990) proposed a model to examine the effects of three systematic sources of variability on test scores: communicative language competence, individual characteristics of test-takers, and characteristics of the test method or task. Of the three systematic sources of variability, communicative language competence is considered the central factor leading to variation in test scores in second language learning. It consists of three components: linguistic competence, strategic competence, and psychophysiological mechanisms. Bachman (1990) also argued that test-taker performance also depends on various personal attributes such as age, gender, native language, educational background, attitudes, motivation, anxiety, learning strategies, and cognitive style. Crosnoe, Johnson, and Elder (2004) classified factors into student factors, family factors, school factors, and peer factors. Lightbown and Nina (2013) and Macaro (2010) identified two main factors that influence students' second language acquisition: internal factors (age, personality, intrinsic motivation, experience, cognition, and native language) and external factors



(curriculum, instruction, culture and status, external motivation, and exposure to native speakers).

Individual differences can have a significant impact on the use of learning strategies, mainly in terms of age, learning potential, learning style, motivation, personality, and personal experience (Wang, 2012). For example, Jiang & Smith (2009) showed a significant positive correlation between achievement, motivation and learning strategy use. Hao and Wang (2004) also showed that learners of different intelligence types tend to choose different learning strategies, and Zhang (2008) found a weak correlation between language anxiety and the choice, and use, of learning strategies.

Quantitative research suggests that teacher quality and good classroom practices have a greater impact on student achievement, while the qualitative literature emphasizes the value of individualized instruction, teacher professional development, and authentic assessment (Wenglinsky, 2002). Klem and Connell (2004) reported that teachers who support student engagement by creating a caring, well-structured learning environment have been shown to be strong predictors of successful student learning. Ganyaupfu (2013) noted that a teacher-student interaction approach, followed by a student-centered approach, may be the most effective way to develop student learning outcomes. He added that in order to have such good classroom practices, teachers need to have good professional development. Furthermore, Hayes (2014) emphasized that teachers' professional development needs to be supported by good school policies that try to encourage teachers to integrate new approaches into their classrooms.

The study also found that the subjects' reading comprehension test scores were positively correlated with the use of learning strategies. Ghaournia and Afghari (2013) examined the reader-related and text-related factors that significantly affected students' reading comprehension. Bernaus and Gardner (2008) concluded that teachers' traditional strategies were not associated with students' English language performance, but attitudes, students' motivation, language anxiety, and students' perceptions of learning strategies were often associated with their language performance.

More recently, Pourdana et al., (2012) explored whether there was an association between reported use of test-taking strategies and successful performance on EFL reading comprehension assessments. Sixty-eight students of different genders were selected for this study and categorized as high, medium and low-level. It was found that reading comprehension performance was negatively associated with the use of test administration strategies but not with most test-taking strategies. Specifically, the results indicated that the proficient and intermediate groups used evaluation strategies more frequently when completing reasoning items. In addition, lower proficient test takers used more test-taking strategies on reasoning items, while intermediate test takers used monitoring strategies more extensively on factual information items than did proficient test takers.

## **2.5 Previous studies on EFL reading test performance**

Reading in an EFL context is viewed as complex, dynamic and multidimensional (Alderson, 2000). Over the past few decades, several studies have attempted to understand the nature of L2 reading by investigating reader factors and contextual factors. Of these factors, the present study focuses on the nature of cognitive and metacognitive strategies and their relationships to EFL reading test performance.

In the literature, cognitive and metacognitive strategies have been viewed as closely related, indicating that metacognitive strategies have a direct effect on cognitive strategies in L2 reading, use or performance (e.g., Alderson, 2005; Bachman, 1990; Bachman & Palmer, 1996; Chamot, 2005; Oxford, 1990; Phakiti, 2003). In turn, cognitive strategies have a direct influence on L2 performance since they are involved in the use of the target language.

In a recent study, Tunaz and Tm (2019) investigated the effect of reading test strategy training on EFL students' English reading test scores. Ninety university students enrolled in the study were randomly selected and divided into three groups: a face-to-face training group, an online self-training group, and a control group. In addition, semi-structured interviews were conducted with the participants, and the findings were analyzed through content analysis. The results showed that students' awareness of test-taking strategies was positively correlated with test scores.



Block (1986) also conducted a study of nine college-level English students and native English speakers in a remedial reading program. It was found that while more efficient readers used their general knowledge to highlight the overall meaning of the text, combine new information with existing information, and distinguish between main ideas and supporting points, less efficient readers rarely used either of these reading strategies during their reading. Ghafournia and Afghari (2013) further explored the interaction between cognitive test-taking strategies and reading strategies. The results showed that subjects with higher reading levels used cognitive test-taking strategies more than those with lower reading levels.

Sheorey and Mokhtari (2001) found that both American college students and ESL college students had strong metacognitive awareness but the frequency of reading strategy use was positively correlated with reading ability. Phakiti (2003) studied the relationship between reading comprehension ability and cognitive and metacognitive strategies based on Bachman Palmer's (1996) model of language ability, which treats reading comprehension as communicative language ability, and cognitive and metacognitive strategies as part of the subjects' individual characteristics. This study revealed a positive relationship between cognitive and metacognitive strategies and test scores, and the level of metacognitive strategies used by students in high, medium, and low subgroups decreased sequentially. Wang and Guthrie (2004) investigated Chinese college students' metacognitive reading strategy awareness and learning strategies. The findings indicated that metacognitive reading strategy awareness and metacognitive strategy use were positively related to learners' academic performance. Li (2020) conducted a three-month teaching experiment where metacognitive strategies were integrated into classroom teaching. It was found that the study of metacognitive strategies in English reading for high school students can effectively improve students' English reading ability and reading level. Wang (2011) examined the application of metacognitive strategies in English reading for vocational college students and found that the metacognitive awareness of highly proficient students during the reading process was relatively weak, suggesting that they unconsciously used metacognitive strategies. Among the five subcategories of metacognitive strategies, selective attention strategies were used the most frequently,

followed by self-regulation strategies, monitoring strategies, planning strategies, and evaluation strategies, respectively.

Gordon (1987) investigated the test-taking strategies of low and high proficient EFL students. It was found that their answers to the test questions did not effectively reflect their understanding of the text. In terms of test-taking strategies, low-level students preferred to acquire information at the local (sentence/word) level rather than linking individual pieces of information to the whole discourse. By contrast, high-level students understood the text from a global perspective, use context to predict information and, when they encounter linguistic ambiguity, they use their knowledge of vocabulary and structure to resolve difficulties.

Several studies in literature investigated the effects of teaching test-taking strategies on learners' success. For instance, Janowicz (2007), states that test achievement is a valuable criterion to demonstrate a learnt ability, and in many fields of education learners are mostly evaluated according to their responses to standard tests. That's why, the content knowledge alone might not be sufficient to be successful in most cases. However, in the research conducted by Janowicz (2007) on young learners' test results, there was no remarkable difference between the students who received test taking instructions and those who were excluded.

In another researches, Lance (2004) examined the effects of instructional test-taking strategies on special education high school students. In this study, students with disabilities were provided with test-taking strategies. The results of the study showed the positive effects of teaching test-taking strategies. Similarly, Scharnagl (2004) found a positive effect of teaching test-taking strategies on learners' academic performance and suggested integrating test-taking strategies into the curriculum to increase test awareness. On the other hand, Bunting and Mooney (2001) found that test coaching may lead to unreliable test scores. Finally, Edwards (2009) investigated the effect of test-taking strategies on learners' anxiety levels and found that students who received test-taking strategy training showed higher anxiety in the last 30 minutes of important test levels, suggesting that strategy training does not always guarantee lower test anxiety.

Purpura (1999) and Song (2005) examined test-takers' perceptions regarding their normal use of a set of cognitive and metacognitive strategies without reference to a specific context, while Phakiti (2003b) examined test takers' reported cognitive and metacognitive strategy use in a specific test context. The strategy use questionnaire items in Purpura, on the one hand, are written using the Simple Present tense, which reflects individuals' habitual strategy use, for example, 'I double-check my understanding when I read.' Each strategy use item in Phakiti, on the other hand, is written using the Simple Past tense, which suggests that the use of the strategy relates specifically and exclusively to a particular context and occasion, for example, 'I double-checked my understanding during this reading test.' Accordingly, there may be underlying assumptions about the nature of strategic competence that need clarification prior to empirical data gathering.

Several studies show that females tend to be more active strategy users than their male counterparts, most of which were carried out using Oxford's Strategy Inventory for Language Learning (SILL). A study of gender and English learning strategy use using the SILL was conducted by Xu (2004), who studied 1554 students as participants from junior high schools through satisfied cluster random sampling, found that female students scored higher grades in cognitive strategy and compensation strategy than male students. Another related study also pointed out that significant differences were found between males and females in the categories of compensation and affective strategies, yet not in the other four categories of memory, cognitive metacognitive, and social strategies (Goh and Foong, 1997). However, in Phakiti study (2009) found there were no gender differences in either reading performance or use of cognitive and metacognitive strategies. Hayati and Ghogh (2008) investigated whether there was a significant association between test-taking strategies, proficiency, and gender. The results indicated that groups with high proficiency performed better compared to groups with low proficiency. The study also showed that there was no significant difference between male and female college students in the use of test-taking strategies. Similarly, Zare (2013) investigated whether the gender variable influenced the overall frequency of reading strategies and the choice of reading strategies. The

results indicated that there were no significant differences between males and females in the use of reading strategies.

Kashkouli & Brarati (2013) investigated the effects of task-based assessments on the types of test-taking strategies used by Iranian adult EFL learners at three levels of completing task-based reading assessments. Cardinality analysis revealed that skilled subjects used monitoring strategies significantly more than other strategies, and the intermediate group used all strategies except assessment strategies. In addition, the beginners used planning strategies significantly more than the other types of strategies.

Aghaie & Zhang (2012) examined the effects of explicit reading strategy instruction on Iranian EFL students' reading performance. The study used a questionnaire adapted from Chamot and O'Malley's (1994) cognitive and metacognitive strategy framework. After four months of strategy instruction, the treatment group showed significantly better results than the control group, indicating that reading comprehension and reading strategy use improved with strategy instruction. In addition, students in the treatment group outperformed the control group in reading comprehension and reading strategy transfer. The findings also showed that strategy instruction had a beneficial effect on independent reading behavior.

In a recent study, Xia (2011) found that the total number of strategies used was unrelated to test performance, as unsuccessful students were observed to use more metacognitive strategies than successful students. The results also indicated that poor language proficiency, lack of autonomy, and low reading rates were the most obvious barriers to reading, rather than frequency of strategy use. By contrast, Lee (2011) found that high-scoring test-takers used strategies much more frequently than low-scoring test-takers. Specifically, higher scoring subjects used "identifying important information through discourse structure, contextual vocabulary/sentences, and multiple-choice management" significantly more often than lower-scoring participants. Kasimi (2012) investigated the frequency of using cognitive and metacognitive reading strategies among students with higher language proficiency and revealed the relationship between subjects' use of cognitive and metacognitive

reading strategies. The results showed that there were significant differences between groups in the frequency of using cognitive and metacognitive strategies. Zhu et al., (2021) explored the importance of metacognitive strategies and their correlation with English reading comprehension performance. The results showed that the use of metacognitive strategies was positively correlated with reading performance. Non-English majors used metacognitive strategies extensively, but the frequency of use was generally not high. Gui, Chen and Verspoor (2021) employed a mixed research approach to investigate the complex and dynamic developmental trajectories of English academic reading skills of 27 Chinese undergraduate chemistry majors. The study showed that English language proficiency predicted initial reading scores and that this group made significant progress in academic reading. Specifically, high achievers used more strategies overall and used various and more complex learning and reading strategies to improve.

Sukyong (2021) used a questionnaire to investigate the use of English language learning methods among Thai university students. The analysis showed that learning strategies are interrelated and that the use of learning strategies varies across academic clusters. And the use of learning strategies by Thai university students varies with individual differences and contextual factors. In addition, learners would benefit from training in the use of learning strategies.

In the literature reviewed above, researchers investigated strategies in a variety of contexts and with different populations. Inspired by empirical research on the relationship between strategy type and reader performance, the present study investigated reports of strategy use among Thai learners. Considering the lack of research on the relationship between cognitive and metacognitive strategies and Thai university learners' EFL reading test performance, this paper can bridge this gap and provide lessons for the TOEIC reading test by comparing the use of cognitive and metacognitive strategies among different proficiency groups.

## **2.6 Previous studies on TOEIC reading test**

The Test of English for International Communication (TOEIC) test is designed by the Educational Testing Service (ETS) to improve students' overall English proficiency

and competitiveness in the workplace. Part of the appeal of TOEIC tests is that they are available everywhere, and their scores are recognized worldwide. The importance of TOEIC test scores is most evident in Asia. The TOEIC test was initiated in Japan by the Educational Testing Service (ETS) to determine the English communication skills of those who wished to use English in the workplace. The TOEIC test measures a person's ability to communicate in English using key expressions and common everyday vocabulary in everyday life and the global workplace environment. Therefore, the TOEIC test does not require candidates to have specialized knowledge of business terminology.

The three most common reasons for administering the TOEIC are 1) to screen employees for overseas business travel or job postings, 2) to urge employees to focus on improving their English, and 3) to evaluate the effectiveness of company-sponsored English training programs. More than 70% of Japanese companies surveyed said they expect employees to score 600 out of a maximum of 990 before being considered for overseas assignments (TOEIC Assessment of English Language Skills, 1997, p. 9). At present, more than 50 countries have recognized the TOEIC test as the most reliable test of English communication skills, and the number of TOEIC test takers continues to grow. Indeed, the TOEIC test has proven to be a quick, affordable and reliable tool to test employees' language skills, thus allowing companies to determine their employees' learning efforts (TOEIC: A Critical Measure of Communication Skills, 1997, p. 11). As a result, the TOEIC has become one of the most popular comprehensive assessments globally (Bozorgian, 2012); more specifically, it is designed to measure English skills in an international working environment (Chujo & Oghigian, 2009).

The reading section assesses the test taker's understanding of written English (Webb & Chang, 2012). This test was chosen because the participants in this study were selected for their varying levels of English proficiency and because tests such as TOEFL or IELTS are too difficult and expensive for most Thai English learners. In addition, TOEIC scores are used to determine whether students can receive academic scholarships or study at an English-speaking university. Reading in TOEIC mainly focuses on business context, while reading in TOEFL tends to concentrate on broad-



spectrum and comprehensive academic passages. In other words, according to Liao, Qu, and Morgan (2010), “each test measures distinct aspects that cannot be assessed and compared by the other tests” (p. 11). On the other hand, the TOEIC test primarily measures daily English skills for individuals working in an international environment in a first language other than English. There is a strong correlation between TOEIC reading scores and test takers' performance on daily English language tasks, which is a good indication of the reliability and validity of TOEIC scores.

A study showed the relationship between the TOEIC reading test and test-taking strategies. For example, Lee (2018) studied the test-taking strategies of high- and low-scoring Chinese participants responding to multiple-choice reading comprehension questions in English. To better understand how test-taking strategies are used in the TOEIC reading section, and how high and low scorers use these strategies, 32 participants took the TOEIC reading test, were provided with thinking aloud protocol, and participated in a post-task interview. The findings suggest that multiple-choice questions appear to provide test-takers with important clues that may lead to patterns of processing that differ from those of non-testing situations. Furthermore, the results of this study show that the use of strategies can easily distinguish between good and poor performance. Specific groups of student readers, especially low-level students, may benefit greatly by including test-taking strategies as part of a second language reading curriculum, rather than as a separate topic.

## **2.7 Summary of the chapter**

Overall, previous studies have demonstrated that cognitive and metacognitive strategies are correlated and affect language test performance. Therefore, to explain the nature of language performance, both cognitive and metacognitive strategies need to be further investigated. It is also noteworthy that cognitive and metacognitive strategies tend to contribute differently to language test performance. It has also been shown that metacognitive strategies directly control cognitive strategy use, which, in turn, directly impacts the success of communicative language use. This chapter discusses some of the literature that contributes to the understanding of cognitive and metacognitive strategies, and test-taking strategies. The next chapter will discuss the research methods used in this study in more detail.

## **CHAPTER III**

### **RESEARCH METHODS**

#### **3.1 Research paradigm and design**

Positivism assumes that people's behavior is intrinsically linked and that they are clear about their motives and meanings. There are preexisting connections between things that can be described by theoretical propositions expressed in language (Wittgenstein, 2014). Additionally, logical positivism recognizes laws in the social sphere but not universal laws in the natural sciences, where the goal of the research is to obtain theoretical hypotheses with a high probability of empirical confirmation. In order to facilitate mental restructuring, language learners use the strategies to link new and already known information. According to Vygotsky's (1978) tapestry approach, cognitive strategies in language learning are related to the social aspects of language interaction. According to this approach, learners are initially helped to accomplish required tasks, and then the assistance is gradually reduced as cognitive strategic thinking is developed. To solve given tasks in a test-taking setting, test takers use their linguistic and world knowledge. Language test takers can implement the appropriate strategic plans in test-taking settings to be able to take the language tests effectively using these strategies.

This study aimed to investigate the use of cognitive strategies and metacognitive strategies among Thai EFL learners and investigate the relationship between cognitive strategies and metacognitive strategies and EFL reading test performance. During the first phase of the study, participants were asked to answer a test and a questionnaire, and ten participants were randomly selected for interviews. In the second stage, the data obtained are analyzed and processed through quantitative and qualitative analysis to determine the types of cognitive strategies and metacognitive strategies used by the subjects when reading and the frequency with which they use these strategies, and the relationship between cognitive and metacognitive strategies and EFL reading test scores. The study used descriptive statistics, t-test, Pearson's correlation analysis, and effect size for data analysis.



The present study addresses two research questions:

1. What are the patterns of strategy use in reading test performance among Thai non-English major students?
2. What is the relationship between cognitive and metacognitive strategies and reading test performance?

This research design used quantitative and qualitative to analyze the data. The data collection methods were a reading test, a questionnaire, and an interview. In addition, the following sections discuss each data collection method used in the study.

### **3.2 Participants and context**

This study investigated the relationship between cognitive and metacognitive strategies and EFL reading test performance among 199 undergraduate students located at a public university in northeastern Thailand. Participants were current undergraduate students at the university, aged between 18 and 23 at the time of data collection, with an average age of 19. They have studied English for an average of 17 years. All participants were 34 (17%) male and 165 (83%) female. In the Bachelor's program, each student is required to take a basic English course during the first and second years of the four-year program. It was voluntary for students to participate in the study, and they were informed of the study process before collecting data. At the end of the test, participants were asked to answer a questionnaire about their use of cognitive and metacognitive strategies. To evaluate the participants' English proficiency, a modified TOEIC reading test was administered, and at the end of the test, participants were asked to answer a questionnaire about their use of cognitive and metacognitive strategies. Then, among the 199 respondents, the researchers randomly selected ten respondents for the interview.

### **3.3 Research instruments**

This study used three main research instruments: the TOEIC reading test, a cognitive-metacognitive questionnaire, and an interview. These tools are described in detail in the following sections.

### **3.3.1 TOEIC Reading Test**

According to a large number of research results, the scores of the TOEIC test are closely related to the scores of other English proficiency tests, which proves that the results of the TOEIC test have good reliability. The TOEIC test has a quick comparison table of test scores and descriptions of English proficiency. For any score level, the TOEIC test gives an accurate description of the corresponding English ability, which is convenient for test takers to conduct self-assessment. The advantage of the TOEIC test is that it provides an objective assessment of English proficiency and provides a quantitative measure of test scores.

The study adopted the reading section from the 2010 ETS Official TOEIC Test Preparation Guide and the reading section from the actual TOEIC test administered in Thailand in March 2021(see Appendix A). The adopted section of this reading test has a total of 60 items, including 12 items from complete texts, 28 items from single passages (7-10 reading texts with 2-5 questions each), and 20 items from two passages (4 pairs of reading texts with five questions each). The complete texts section tests the test taker's ability to use their knowledge of structure and comprehension of discourse. The text comprehension section measures the ability to recognize major themes/ideas, headings, the author's purpose, reference words, implied statements, words used within context, and specific details. This part of the test includes reading materials from everyday contexts, such as notices, letters, forms, advertisements, newspapers, schedules, forms, and applications. Test takers must select one of four possible responses to the questions in each text in order to answer the question correctly. Answers are determined by what is stated or implied in the text. Test-takers are tested on their ability to read and comprehend texts so that they are capable of answering the questions correctly in the Reading section. Test-takers are supposed to be able to make inferences from texts, locate and understand specific information, and link information in texts across multiple sentences. Participants had 60 minutes to complete these tasks.

### **3.3.2 Cognitive and Metacognitive Strategy Questionnaires**

The classification of cognitive and metacognitive strategies is derived from reading comprehension and metacognition theories. Cognitive strategies are thought to

include (a) comprehension strategies (e.g., making predictions, translating, summarizing), (b) memory strategies (e.g., relating and repeating prior knowledge or experience) and (c) retrieval strategies (e.g., applying grammatical rules, guessing meaning from context, and transferring prior knowledge). By contrast, metacognitive strategies include (a) planning strategies (e.g., planning what to do before starting, budgeting time for task completion, identifying and clarifying specific goals to be achieved and how to achieve them) and (b) monitoring strategies (e.g., text comprehension monitoring, self-checking) and (c) evaluating strategies (e.g., assessing ongoing performance, and assessing task-related understanding).

The items in the questionnaire were adopted from Phakiti (2006). Phakiti's (2006) questionnaire was modified to incorporate 30 items that provide a clear structure of cognitive and metacognitive strategies since Phakiti (2003b) identified some problematic questions in his questionnaire. Phakiti (2006) reported that the questionnaire was construct validated. The reading test section was different from Phakiti (2006) in the current study. Thus, the researcher modified Phakiti's (2006) items to link them more closely to the reading test portion of the current study, removed items that were not relevant to this reading test and retained only 26 items to measure cognitive and metacognitive strategies. There were 13 items used for measuring cognitive strategies categories (as in Table 1), nine items for the comprehending/Memory strategies and 4 for the retrieval strategies. Metacognitive strategy categories included three items related to planning strategies, five items related to monitoring strategies, and five items related to evaluating strategies. The total number of items in this questionnaire was equal for both strategy categories (26 items in total)

Since the questionnaire (see Appendix B) was administered after the students had completed the TOEIC test, the "past tense" was used. A five-point Likert scale was used in this study to measure how often learners used specific strategies: 1 (never); 2 (sometimes); 3 (often); 4 (usually); and 5 (always). The questionnaire was translated into Thai to help participants understand the questionnaire items. The strategy use scale to describe a continuum of increasing intensity. In other words, low scores indicate that the strategy was used less frequently when completing the TOEIC test,

while high scores indicate it was used more frequently. Time spent on the questionnaire is approximately 10-15 minutes. A description of the questionnaire's reliability and classification is provided in Table 1. Comprehension/memory/retrieval strategies were averaged by the number of items divided by 5 to create a composite variable. It was divided in order to provide meaningful interpretation, i.e., 1 means "never" and 5 means "always".

Table 1: Taxonomy of the strategy questionnaire

Processing	Subscale	No. of items	Items
Cognitive strategies	Comprehending	5	1,2, 6, 8, 15
	Memory	4	4, 5, 9, 23
	Retrieval	4	7,16,17,25
Metacognitive strategies	Planning	3	3,12,18
	Monitoring	5	11,19, 21,22, 26
	Evaluating	5	10,13,14,20,24
		26	

### 3.3.3 Interview

The purpose of the interview was to obtain in-depth responses from interviewees in order to gain a deeper understanding of their own experiences. Interview data was gathered to help explain the use of cognitive and metacognitive strategies in the EFL reading test by Thai non-English majors. After completing the reading test and questionnaire, an interview was conducted. Several questions were posted on the two topics: 1) What are the patterns of strategy use in reading test performance among Thai non-English major students? 2) What is the relationship between cognitive and metacognitive strategies and reading test performance? Interviews included leading questions designed to reveal how they performed the reading test (see Appendix C), with follow-up questions if necessary. Each interview is ranged between 20-30 minutes. This study conducted online interviews with 10 randomly selected subjects from 199 subjects who participated in the reading test. Interviews were conducted in Thai because respondents felt more comfortable expressing their opinions in their first language and they could provide rich and in-depth information in Thai. Interviews were transcribed verbatim and translated into English. All the transcripts were then sent back to the respondents for verification. The recordings were transcribed for

analysis. These names are anonymous. Interviews have been used as a complementary tool to recall protocols due to their advantages of allowing individuals to lead discussions and provide relatively diverse information for analysis (Joh & Schallert, 2014).

The data collection for this study was conducted in the context of the COVID-19 pandemic; therefore, the TOEIC reading test questionnaire data were collected through Google Forms. Interview data were collected via zoom.

### **3.4 Data collection procedure**

Reading tests and questionnaires were then distributed and collected electronically via Google Forms for approximately one week after obtaining permission from the university and its departments. First, the TOEIC reading test is sent to participants, who must independently complete 60 multiple-choice questions within 60 minutes. Participants were told before entering the reading test that the test was unrelated to their academic performance and would not affect their grades for the semester. Then, after completing the TOEIC reading test, participants were asked to truthfully fill out a cognitive and metacognitive strategies questionnaire within 10-15 minutes of their actual situation to learn about the strategies they used when taking the test. Questionnaire items were scored on the five-point Likert scale of frequency. The researcher conducted 20-30 minutes of online interviews with ten randomly selected participants who were willing to be interviewed. Before the start of the interview, interviewees were informed about the purpose, process and duration of the interview. Finally, the data obtained were analyzed and tabulated using descriptive statistics, t-test, Pearson product-moment correlation, and effect size to investigate the use of each strategy and the relationship between strategy and reading test performance.

### **3.5 Data analysis**

Quantitative and qualitative analyses were performed in this study. Quantitative analysis compiles descriptive statistics to obtain a numerical summary of the survey data to examine the percentage (%) of the mean and the standard deviation (SD). The Statistical Package for Social Sciences (SPSS) version 25.0 and Microsoft Excel 2010 were used to quantitatively analyze descriptive statistics for each question in the

questionnaire. Specifically, Descriptive statistics of questionnaire results were obtained to reveal the distribution of strategies employed by non-English majors in Thailand, and this was done to answer the first question of the study. Pearson product correlations were used to determine the correlation between strategies and reading test scores and the relationship between cognitive and metacognitive strategies and English reading performance to answer the second research question. The effect sizes were also calculated. According to Oxford (1990), the ranges of the frequency of strategy use are low strategy use (0.00 – 2.49), medium strategy use (2.50 – 3.49), and high strategy use (3.50 – 5.00). That is, the range from 0% to 49.9% is considered low-frequency strategy use, between 50% and 69.9% is moderate, and 70% or above is considered high-frequency strategy use (Sukyong, 2021).

By transcribing, coding, and interpreting the data, qualitative analysis of the interview data was performed to derive any emerging topics of discussion (Huang, 2015). The interview data were analyzed using qualitative content analysis to identify the main themes.

### **3.6 Summary**

This chapter outlines the methodology of this study, including participants and context, research instruments (TOEIC Reading Test, Cognitive and Metacognitive Strategies Questionnaire, Interview), data collection procedures, and data analysis. The results of this study are presented in the next chapter.



## CHAPTER IV

### RESULTS

This chapter describes the results of this study on the relationship between cognitive and metacognitive strategies and EFL reading test performance.

#### **4.1 The use of cognitive and metacognitive strategies in Thai non-English major students**

##### **4.1.1 Quantitative findings**

The quantitative data from the five-point Likert scale questionnaire were analyzed to address Research Question 1: What are the patterns of strategy use in reading test performance among Thai non-English major students? Descriptive statistics, including mean scores, percentages, and standard deviations, were calculated. The raw test scores were converted into a percentage to compare the use of cognitive and metacognitive strategies. A t-test was used to determine whether there was any significant difference between cognitive and metacognitive strategy use among Thai non-English majors. The quantitative data were obtained from 199 participants, of whom 165 were female, and 34 were male.

Table 2 summarizes the descriptive statistics on the use of cognitive and metacognitive strategies among Thai non-English majors. The mean percentage score reflects the percentage of students who report using these strategies. The results showed that the mean percentage score for the use of cognitive strategies was 73.80% (SD=0.53), and the mean percentage score for the use of metacognitive strategies was 70.40% (SD=0.54). Among the categorization of cognitive strategies, retrieval strategy (M=75.00%, SD=0.64) was the most frequently used strategy by Thai non-English major's students. Planning (M=76.20%, SD=0.70) was the most widely used metacognitive strategy, whereas evaluation was the least frequently used strategy. Overall, these results suggest that cognitive strategies were used more frequently than metacognitive strategies among Thai non-English majors. This suggests that Thai non-English majors are still insufficient in using metacognitive strategies.



Table 2: Descriptive statistics of cognitive and metacognitive strategies

Strategies	Sub-strategies	Mean (%)	SD
Cognitive	Comprehending	72.40	0.55
	Memory	73.80	0.61
	Retrieval	75.00	0.64
<b>Total</b>		<b>73.80</b>	<b>0.53</b>
Metacognitive	Planning	76.20	0.70
	Monitoring	73.60	0.59
	Evaluating	61.20	0.69
<b>Total</b>		<b>70.40</b>	<b>0.54</b>
<b>Overall</b>		<b>72.00</b>	<b>0.49</b>

Table 3 compares the use of cognitive and metacognitive strategies by Thai non-English majors' students. The mean scores on the use of cognitive and metacognitive strategies among non-English majors in Thailand were significantly different ( $t = 5.54$ ,  $p < 0.05$ , Sig. 2-tailed = .000), as shown in Figure 1.

Table 3: Comparison of the cognitive and metacognitive strategies

Strategies	Mean (%)	N	SD	<i>t</i>	Dif.	Sig. (2-tailed)
<b>Cognitive</b>	73.80	199	0.53	5.54	198	.000
<b>Metacognitive</b>	70.40	199	0.54			

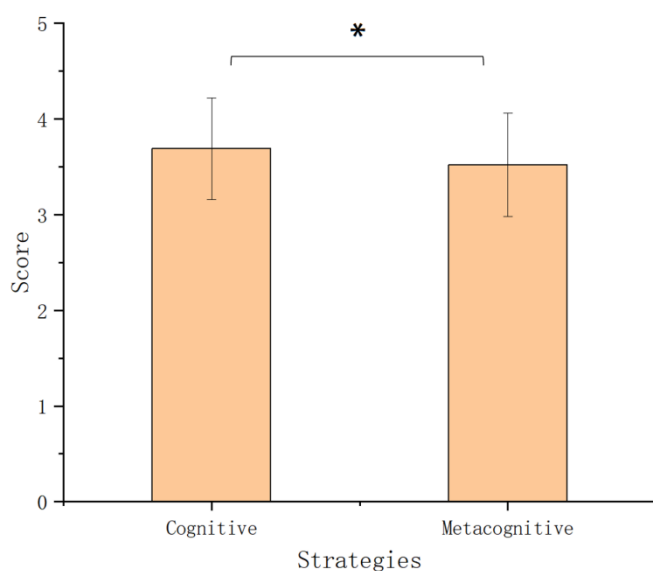


Figure 1: Difference between the use of cognitive and metacognitive strategies among Thai non-English major students.

#### 4.1.2 Qualitative findings

After participants completed the tests and questionnaires, online interviews were conducted via Zoom with some of the participants who agreed to be interviewed. Ten volunteer participants were randomly selected for an interview, and each interview lasted 20-30 minutes. Pseudonyms were used to avoid the identification of the participants. The qualitative data were analyzed and classified into themes based on Phakiti's (2006) cognitive and metacognitive model. The thematic content analysis revealed that it was difficult for participants to use metacognitive strategies separately from cognitive strategies. For example, participants reported that the distinction between comprehending/memory (cognitive strategy) and planning (metacognitive strategy) was unclear, and the purpose of using these strategies differed between test-takers. The interviewees reported that they tried to scan and skim to find the topic and main ideas (comprehension and memory strategies) and plan a course of action to answer the questions before answering (planning strategies). In the current study, planning strategies did not directly affect comprehension, memory, and retrieval strategies. However, planning strategies were found to indirectly affect comprehension and memory strategies via monitoring strategies. This indicates that planning indirectly enhances information storage rather than retrieval or

comprehension. As such, the current findings suggest that planning strategies are essential for language test performance, even though they are not directly related to cognitive strategies. This is because planning does not perform an executive function of monitoring ongoing processes (in contrast to monitoring and evaluating strategies). Comprehending and memory strategies influenced EFL reading test scores through retrieval strategies, and planning strategies affected EFL reading test performance by monitoring and evaluating strategies. All metacognitive and cognitive strategies were found to have indirect positive effects on EFL reading test performance. Table 4 shows extracts from the interviews.

Table 4: Qualitative analysis of interviews

Participants	Participants' responses
ST1	I used my <b>prior knowledge/experience</b> to help me understand the passage or test ( <i>cognitive strategies</i> ). I <b>checked</b> answers by substituting the selected answer with the sentence in the passage ( <i>evaluating-monitoring strategies</i> ).
ST2	I <b>marked</b> the answer on the question I wasn't sure about, and I later returned to <b>consider/recheck</b> it ( <i>comprehension-planning-monitoring strategies</i> ). I <b>checked work</b> while completing the test ( <i>monitoring strategies</i> ).
ST3	I <b>allocated time for answering questions</b> based on <b>prior experience</b> , such as doing easy items first and then answering difficult items ( <i>planning-retrieval strategies</i> ). I read the questions to see what was asked and <b>eliminated bad choices</b> based on the passage ( <i>evaluating-monitoring strategies</i> ).
ST4	I <b>reread</b> the passage and questions several times to understand and sometimes <b>use prior knowledge</b> about the topic ( <i>cognitive strategies</i> ).
ST5	During the test, I choose to complete the more straightforward questions first and <b>skip</b> the ones I don't know to save time ( <i>planning strategies</i> ). If there are unfamiliar words, I will <b>guess</b> the approximate meaning by <b>linking the context</b> ( <i>retrieval-monitoring strategies</i> ).
ST6	I <b>translated</b> it into Thai while reading ( <i>translation-cognitive strategies</i> ) and <b>evaluated</b> if it made any sense and understandable ( <i>evaluating-monitoring strategies</i> ).

Participants	Participants' responses
ST7	I <b>translated</b> the article into Thai ( <i>translation-cognitive strategies</i> ) and <b>guessed</b> the words I didn't know from the context ( <i>retrieval strategies</i> ). I tried to <b>find topics and main ideas</b> of the passage without reading it in detail.
ST8	<b>Identify</b> the easy and difficult questions, and complete the easy parts first ( <i>planning strategies</i> ). I checked the core parts and tenses of the sentences. I was also able to know what part of blank space followed the option through <b>previous knowledge</b> to help me rule out some wrong options ( <i>planning-retrieval strategies</i> ).
ST9	Roughly <b>scan</b> the content of the article, then look at the question, and then <b>return to the article with the question</b> to find the answer ( <i>comprehension-planning-monitoring strategies</i> ).
ST10	I indicated the answer that could be <b>translated</b> ( <i>translation-cognitive strategies</i> ) and was most likely to be correct ( <i>evaluating-monitoring strategies</i> ).

Metacognitive strategies such as inferencing, elaborating, and transferring are essential for test-takers. In the interview analysis, metacognitive behavior was characterized as continua (i.e., occurring at all times) rather than as discrete categories. Cognitive and metacognitive strategy processing may also be viewed as a nonalgorithmic system where thinking does not proceed step-by-step. The interviewees reported that they used cognitive and metacognitive strategies that occurred before, during, and after the action, as proposed by Wenden (1991). Specifically, participants mostly planned the tests based on their previous experience of doing reading tests and answered the questions based on their prior knowledge. Regardless of which strategies the test takers used, they tended to know how and why they used them. Indeed, they knew which metacognitive strategies and cognitive strategies worked best for them to complete the test tasks at hand.

#### 4.2 The relationship between cognitive and metacognitive strategy use and EFL reading performance

This section answers the second research question: What is the relationship between cognitive and metacognitive strategies and reading test performance? The mean and standard deviation for the reading test performance among Thai non-English majors is

shown in Table 5. The overall reading test performance, as well as the overall use of cognitive and metacognitive strategies is presented in Table 6.

Table 5: A summary of reading test performance among Thai non-English majors

Variables	Mean (%)	SD
Reading test performance	23.06	6.72

The results showed that, on average, the average performance of the reading test scores for Thai non-English majors was 23.06%. This shows that the English proficiency of non-English majors in Thailand is relatively low.

Table 6 shows the results of significance values and the Pearson Correlation Index of cognitive strategies and reading score, and metacognitive strategies and reading score. The  $r$  values and the Sig. (2-tailed) values are used to analyzed the data. The Pearson product-moment correlation coefficient was 0.176 between cognitive and reading test scores, and -0.0433 for metacognition and reading test performance. The correlation coefficient between metacognitive strategies and cognitive strategies was 0.617. This indicated that the use of cognitive strategies was correlated with the use of cognitive strategies and metacognitive strategies ( $r=0.6701$ ;  $p < 0.01$ ). It was found that there was no significant correlation between reading performance and cognitive strategies ( $p > 0.01$ ), and similarly, there was no significant correlation between reading performance and metacognitive strategies ( $p > 0.01$ ). In the strategy use of Thai non-English majors, there is a significant correlation between the use of cognitive strategies and the use of metacognitive strategies. The direct effect of cognitive strategy use on metacognitive strategy use indicates cognitive strategy use was a predictor of metacognitive strategy use. In other words, the frequency of using cognitive strategies might affect the frequency of using metacognitive strategies.

Table 6: Pearson product-moment correlations between cognitive strategies and metacognitive strategies and reading test performance

		Metacognitive	Cognitive	Reading Test Performance
<b>Cognitive</b>	Pearson correlation	.6701***		.0176
	Sig. (2- tailed)	.0000		.8050
	N	199		199
<b>Metacognitive</b>	Pearson correlation		.6701***	-.0433
	Sig. (2- tailed)		.0000	.5435
	N		199	199
<b>Reading Test Performance</b>	Pearson correlation	-.0433	.0176	
	Sig. (2- tailed)	.5435	.8050	
	N	199	199	

Note: \*\*\*Correlation is significant at the 0.01 level (2-tailed).

It can be seen from Table 7 that in the sub-strategies of cognitive strategies, there is a significant correlation between each sub-strategy. The correlation coefficient between comprehension strategies and memory strategies is 0.650 ( $p < 0.01$ ), which is significant at the 0.01 level. The correlation coefficient between the comprehension strategy and the retrieval strategy was 0.680 ( $p < 0.01$ ), and the correlation coefficient between the memory strategy and the retrieval strategy was 0.679 ( $p < 0.01$ ), which was significant at the 0.01 level.

Table 7: Correlations between sub-strategies of cognitive strategy

		Comprehension	Memory	Retrieval
<b>Comprehension</b>	Pearson correlation		.650 **	.680**
	Sig. (2- tailed)		.000	.000
	N		199	199
<b>Memory</b>	Pearson correlation	.650**		.679**
	Sig. (2- tailed)	.000		.000
	N	199		199
<b>Retrieval</b>	Pearson correlation	.680**	.679**	
	Sig. (2- tailed)	.000	.000	
	N	199	199	

Note: \*\*Correlation is significant at the 0.01 level (2-tailed)

In Table 8, the correlations between each sub-strategy of the metacognitive strategy are analyzed. The results show that the correlation coefficients between the planning strategy, the monitoring strategy and the evaluation strategy are 0.505 and 0.450, respectively, and the correlation coefficient between the monitoring strategy and the evaluation strategy is 0.598, both of which are significant at the level of 0.01 ( $p < 0.01$ ).



Table 8: Correlations between sub-strategies of metacognitive strategy

	Planning	Monitoring	Evaluating
<b>Planning</b>	Pearson correlation	.505 **	.450**
	Sig. (2- tailed)	.000	.000
	N	199	199
<b>Monitoring</b>	Pearson correlation	.505**	.598**
	Sig. (2- tailed)	.000	.000
	N	199	199
<b>Evaluating</b>	Pearson correlation	.450**	.598**
	Sig. (2- tailed)	.000	.000
	N	199	199

Note: \*\*Correlation is significant at the 0.01 level (2-tailed)

Table 9: Results of a pairwise comparison of cognitive and metacognitive strategies used by Thai non-English majors

Strategy	N	Mean	SD	<i>t</i>	Dif.	P-value	Effect size
Cognitive Metacognitive	- 199	0.17	0.03	5.54	198	.000	.39

Cohen (1988, 1992) provides guidelines for interpreting these values: the effect size is low if the value of  $r$  varies around 0.1, medium if  $r$  varies around 0.3, and large if  $r$  varies more than 0.5. Table 9 shows that Thai non-English majors employed a medium level of cognitive and metacognitive strategies on reading test performance ( $r=0.39$ ).

Overall, these results suggest that Thai EFL learners use more cognitive strategies; Thai EFL learners employed a medium level of cognitive and metacognitive strategies on reading performance; Reading test performance is predictive, and the conscious and appropriate use of strategies can help EFL learners achieve effective results.

The present findings suggest that the use of cognitive strategies is higher than the use of metacognitive strategies among Thai EFL learners, and that cognitive and metacognitive strategies do not directly affect performance on the EFL reading test. However, these strategies interacted with each other, thus indirectly affecting performance on the reading test. Therefore, understanding the relationship between cognitive and metacognitive strategies may improve performance on the EFL reading test. Understanding the relationship between cognitive and metacognitive strategies may improve EFL reading test performance. Indeed, knowing that strategy use contributes to good performance is vital to language assessment theory; therefore, L2 use, learning, and testing approaches need to employ cognitive and metacognitive strategies. Importantly, successful strategy use may be particularly likely when: (1) the strategy is well matched with the L2 task at hand; (2) the strategy is linked with other strategies and processes relevant to the task; (3) the strategy coordinates well with the individual's cognitive style (Oxford, 2003, p. 8).

#### **4.3 Summary**

In summary, the results of this study suggest that Thai non-English major learners use cognitive strategies more than metacognitive strategies, and the frequency of using cognitive strategies may affect the frequency of using metacognitive strategies, so the use of metacognitive strategies is highly considered insufficient. These results suggest that cognitive and metacognitive strategies interact and are predictive of EFL reading performance and that the conscious and appropriate use of strategies may help EFL learners achieve effective outcomes.

## CHAPTER V

### DISCUSSIONS AND CONCLUSION

The previous chapter described the results of the current study in relation to the research questions. This chapter further explores the current findings based on previous research. Overall, these results will contribute to a better understanding of the relationship between cognitive and metacognitive strategies and EFL reading test performance in Thai EFL learners. Limitations of the current study and future research directions are also discussed.

#### **5.1 The use of cognitive and metacognitive strategies in Thai non-English major students**

The quantitative data derived from the questionnaires were analyzed to address the first research question. This analysis revealed that, on average, Thai non-English major students were moderate users of cognitive and metacognitive strategies, and cognitive strategies were used more frequently than metacognitive strategies. These findings are consistent with previous studies showing that learners and test-takers used metacognitive strategies less than cognitive strategies (Sukying, 2021). This is likely because cognitive strategies represent the initial stage in learning (O'Malley & Chamot (1990). Indeed, cognitive strategies relate to the psychological processes the reader uses to obtain, store, or extract new information. These strategies help integrate old and new information and are indispensable tools in the learning process and test performance. However, metacognitive knowledge systems typically require thinking or cognitive cognition and the regulation and execution of cognition via students' behaviors and problem-solving strategies. These processes provide students with rich metacognitive experiences that enable them to be more effective and clearly understand what they do and why they do it (Paris, 2002).

The descriptive results also confirmed that Thai EFL university learners reported using cognitive strategies more than metacognitive strategies, which is consistent with other studies using similar measures (Naeni & Rezaei, 2015; Phakiti, 2003; Purpura, 1998). According to the findings, Thai EFL learners translate the English text into their mother tongue, Thai. Since English is learned as a foreign language in Thailand,

they do not use English very often in their daily life or daily communication. Upton and Lee-Thompson (2001: 487) also previously reported that “L2 readers most frequently shifted into their L1 simply to translate a word or phrase meaning or confirm their understanding of a sentence they had read”. The current results also indicate that Thai EFL University learners are not proficient in the use of metacognitive strategies.

Closer inspection of the cognitive strategy use subscale indicated that the retrieval strategy was reportedly used with the highest frequency (75.0%), while comprehension strategies were reported to be the least frequently used (72.4%). The results also showed that Thai EFL university learners most frequently reported using prior experience/knowledge to help them understand texts and to guess unrecognized words in texts by linking to context. This suggests that EFL learners tend to use comprehension and memory strategies to comprehend EFL texts. The participants may have failed to use comprehension strategies because the reading test texts used in this study were too difficult and, therefore, the test-takers were unable to understand the text content, which would also explain the test takers' low reading test performance.

The metacognitive strategies subscale inspection showed that planning strategies were used the most frequently (76.2%), while evaluation strategies were the least commonly used (61.2%). Planning strategies are relatively abstract rather than concrete and complete. As the test takers worked through the tasks, they may have used these strategies to monitor their performance and update or modify their plans if necessary (Phakiti, 2006). Evaluating strategies may have been used to a lesser extent due to time constraints to complete the test. That is, participants may have rushed to complete the test and not had sufficient opportunity to evaluate their performance. In addition, the English proficiency of the students may have been too low for the students to frequently use evaluating strategies.

The quantitative data suggest that the use of cognitive and metacognitive strategies is inextricably linked, and the qualitative data indicated that all metacognitive and cognitive strategies had indirect positive effects on English reading test performance.

Specifically, metacognitive strategy use indirectly affected reading test performance, which was mediated by cognitive strategy use. That is, metacognitive strategies monitor and regulate actual cognitive behaviors for tackling specific tasks in the test-taking process, which eventually affects test performance. This result is consistent with previous findings showing that metacognitive strategy use did not directly influence test performance but affected it indirectly through cognitive strategy use (Phakiti, 2008; Purpura, 1999). The following excerpts from the qualitative analysis illustrate the impact of cognitive and metacognitive strategies on reading test performance:

I allocated time for answering questions based on prior experiences, such as doing easy items first and then answering difficult items. I read the questions to see what was asked and eliminated bad choices based on the passage (ST3).

*“I reread the passage and questions several times to understand and sometimes use prior knowledge about the topic” (ST4).*

*“During the test, I choose to complete the more straightforward questions first and skip the ones I don't know to save time. If there are unfamiliar words, I will guess the approximate meaning by linking the context” (ST5).*

*“Roughly scan the content of the article, then look at the question, and then return to the article with the question to find the answer” (ST9).*

An explanation for the current findings may be that cognitive strategies serve as direct language learning strategies in which learners interact with new information in a variety of ways and consciously receive and produce information in the target language (Hedge, 2000). Specifically, cognitive strategies directly impact L2 performance as they involve the use of the target language. Consistent with previous studies (e.g., Bachman, 1990; Oxford, 1990; Bachman & Palmer, 1996; Phakiti, 2003; Alderson, 2005; Chamot, 2005), the present findings suggest that cognitive and metacognitive strategies are closely related. Indeed, cognitive strategies and metacognitive strategies influence each other, and the use of cognitive strategies has a direct impact on reading performance, while the use of metacognitive strategies

affects the use of cognitive strategies, which in turn affects performance on reading tests. Although non-English majors in Thailand used cognitive strategies, the overall frequency of use was not high.

In summary, Thai non-English majors used cognitive strategies more frequently than metacognitive strategies in reading tests, with retrieval strategies and planning strategies being the most frequently used in each category.

## **5.2 The relationship between cognitive and metacognitive strategy use and EFL reading performance**

A correlational analysis between strategy use and reading test performance was conducted to address the second research question. The results showed a significant bidirectional correlation between the use of cognitive strategies and metacognitive strategies. This is consistent with previous studies on L2 English test takers' strategy use, showing that metacognitive strategy use has an executive function on cognitive strategy use (Phakiti, 2003; Purpura, 1999, 2008, 2016; Zhang & Zhang, 2013). Indeed, metacognitive reading strategies are the strategies that the readers employ in order to improve their awareness and control over their reading comprehension and evaluate their comprehension (Zhang & Seepho, 2013).

The analysis also showed that cognitive and metacognitive strategies could predict EFL reading performance, and the conscious and appropriate use of strategies can help EFL learners achieve effective outcomes. Cognitive strategies are related to students making predictions, translating, summarizing, and guessing meaning from context, and also their act of relating their reading to their background knowledge (O'Malley & Chamot (1990) in Zarra-Nezhad, Shooshtari, and Vahdat, 2015). Phakiti (2006) reported that cognitive and metacognitive strategies might need to be viewed as two interacting aspects of strategic competence that do not occur independently of each other. However, distinguishing cognitive strategies from metacognitive strategies is difficult because they may overlap in some cases (Bax, 2013). That is, the same strategy can be viewed as either a cognitive strategy or a metacognitive strategy, depending on the purpose for which the strategy is used. For example, one of the items in the test requires test takers to read the text and fill in the blanks. In this case,

one might go back to the text to find these statements as a scanning strategy (cognitive strategy) or as a way of checking answers or making sure sentences are correct (metacognitive strategies). Thus, as Phakiti (2003) states, “the same strategy may be cognitive in one context and metacognitive in another” (p. 43), suggesting that participants may have some difficulties in making decisions with regard to their strategy use.

The results also showed that all cognitive strategies were highly correlated with each other, with retrieval strategies and comprehension strategies being the most strongly correlated and comprehension and memory strategies the weakest correlated. The robust relationship between retrieval and comprehension strategies is likely because, in the Thai context, most English teachers employ comprehension test-type teaching strategies, and they often use comprehension passages to test students. These comprehension exercises allow students to learn about the comprehension strategies used in reading and to practice using them. When they take the EFL reading test, they use their prior experience/knowledge (retrieval strategy) to help them understand English texts (Dawadi. S, 2017). The weaker relationship between comprehension and memory strategies might be due to EFL learners simply practicing comprehension strategies in class but not repeating them after class to consolidate their knowledge (Gonthier & Thomassin, 2015).

The current study found that, for metacognitive strategies, evaluating strategies and monitoring strategies were the most highly correlated. This indicates that the Thai EFL learners consciously monitor their own reading strategies and reading process during the reading process and adjust their reading strategies and methods (Zhang & Zhang, 2013; Liu, 2015; Dawadi. S, 2017). The correlation between planning and evaluating strategies was the weakest but was still moderate ( $r=0.450$ ). This suggests that Thai EFL learners are able to make plans and arrangements, including setting goals, processes, and steps before reading. But, it also shows that most Thai EFL learners have not yet developed the habit of formulating writing plans and objectives, evaluating and reflecting on their own reading process, and performing self-assessments.



Surprisingly, Pearson correlation analysis showed no statistically significant relationship between cognitive and metacognitive reading strategies and learners' reading performance, which is inconsistent with previous research (Kummin & Rahman, 2010; Kasimi, 2012; Naeni & Rezaei, 2015; Zarra-Nezhad, Shooshtari, & Vahdat, 2015; Zhu et al., 2021). Previous research has shown that participants perform better on reading tests when they employ metacognitive and cognitive strategies. Unfortunately, this did not happen in the current study. One possible explanation for this result is that participants probably over-reported their test-taking strategy use because they wanted to show that they understood test-taking strategies and that they already applied them while doing the reading test even though in fact they did not use the strategies or they use them, but not very often. In addition, it is possible that subjects knew and were aware of the strategies they learned in class, but were unable to apply them correctly while taking the reading. In the current study, although participants reported using cognitive and metacognitive strategies during reading, their reading test performance remained low-level. This may be due to respondents' tendency to rate themselves higher on questionnaires using cognitive and metacognitive strategies, with limited language skills, which negatively impacted their reading test performance. As Alsamadani (2009) mentioned in his research, awareness and use of metacognitive strategies does not guarantee satisfactory reading test performance, as there are still many other factors interacting during the reading process that may affect the overall performance. This inconsistency may be explained by the participants' language ability and the difficulty of the exam. Indeed, Phakiti (2003) argued that cognitive and metacognitive strategies are weakly associated with reading performance due to the strong influence of other factors such as language ability and test method effectiveness. This result suggests that strategy use can explain a minority of test takers' performance on language tests (Phakiti, 2008; Song, 2005; Zhang et al., 2014)

### **5.3 Conclusion**

Overall, the current study revealed that Thai non-English major learners use cognitive strategies more than metacognitive strategies. The direct effect of cognitive strategy use on metacognitive strategy use suggests that cognitive strategy use is a predictor of

metacognitive strategy use. That is, the frequency of cognitive strategy use affects the frequency of metacognitive strategy use. Thus, the use of cognitive and metacognitive strategies was predictive of EFL reading test performance. Metacognitive strategy use also had indirect effects on reading test scores, mediated by cognitive strategy use. Metacognitive strategies monitor and modulate actual cognitive behaviors to address specific tasks in the test-taking process, ultimately affecting test performance. This result supports the findings of previous research on strategy use (Phakiti, 2008; Purpura, 1999) that the use of metacognitive strategies did not directly affect test performance but indirectly through the use of cognitive strategies.

Although correlation analysis showed no statistical significance between cognitive and metacognitive strategies and reading performance. These results are consistent with previous L2 English research findings that strategy use explained language test performance for a small number of test candidates. In the present study, there was no statistical significance between cognitive and metacognitive strategies and reading test scores, which is inconsistent with previous studies (Kummin & Rahman, 2010; Kasimi, 2012; Naeni & Rezaei, 2015; Zarra-Nezhad, Shooshtari, & Vahdat, 2015; Zhu et al., 2021). Furthermore, the current results support the language use model of Bachman and Palmer (2010), which considers strategy use as only one of the individual characteristics that influence test performance. Other individual characteristics, such as subject knowledge, personal attributes, and language knowledge, also affect test achievement. Indeed, Purpura (1999) argues that test takers' performance on language tests depends mainly on their own language knowledge, and the impact of strategy use on test scores is reduced if the test taker's language knowledge is lower than the test difficulty (Bachman, 2002). Therefore, strategy use can only account for a limited part of reading test performance.

#### **5.4 Pedagogical implications**

This study showed no statistically significant relationship between cognitive and metacognitive strategies and reading test scores of Thai EFL learners. Still, cognitive strategies and metacognitive strategies indirectly had positive effects on reading test performance. This may be explained by the fact that the participants rated their own strategy use higher when answering the questionnaire but limited by language ability

while taking the test, resulting in inconsistent analysis of quantitative and qualitative data. The research has practical implications for classroom teaching. For instance, the finding that cognitive and metacognitive strategies indirectly affect reading test performance may suggest that EFL reading is a language problem and a reading problem. Therefore, it is reasonable to believe that informed training on the use of reading strategies can help EFL learners improve their reading skills and potentially improve their overall English proficiency (Zhang & Wu, 2009). EFL teachers need to understand whether their students are aware of different learning strategies and/or how effectively they are using them. In addition, research on how to conduct systematic and effective cognitive and metacognitive strategy training for Thai university EFL learners will also have an important impact on college English teaching outcomes.

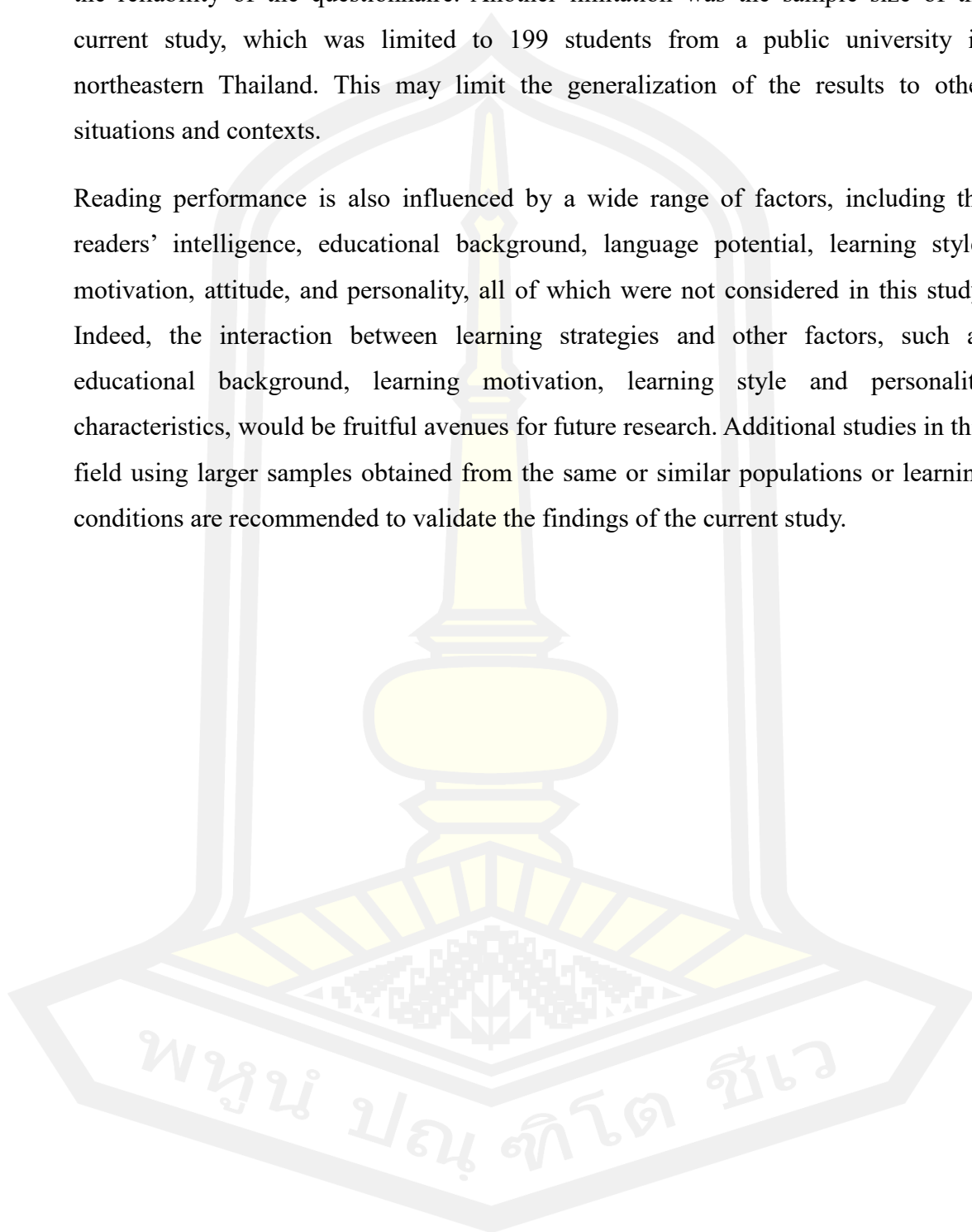
Teachers are also encouraged to allocate more time to teaching students how to apply cognitive and metacognitive strategies in order to improve students' reading test scores. Teachers should also provide more practice and tasks for students to use cognitive and metacognitive strategies since students may know and understand cognitive and metacognitive strategies but be unable to apply them correctly when reading English texts. With sufficient practice, students should be able to internalize these strategies and apply them appropriately when reading English texts.

### **5.5 Limitations and recommendations for future studies**

The study revealed some interesting findings regarding the use of cognitive and metacognitive strategies in the EFL reading test. However, they are certainly not conclusive or comprehensive. The ambiguity of the effect of strategy use on test performance in the current findings suggests that this relationship between strategy use and reading performance may be more complex than previously thought (Song & Cheng, 2006). It should also be noted that this study had some limitations that may have affected the results. For example, all data were collected entirely online through Google Forms during the COVID-19 pandemic which limited the distribution of the study. Moreover, the cognitive and metacognitive strategies listed in the questionnaire may have failed to capture all the complex mental processes that test-takers use while completing the test. In addition, although test-takers report high usage of available

strategies, it can be difficult to know if they are actually using them, which may affect the reliability of the questionnaire. Another limitation was the sample size of the current study, which was limited to 199 students from a public university in northeastern Thailand. This may limit the generalization of the results to other situations and contexts.

Reading performance is also influenced by a wide range of factors, including the readers' intelligence, educational background, language potential, learning style, motivation, attitude, and personality, all of which were not considered in this study. Indeed, the interaction between learning strategies and other factors, such as educational background, learning motivation, learning style and personality characteristics, would be fruitful avenues for future research. Additional studies in this field using larger samples obtained from the same or similar populations or learning conditions are recommended to validate the findings of the current study.



## REFERENCES



## References

- Anderson, N. J., Bachman, L., Perkins, K., & Cohen, A. (1991). An exploratory study into the construct validity of a reading comprehension test: Triangulation of data sources. *Language testing*, 8(1), 41-66.
- Anderson, J. (1983). *The Architecture of Cognition*. Harvard University Press, Cambridge, Massachusetts.
- Anderson, N. J. (1999). *Exploring second language reading: Issues and strategies*. Boston, MA: Heinle and Heinle.
- Anderson, N. J. (2002). *The role of metacognition in second language teaching and learning*. Washington: ERIC Digest. Education Resources Information Center.
- Anderson, N. J. (2005). L2 learning strategies. In E. Hinkel, editor, *Handbook of research in second language teaching and learning* (pp. 757–771). Mahwah, NJ: Lawrence Erlbaum.
- Alsamadani, H. A. (2009). *The relationship between Saudi EFL college-level students' use of reading strategies and their EFL reading comprehension*. Retrieved from [https://etd.ohiolink.edu/rws\\_etd/document/get/ohiou1224685570/inline](https://etd.ohiolink.edu/rws_etd/document/get/ohiou1224685570/inline)
- Alderson, J. C. (2000). *Assessing reading*. Cambridge: Cambridge University Press.
- Alderson, J. C., & Urquhart, A. H. (1984). *ESP Tests: The Problem of Student Background Discipline*.
- Alderson, J. C. (2005). *Diagnosing foreign language proficiency: The interface between learning and assessment*. A&C Black.
- Alexander, P. A., & Jetton, T. L. (2000). Learning from text: A multidimensional and developmental perspective. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Vol. III* (pp. 285-310). Mahwah, NJ: Lawrence Erlbaum Associates.

- Alfassi, M. (2004). Reading to learn: Effects of combined strategy instruction on high school students. *The Journal of Educational Research*, 97(4), 171-184. <https://doi.org/10.3200/JOER.97.4.171-185>
- Allan, A. (1992). Development and validation of a scale to measure test-wiseness in EFL/ESL reading test takers. *Language Testing*, 9(2), 101-122.
- Al Melhi, A. M. (2000). Analysis of Saudi college students, reported and actual strategies along with their metacognitive awareness as they read in English as a foreign language.
- Assiri, M. S. (2011). Test-taking strategy use on the reading section of the TOEFL iBT: A study of Arab ESL learners (Doctoral dissertation). ProQuest dissertation and theses database.
- Assiri, M. S., & Alodhahi, E. A. (2018). Test-taking strategies on reading comprehension tests: A review of major research themes. *Studies in English Language Teaching*, 6(3), 207-227.
- Aghaie, R., & Zhang, L. J. (2012). Effects of explicit instruction in cognitive and metacognitive reading strategies on Iranian EFL students' reading performance and strategy transfer. *Instructional Science*, 40(6), 1063-1081.
- Bachman, L. F. (1990). *Fundamental considerations in language testing*. Oxford: Oxford University Press.
- Bachman, L. F. (1991). What does language testing have to offer? *TESOL Quarterly*, 25, 671-704. <https://doi.org/10.2307/3587082>
- Bachman, L. F. & Palmer, A. S. (1996). *Language testing in practice*. Oxford: Oxford University Press.
- Bachman, L. F. (2002). Some reflections on task-based language performance assessment. *Language testing*, 19(4), 453-476.
- Baker, L. & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, editor, *Handbook of reading research* (pp. 353–394). New York: Longman.



- Bax, S. (2013). The cognitive processing of candidates during reading tests: Evidence from eye-tracking. *Language Testing*, 30(4), 441-465.
- Bazerman, C. (1985). Physicist reading physics: Schema-laden purposes and purpose-laden schema. *Written Communication*, 2(1), 3-23.  
<http://dx.doi.org/10.1177/0741088385002001001>
- Birch, B. (2002). *English L2 reading: Getting to the bottom*. Mahwah, NJ: Erlbaum.
- Block, E. (1986). The comprehension strategies of second language readers. *TESOL Quarterly*, 20(3), 463-94.
- Block, E. L. (1992). See how they read: Comprehension monitoring of L1 and L2 readers. *TESOL Quarterly*, 26, 319–343.
- Bornholt, L. J. (2002). An analysis of children's task strategies for a test of reading comprehension. *Contemporary Educational Psychology*, 27(1), 80-98.
- Bozorgian, H. (2012). Listening skill requires a further look into second/foreign language learning. *ISR Education*, 2012, 1-10.
- Brown, H. D. (1980). The optimal distance model of second language acquisition. *TESOL quarterly*, 157-164.
- Brown, A. L., Bransford, J.D., Ferrara, R.A., Campiona, J.C. (1983). "Learning, remembering and understanding." In J.H. Flavell & E. M. Markman (eds.) *Handbook of Child Psychology*. NY: Wiley.
- Brown, H. D. (1987). *Principles of language learning and teaching*. New Jersey: Prentice – Hall, Inc.
- Brown, A. L., & Palincsar, A. S. (1985). *Reciprocal Teaching of Comprehension Strategies: A Natural History of One Program for Enhancing Learning*. Technical Report No. 334.
- Brown, H. (2007). *Principles of Language Learning and Teaching* (5th edition) (pp. 132-151). New York: Pearson.

- Bunting, B.P. & Mooney, E. (2001). The effects of practice and coaching on test results for educational selection at 11 years of age. *Educational Psychology*, 21(3), 243-253.
- Carrell, P. L., & Eisterhold, J. C. (1983). Schema theory and ESL reading pedagogy. *TESOL Quarterly*, 17(4), 553. <https://doi.org/10.2307/3586613>
- Carrell, P. L. (1987). Content and formal schemata in ESL reading. *TESOL quarterly*, 21(3), 461-481.
- Carrell, P. L. (1988). Some causes of text-boundedness and schema interference in ESL reading. *Interactive approaches to second language reading*, 101-113.
- Carrell, P. L., Gasdusek, L., & Wise, T. (1998). Metacognition and EFL/ESL reading. *Instructional Science* 26(1-2), 97–112.
- Carrell, P. L., Pharis, B. G., & Liberto, J. C. (1989). Metacognitive strategy training for ESL reading. *TESOL Quarterly*, 23(4), 647-678.
- Chamot, A. U., & Kupper, L. (1989). Learning strategies in foreign language instruction. *Foreign language annals*, 22(1), 13-22.
- Chamot, A. U., & O'Malley, J. M. (1994). *The CALLA handbook: Implementing the cognitive academic language learning approach*. New York: Longman.
- Chamot, A. U., & O'Malley, J. M. (1996). The cognitive academic language learning approach: A model for linguistically diverse classrooms. *The elementary school journal*, 96(3), 259-273.
- Chamot, A. (2005). Language Learning Strategy Instruction: Current Issues and Research. *Annual Review of Applied Linguistics* 25, 112-130.
- Chalmers, J., & Walkinshaw, I. (2014). Reading strategies in IELTS tests: Prevalence and impact on outcomes. *English Australia Journal*, 30(1), 24–39.

- Chujo, K., & Oghigian, K. (2009). How many words do you need to know to understand TOEIC, TOEFL & EIKEN? An examination of text coverage and high frequency vocabulary. *The Journal of Asia TEFL* 6(2), 121–148.
- Cohen, A. D. (1986). Mentalistic measures in reading strategy research: Some recent findings. *The ESP Journal*, 5(2), 131-145. [https://doi.org/10.1016/0889-4906\(86\)90019-0](https://doi.org/10.1016/0889-4906(86)90019-0)
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2 nd edition). Erlbaum.
- Cohen, A. D. (1992). Test-taking strategies on language tests. *Journal of English and Foreign Languages*, 10-11, 90-105.
- Cohen, A. D. (1994). *Assessing language ability in the classroom*.
- Cohen, A.D. (1998). *Strategies in learning and using a second language*. London. Longman.
- Cohen, A. D. (2000). Strategies-based instruction for learners of a second language. *NASSP Bulletin*, 84(612), 10-18.
- Cohen, A. D. (2006). The coming of age of research on test-taking strategies. *Language Assessment Quarterly*, 3, 307–331. doi:10.1080/15434300701333129.
- Cohen, A. D., & Upton, T. A. (2006). Strategies in responding to the New TOEFL reading tasks (TOEFL Monograph Series Report No. 33). Princeton, NJ: Educational Testing Service. Retrieved from <http://www.ets.org/Media/Research/pdf/RR-06-06.pdf>
- Cohen, A. D. (2007). The coming of age of research on test-taking strategies. In J. Fox, M. Weshe, D. Bayliss, L. Cheng, C. Turner, & C. Doe, editors, *Language testing reconsidered*. Ottawa: Ottawa University Press.
- Cohen, A. D. (2011). Second language learner strategies. *Handbook of research in second language teaching and learning*, 2(Part V), 681-698.

- Damankesh, M., & Babaii, E. (2015). The washback effect of Iranian high school final examinations on students' test-taking and test-preparation strategies. *Studies in educational evaluation*, 45, 62-69.
- Dawadi, S. (2017). Language learning strategies profiles of EFL learners in Nepal. *European Journal of Educational and Social Sciences*, 2(2), 42-55.
- Diekhoff, G. (1992). *STATISTICS FOR THE SOCIAL AND BEHAVIORAL SCIENCES: UNIVARIANTE, BIVARIATE, MULTIVARIANTE* (No. HA29. D46 1992.).
- Dole, J. A., Duffy, G. G., Roehler, L. R., & Pearson, P. D. (1991). Moving from the old to the new: Research on reading comprehension instruction. *Review of educational research*, 61(2), 239-264.
- Duffy, G. G., Roehler, L. R., & Rackliffe, G. (1986). How teachers' instructional talk influences students' understanding of lesson content. *The Elementary School Journal*, 87(1), 3-16.
- Duke, N., & Pearson, P. D. (2002). Effective practices for developing reading comprehension. In A. E. Farstrup, & S. J. Samuels (Eds.), *What research has to say about reading instruction* (pp. 205-242). Newark, DE: International Reading association.
- Du Plooy, A. (1996). *Reading Strategies for Effective Reading Comprehension* (Unpublished Doctoral dissertation). Potchefstroom University for Christian Higher Education, Potchefstroom, North-West.
- Dunlosky, J., & Lipko, A. R. (2007). Metacomprehension: A brief history and how to improve its accuracy. *Current Directions in Psychological Science*, 16(4), 228-232.
- Durkin, D. (1993). *Teaching them to read* (6th ed.). Boston, MA: Allyn and Bacon.
- Edwards, J. (2009). Physical activity and test anxiety. *School Science and Mathematics*, 109, 5-7.

- Ericsson, K. A., and Simon, H. A. (1980). *Verbal Reports and Data*. Cambridge, MA: MIT Press.
- Farr, R., Pritchard, R., & Smitten, B. (1990). A description of what happens when an examinee takes a multiple-choice reading comprehension test. *Journal of Educational Measurement*, 27(3), 209-226.
- Flavell, J. H. (1971). First discussant's comments: What is memory development the development of? *Human Development*, 14, 272–278.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of psychological inquiry. *American Psychologist*, 34, 272–278.
- Gebril, A. (2018). Test preparation in the accountability era: Toward a learning-oriented approach. *TESOL Journal*, 9, 4–16. doi:10.1002/tesj.302
- Ghafoornia, N., & Afghari, A. (2013). Relationship between Reading Proficiency, Strategic Competence, and Reading Comprehension Test Performance: A Study of Iranian EFL Learners. *International Education Studies*, 6(8), 21-30.
- Goh, C., & Foong, K. (1997). Chinese ESL students' learning strategies: A look at frequency, proficiency, and gender. *Hong Kong. Journal of Applied Linguistics*, 2(1), 39-53.
- Gordon, C. (1987). The effect of testing method on achievement in reading comprehension tests in English as a foreign language. Unpublished MA thesis, Tel-Aviv University.
- Gonthier, C., & Thomassin, N. (2015). Strategy use fully mediates the relationship between working memory capacity and performance on Raven's matrices. *Journal of experimental psychology. General*, 144(5), 916–924. <https://doi.org/10.1037/xge0000101>

- Grabe, W. (1999). Developments in reading research and their implications for computer-adaptive reading assessment. *Issues in computer-adaptive testing of reading proficiency*, 10, 11-47.
- Green, N. M., & Oxford, R. (1995). A closer look at learning strategies, L2 proficiency, and gender. *TESOL Quarterly*, 29, 261–297.
- Gui, M., Chen, X., & Verspoor, M. (2021). The dynamics of reading development in L2 English for Academic Purposes. *System*, 102546.
- Hacker, D. J. (1998). *Self-regulated comprehension during normal reading* (pp. 179-206). Routledge.
- Hao, M., & Wang, Y. Z. (2004). Strategy Training for Learning Foreign Languages and Its influential Factors. *Journal of Taiyuan University of Technology (Social Sciences Edition)*, 03.
- Hattie, J. A. C. (2009). Visible learning. A synthesis of over 800 meta-analyses relating to achievement. London: Routledge.
- Hayati, A. M., & Ghogh, A. N. (2008). Investigating the Influence of Proficiency and Gender on the Use of Selected Test-Wiseness Strategies in Higher Education. *English Language Teaching*, 1(2), 169-181.
- Hedge, T. (2000). *Teaching and Learning in the Language Classroom*. Oxford: Oxford University Press.
- Heyneman, S. P. (1976). Influences on academic achievement: A comparison of results from Uganda and more industrialized societies. *Sociology of education*, 200-211.
- Heyneman, S. P., & Jamison, D. T. (1980). Student learning in Uganda: Textbook availability and other factors. *Comparative education review*, 24(2, Part 1), 206-220.

- Huang, S. (1997). Learning strategies of memorizing a conversation text. In J. Katchen (Ed.), *The Proceedings of the Sixth International Symposium on English Teaching*, 283-295. Taiwan: The Crane Publishing Co., Ltd
- Hudson, T. (1998). Theoretical perspectives on reading. *Annual Review of Applied Linguistics*, 18(1), 43–60.
- Hungi, N., & Postlethwaite, T. N. (2009). The key factors affecting grade 5 achievement in Laos: Emerging policy issues. *Education Research Policy Practice*, 8, 211-230.
- Iwai, Y. (2011). Metacognitive awareness and strategy use in academic English reading among adult English as a Second Language (ESL) students. ProQuest, UMI Dissertation Publishing.
- Janowicz, T. (2007). Teaching Test Taking Strategies to Improve Self-Efficacy and Academic Achievement (Chapman University College). Retrieved from Erciyes University Database.
- Jiang, X., & Smith, R. (2009). Chinese learners' strategy use in historical perspective: A cross-generational interview-based study. *System*, 37(2), 286-299.
- Joh, J., & Schallert, D. L. (2014). How conception of task influences approaches to reading: A study of Korean college students recalling an English text. *TESOL Quarterly*, 48, 715-737.
- Kashkouli, Z., & Barati, H. (2013). Type of test-taking strategies and task-based reading assessment: A case in Iranian EFL learners. *Procedia - Social and Behavioral Sciences*, 70, 1580–1589. <https://doi.org/10.1016/j.sbspro.2013.01.226>
- KASIMI, Y. (2012). Cognitive and metacognitive strategies employed by Iranian and Turkish EFL readers. *ELT Research Journal*, 1(3), 159-174.



- Kern, R. G. (1989). Second language reading strategy instruction: Its effects on comprehension and word inference ability. *Modern Language Journal*, 73(2), 135-148.
- Kintsch, W (1998). *Comprehension: A paradigm for cognition*. New York: Cambridge University Press
- Koda, K. (2005). *Insights into second language reading: A cross-linguistic approach*. (1st ed.). Cambridge: Cambridge University Press.
- Koda, K. (2007). Reading and language learning: Crosslinguistic constraints on second language reading development. *Language learning*.
- Kummin, S., & Rahman, S. (2010). The relationship between the use of metacognitive strategies and achievement in English. *Procedia – Social and Behavioral Sciences*, 7, 145-150. <http://dx.doi.org/10.1016/j.sbspro.2010.10.021>
- Lance, L. (2004). *The Effects of Teaching Test-Taking Strategies to High School Special Education Students on Achievement Scores on The New Jersey High School Proficiency Assessment*. Dissertations & theses, Widener University, Retrieved from ProQuest
- Lee, J. Y. (2011). *Second language reading topic familiarity and test score: test-taking strategies for multiple-choice comprehension questions*. (Doctoral dissertation). The University of Iowa.
- Lee, J. Y. (2018). The Use of Test-Taking Strategies and Students' Performances in Answering TOEIC Reading Comprehension Questions. *Taiwan Journal of TESOL*, 15(2), 33-64.
- Li L, Chen PS, & Jiang YH. (2006). *Strategies - Styles - Attributions - Learning to Learn English*. [C]. Shanghai: Shanghai Foreign Language Education Press.
- Li, J. (2020). Development and validation of second language online reading strategies inventory. *Computers & Education*, 145. <https://doi.org/10.1016/j.compedu.2019.103733>, 103733.

- Liao, C., Qu, Y., & Morgan, R. (2010). The relationships of test scores measured by the TOEIC listening and reading test and TOEIC speaking and writing tests. Princeton: Educational Testing Services.
- Lockheed, E. M., Fuller, B., & Nyirongo, R. (1989). Family effects on students' achievement in Thailand and Malawi. *Sociology of Education*, 62 (4), 239-256
- Macaro, E., & Erler, L. (2008). Raising the achievement of young-beginner readers of French through strategy instruction. *Applied Linguistics*, 29(1), 90–11.
- Mastropieri, M.A., Scruggs, T.E. (1997). Best practices in promoting reading comprehension in students with learning disabilities 1976 to 1996. *Remedial and Special Education*, 18, 197-213.
- McNamara, D. S., & Kintsch, W. (1996). Learning from texts: Effects of prior knowledge and text coherence. *Discourse processes*, 22(3), 247-288.
- Sari, M.I., (2016). Cognitive and Metacognitive Reading Strategy Use and Reading Comprehension Performance of Indonesian EFL Pre-Service Teachers. *Journal of Foreign Language Teaching & Learning*, Vol.1(No. 2).
- Mokhtari, K., & Sheorey, R. (2008). Reading strategies of first- and second-language learners: See how they read. Norwood, MA: Christopher-Gordon.
- Naeini, M.B., & Rezaei, R. (2015). Examining and dealing with the issue of reading strategy use by Iranian EFL learners. *The Reading Matrix: An International Online Journal*, 15(2), 182-195.
- Nikolov, M. (2006). Test-taking strategies of 12-and 13-year-old Hungarian Learners of EFL: Why whales have migraines. *Language Learning*, 56, 1-51.
- O'Malley, M. J. & Chamot, A. U. (1990). Learning strategies in second language acquisition. Cambridge: Cambridge University Press.

- Oxford, R. (1990). *Language learning strategies: What every teacher should know*. Boston, MA: Heinle and Heinle.
- Oxford, R. (2011). *Teaching and researching language learning strategies*. Routledge.
- Palincsar, A. (1986). Metacognitive strategy instruction. *Exceptional Children*, 53(2), 118-124.
- Paris, S. G. (2002). When is metacognition helpful, debilitating, or benign? In P. Chambers, M. Izaute, & P. Marescaux (Eds.), *Metacognition: Practice, function, and use* (pp. 105–120). Boston, MA: Springer.
- Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. *Contemporary educational psychology*, 8(3), 293-316.
- Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed Strategies for Learning: A program to improve children's reading awareness and comprehension. *Journal of Educational psychology*, 76(6), 1239.
- Pammu, A., Amir, Z., & Maasum, T. N. R. T. M. (2014). Metacognitive reading strategies of less proficient tertiary learners: A case study of EFL learners at a public university in Makassar, Indonesia. *Procedia-Social and Behavioral Sciences*, 118, 357-364.
- Pan, Y. C. (2010). Enhancing students' communicative competency and test-taking skills through TOEIC preparatory materials. *Tesol Journal*, 3, 81-91.
- Pearson, P. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology*, 8(3), 317-344.
- Phakiti, A. (2003b). A closer look at the relationship of cognitive and metacognitive strategy use to EFL reading comprehension test performance. *Language Testing*, 20, 26–56.
- Phakiti, A. (2003a). A closer look at gender differences in strategy use in L2 reading. *Language Learning*, 53, 649–702.

- Phakiti, A. (2006). Modeling cognitive and metacognitive strategies and their relationships to EFL reading test performance. *Melbourne papers in language testing*, 11(1), 53-94.
- Phakiti, A. (2008). Construct validation of Bachman and Plamer's (1996) strategic competence model over time in EFL reading tests. *Language Testing*, 25, 237–272. <https://doi.org/10.1177/0265532207086783>.
- Phakiti, A. (2009). A closer look at gender and strategy use in L2 reading. *Language Learning*, 53, 649- 702
- Plonsky, L. (2011). The effectiveness of second language strategy instruction: a meta-analysis. *Language Learning*, 61, 993–1038. doi:10.1111/j.1467-9922.2011.00663.x
- Pitts, M. M. (1983). Comprehension monitoring: definition and practice. *Journal of Reading*. 26, 516-23.
- Pourdana, N., Bornaki, F., Moayedi Fard, Z., & Sarkhosh, S. Z. (2012). Test-taking strategies and performance on reading comprehension tests by Iranian EFL learners. *International Journal of Applied Linguistics & English Literature*, 1(2), 138-153.
- Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Lawrence Erlbaum.
- Pressley, M., Brown, R., El-Dinary, P., & Afflerbach, P. (1995). The comprehension instruction that students need: Instruction fostering constructively responsive reading. *Learning Disabilities Research & Practice*, 10(4), 215-224
- Pressley, M. (2000). What should comprehension instruction be the instruction of? In M.L. Kamil, P.B. Mosenthal, P.D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Volume III*. Mahwah NJ: Erlbaum.

- Pritchard, R. (1990). The effects of cultural schemata on reading processing strategies. *Reading research quarterly*, 273-295.
- Psaltou-Joycey A. (2010). Language learning strategies in the foreign language classroom. (1st ed.). Thessaloniki: University Studio Press.
- Purpura, J.E. (1997). An analysis of the relationships between test-takers' cognitive and metacognitive strategy use and second language test performance. *Language Learning*, 47, 289 – 325.
- Purpura, J.E. (1999). Learner strategy use and performance on language tests: a structural equation modeling approach. Cambridge: University of Cambridge Local Examinations syndicate and Cambridge University press.
- Purpura, J. E. (2016). Second and Foreign Language Assessment. *The Modern Language Journal*, 100, 190–208. <http://www.jstor.org/stable/44135003>
- Rivers, W.P. (2001). Autonomy at all costs: An ethnography of metacognitive self-assessment among experienced language learners, *Modern Language Journal*, 85(2), 279-290.
- Rumelhart, D.E. (1994). Toward an interactive model of reading. In R.B. Ruddell, M.R. Ruddell, & H. Singer (Eds.). *Theoretical models and processes of reading* (5th ed). 1149-1179. Newark, DE: International Reading Association.
- Rupp, A. A., Ferne, T., & Choi, H. (2006). How assessing reading comprehension with multiple-choice questions shapes the construct: A cognitive processing perspective. *Language testing*, 23(4), 441-474.
- Scharnagl, T. (2004). The Effects of Test Taking Strategies on Students' Reading Achievement. Dissertations & theses, Union Institute and University Cincinnati, Ohio, Retrieved from ProQuest
- Segalowitz, S. J., & Cohen, H. (2003). *Brain and Cognition*, 52(1), 1. [https://doi.org/10.1016/s0278-2626\(03\)00158-1](https://doi.org/10.1016/s0278-2626(03)00158-1).

- Sheorey, R., & Mokhtari, K. (2001). Differences in the metacognitive awareness of reading strategies among native and non-native readers. *System*, 29, 431-449.
- Singhal, M. (2001). Reading proficiency, reading strategies, metacognitive awareness and L2 readers. *The Reading Matrix*, 1(1), 1-23.
- Scharnagl, T. (2004). The Effects of Test Taking Strategies on Students' Reading Achievement. Dissertations & theses, Union Institute and University Cincinnati, Ohio, Retrieved from ProQuest.
- Sukyng, A. (2021). Choices of Language Learning Strategies and English Proficiency of EFL University Learners. *LEARN Journal: Language Education and Acquisition Research Network*, 14(2), 59-87.
- Song, M. J. (1998). Teaching reading strategies in an ongoing EFL university reading classroom. *Asian Journal of English Language Teaching*, 8(1), 41-54.
- Song, X. (2004). Language learning strategy use and language performance for Chinese learners of English. Unpublished master's thesis. Ontario: Queen's University, Kingston, Canada.
- Song, X. (2005). Language learner strategy use and English proficiency on the Michigan English Language Assessment Battery. *Spain Fellow Working Papers in Second or Foreign Language Assessment*, 3, 1-26.
- Song, X., & Cheng, L. (2006). Language learner strategy use and test performance of Chinese learners of English. *Language Assessment Quarterly*, 3, 243-266. [https://doi.org/10.1207/s15434311laq0303\\_2](https://doi.org/10.1207/s15434311laq0303_2).
- Thamraksa, C. (2005). Metacognition: A key to success for EFL learners. *BU Academic Review*, 4(1), 95-99.
- TOEIC assesses English language skills with accuracy. (1997, April 1). *The Daily Yomiuri*, p. 9.

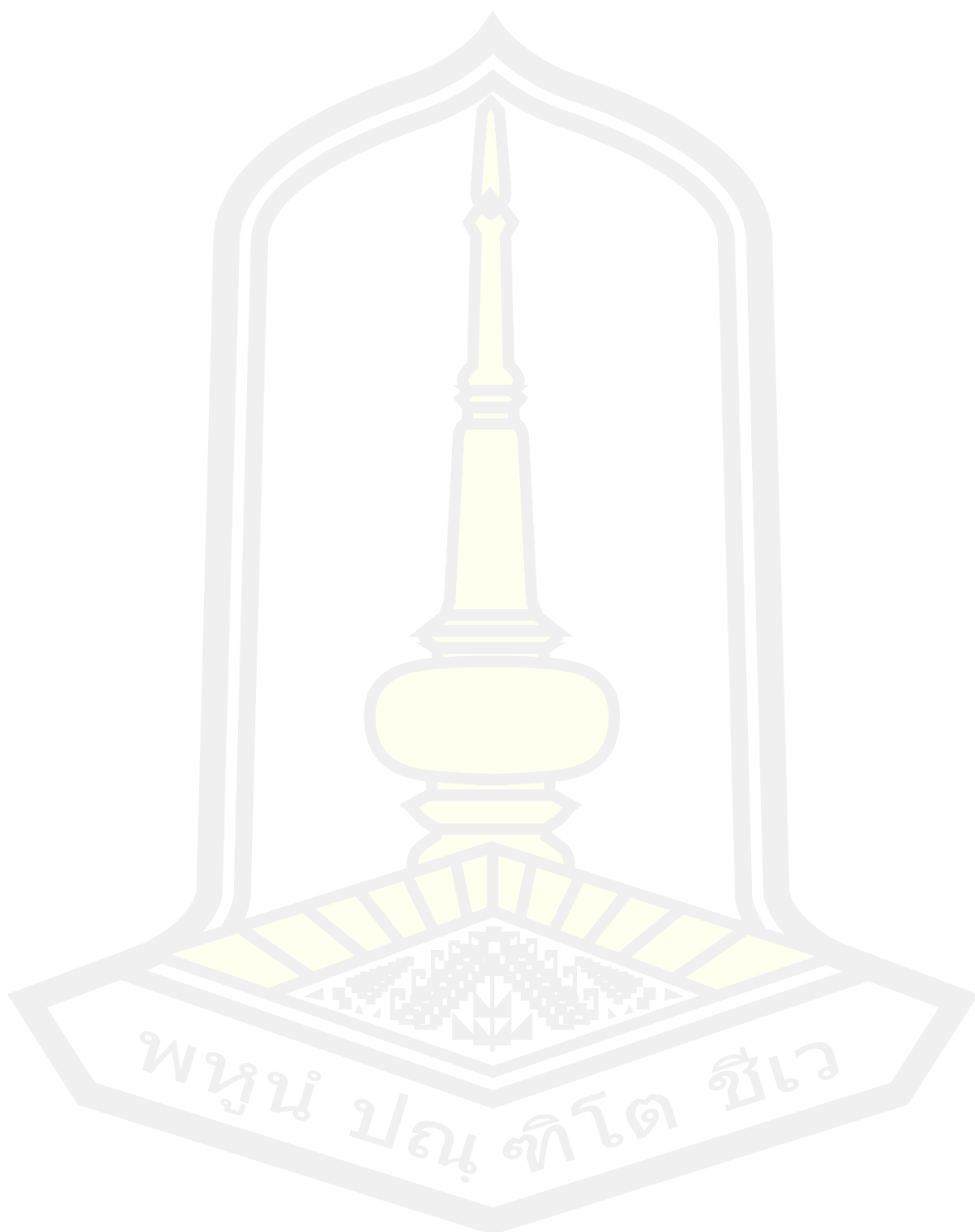
- Tunaz, M., & Gülden, T. Ü. M. (2019). Test-taking strategies and students' achievement in EFL reading tests. *Journal of Language and Linguistic Studies*, 15(1), 140-150.
- Urquhart, A. H., & Weir, C. J. (1998). Reading in a second language: Process, product and practice. London and New York: Longman.
- Urquhart, A. H., & Weir, C. J. (2014). Reading in a second language: Process, product and practice. New York, NY: Routledge.
- Upton, T. A., & Lee-Thompson, L.-C. (2001). THE ROLE OF THE FIRST LANGUAGE IN SECOND LANGUAGE READING. *Studies in Second Language Acquisition*, 23(4), 469–495.  
<http://www.jstor.org/stable/44486958>
- Veenman, M. V. J., & Alexander, P. (2011). Learning to self-monitor and self-regulate. In R. Mayer & P. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 197–218). New York: Routledge.
- Wang, J. (2011). A study of English self-efficacy, English reading strategies, and English reading proficiency of Taiwanese Junior high school students. Ming Chuan University, Taiwan.
- Wang, M. (2012). Effects of cooperative learning on achievement motivation of female university students. *Asian social science*, 8(15), 108.
- WANG, J. H. Y., & Guthrie, J. T. (2004). Modeling the effects of intrinsic motivation, extrinsic motivation, amount of reading, and past reading achievement on text comprehension between US and Chinese students. *Reading research quarterly*, 39(2), 162-186.
- Waiprakhon, T., (2018). Test-Taking Strategies Used in the Reading Section of the Test of English for Thai Engineers and Technologists: A Computer-Based ESP Test. *PASAA, Volume 55*.



- Webb, S. A., & Chang, A. C. S. (2012). Second language vocabulary growth. *RELC Journal*, 43(1), 113–126.
- Wenden, A. L., (1991). *Learner strategies for learner autonomy: Planning and implementing learner training for language learners*. Hertfordshire, UK: Prentice-Hall International.
- Wernke, S., Wagener, U., Anschuetz, A., & Moschner, B. (2011) Assessing cognitive and metacognitive learning strategies in school children: Construct validity and arising questions. *The International Journal of Research and Review*, 6 (2).
- William, M., & Burden, R. (1997). Motivation in language learning: A social constructivist perspective. *Les Cahiers l'APLIUT*, 19-27.
- Xia, Y. (2011). Efficient reading in standardized tests for EFL learners: a case study of reading strategies used by Chinese English major students in TEM-4. Retrieved in March 20, 2014 from: <http://www.diva-portal.org/smash/record.jsf?pid=diva2:429440>
- Xu, Y.T. (2004). The relationships among junior high school students' foreign language anxiety, EFL learning motivation strategy. National Digital Library of Theses and Dissertations in Taiwan, 092NCKU5331002
- Yang, Y. (2002). Reassessing readers' comprehension monitoring. *Reading in a Foreign Language*, 14(1), 18-42.
- Yan, J., & Cai, Y. (2021). Teachers' Instruction of Reading Strategies and Primary School Students' Reading Literacy: An Approach of Multilevel Structural Equation Modelling. *Reading & Writing Quarterly*, 1-17.
- Zare, P. (2013), Exploring reading strategy use and reading comprehension success among EFL Learners. *World Applied Sciences Journal*, 22(11), 1566-1571.

- Zarra-Nezhad, A., Shooshtari, Z. G., & Vahdat, S. (2015). The effects of attitude & motivation on the use of cognitive & metacognitive strategies among Iranian EFL undergraduate readers. *English Linguistics Research*, 4(4), 11-22.
- Zhang, L. J. (2004). Reforming a teacher education program for PRC EFL teachers in Singapore: Sociocultural considerations and curriculum evolution. *International Journal of Educational Reform*, 13, 223–252.
- Zhang, L. J., Gu, P. Y., & Hu, G. (2008). A cognitive perspective on Singaporean bilingual children's use of reading strategies in learning to read in English. *British Journal of Educational Psychology*, 78, 245–271.
- Zhang, F., Wu, P., Huo, R. et al. (2009). Design and Implementation of Integrated Monitoring System for Meteorological Information Network Based on CS Structure. *Meteorological and Environmental Sciences*, 32, 279-282.
- Zhang, L., & Zhang, J. L. (2013). Relationships between Chinese college test takers' strategy use and EFL reading test performance: A structural equation modeling approach. *RELJ Journal*, 44(1), 35–37. <https://doi.org/10.1177/0033688212463272>.
- Zhang, L., & Seepho, S. (2013). Metacognitive Strategy Use and Academic Reading Achievement: Insights from a Chinese Context. *Electronic Journal of Foreign Languages Teaching*, 10, 54-69.
- Zhu, X., Li, G. Y., Cheong, C. M., Yu, G., & Liao, X. (2021). Secondary school students' discourse synthesis performance on Chinese (L1) and English (L2) integrated writing assessments. *Reading and Writing*, 34(1), 49-78.

**APPENDIXES**

**Appendix I: TOEIC Reading Test**

This study is a part of a research project which is in partial fulfillment of the requirements for Master of Education program in English Language Teaching, Mahasarakham University. This test is used to divide participants into three levels of proficiency (high, medium, and low-level proficiency groups), and the score has no bearing on academic performance.

Please kindly complete all items in this reading test and note that your answers will be kept confidential and used only for academic purposes.

**The TOEIC reading test is divided into two parts as follows.**

Part 1: Participant's background information

Part 2: The TOEIC reading test

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**Part 1:** Participant's background information

**Directions:** Please read each question carefully, put a checkmark ( ✓ ) or fill in the blank that corresponds to your personal information.

1. Gender

(    ) Male

(    ) Female

2. Age: \_\_\_\_\_ years

3. No. of year learning English: \_\_\_\_\_

4. Affiliation/ Institution/Company: \_\_\_\_\_

5. Major: \_\_\_\_\_

6. Are you willing to participate in a voluntary interview? (Please provide your email address if you volunteer to be interviewed)

\_\_\_\_\_

## Part 2: The TOEIC reading test

**Directions:** Read the texts below. You are encouraged to answer as many questions as possible within the time allowed. For each empty space, select the best answer to complete the text. Then mark the letter (A), (B), (C), or (D). Please complete all items within 60 minutes.

**Questions 1 - 4 refer to the following article.**

Most consumers are familiar with bar codes. Those black-and-white stripes appear on almost every product purchased. Often the codes are scanned at the checkout counter, causing the item name and its price to appear on 1 the cash register screen and the receipt. This gives a record to the consumer and helps store management monitor inventory. Many delivery services use bar codes to track the progress of each envelope, package, or crate in transit. Every item 2 a bar code, which is read at a number of points from the moment it leaves the sender's hands to the moment the recipient accepts the delivery.

An interesting use for the bar code has been developed by a scientist who works with bees. The scientist attached bar codes to the backs of individual bees in order to 3 them and to follow their movements. Laser scanners at the entrance of the hive read the bar codes to monitor how long each bee had been gone from the hive. By keeping 4 of individual bees, scientists hope to learn more about honey production. Knowing how far bees travel to gather pollen and how many trips they make back to the hive could eventually help beekeepers predict honey yields.

- |                           |                |
|---------------------------|----------------|
| 1. (A) so                 | (C) each       |
| (B) either                | (D) both       |
| 2. (A) having been issued | (C) is issued  |
| (B) issuing               | (D) to issue   |
| 3. (A) identify           | (C) contradict |
| (B) mention               | (D) speculate  |
| 4. (A) tracking           | (C) tracked    |
| (B) to track              | (D) track      |

Questions 5- 8 refer to the following excerpt from a magazine story.

The "Real" Piryanka Sundarajan

By Ranjit Singh, Staff Reporter

While much has been written about famous media mogul Piryanka Sundarajan, little is known about many aspects of her private life. Ms. Suandarajan is married and has two sons. 5 her childhood in Indonesia, where her father was posted with the National Bank of India. Ms. Sundarajan retains fond memories of the country. "I was 6 by everything about Indonesia- specially the architecture."

At United Media Corporation, 7 Ms. Sundarajan founded as a young college graduate, she is recognized as a tough negotiator. However, she is even better known for her ability to 8 quality employees satisfied: hardly one person from the company's senior staff—be it director, general manager, or deputy general manager—has left the organization in the last fifteen years. Employee's attribute this to Ms. Sundarajan's outstanding leadership qualities.

5. (A) to spend

(B) when she had spent

(C) While spending

(D) She spent

6. (A) fascinated

(B) appealed

(C) enjoyed

(D) appreciated

7. (A) which

(B) where

(C) who

(D) what

8. (A) obtain

(B) keep

(C) hire

(D) stay



Questions 9-12 refer to the following e-mail.

To: Karen Jankowski <kjankowski@metromail.net>

From: Selma Arcui <selma@boonerentals.com>

Date: January 4

Subject: Unit 208

Dear Ms. Jankowski,

Thank you for giving written notice about your plans 9 your lease agreement on January 31. I have attached information about the process. 10 we visit your apartment for a final inspection, you should have all of your personal belongings removed from the property. Be sure to leave 11 time to thoroughly clean the apartment. It should be in the same condition in which you received it, with all surfaces dusted, carpets vacuumed, and countertops scrubbed. 12.

Should you have any questions, please feel free to e-mail me at any time.

Sincerely,

Selma Arcui

Property Manager, Boone Rentals

9. (A) terminate (C) terminated  
(B) terminating (D) to terminate
10. (A) Now that (C) Before  
(B) As long as (D) Even if
11. (A) imperative (C) dependable  
(B) complete (D) adequate
12. (A) You can enjoy a tidy living environment.  
(B) Therefore, the final rent payment will be in January.  
(C) Our staff will attempt to fix it for you, if possible.  
(D) We charge a housekeeping fee if this is not done.

Questions 13-14 refer to the following e-mail message.

From: Megan Campbell

To: Marta Apter

Marta:

I'm sorry I didn't respond to your e-mail earlier. I had a problem with my e-mail system for a few days, and I wasn't able to retrieve new messages. I would be delighted to take on the assignment you propose. Please send me all the details about the project and the deadline. I will be out of town next week, but I look forward to hearing from you.

Megan

13. What is Megan's main purpose in writing this e-mail?

- (A) To apologize to Marta for not finishing an assignment
- (B) To tell Marta she will accept an assignment
- (C) To tell Marta she will be unable to complete an assignment on time
- (D) To explain to Marta her problems with an assignment

14. Why did Megan not respond to Marta earlier?

- (A) She needed to work on another project.
- (B) She was not able to accept new work.
- (C) She was out of town.
- (D) She had a computer problem.

Questions 15-16 refer to the following form.

Marigola Industries	
Information Technology Department	
Name: <u>Ravi Sehgal</u>	Employee ID: <u>1394</u>
Department: <u>Marketing</u>	Extension: <u>24</u>
Item #: <u>30429</u>	
Description: <u>Portable projector</u>	
Comments: <u>For use in Conference Room B</u>	
Check-out Date: <u>January 18</u>	
.....	
FOR OFFICE USE ONLY	
Note: <u>To be returned by user within 24 hours. IT team will not retrieve the item.</u>	
Approved by: <u>Kristin Neri</u>	Date: <u>January 18</u>

15. Why did Mr. Sehgal submit the form?

- (A) To reserve a meeting space.
- (B) To place a supply order.
- (C) To borrow a device.
- (D) To ask for a repair service.

16. What does Mr. Sehgal most likely plan to do?

- (A) Inspect a conference room
- (B) Drop off an item person
- (C) Revise a departmental budget
- (D) Receive an express delivery

**Questions 17-19 refer to the following letter.**

*Excelon Travel Services, Inc.  
711 Market Street  
San Francisco, California 94102*

Dear Mr. Mirza:

Thank you for giving Excelon Travel Services the opportunity to arrange your family's vacation travel plans. As an additional service to you, we have provided an overview of your travel and hotel arrangements (all times are local):

<u>Date</u>	<u>Flight No.</u>	<u>Place/Time Depart</u>	<u>Place/Time Arrive</u>
March 3	CM 045	San Francisco-8:40 A.M.	Honolulu-10:50A.M.
March 10	CM 1226	Honolulu-1:00 P.M.	San Francisco-8:50A.M.

Upon your arrival at Honolulu, your rental car will be waiting for you-- just go to the Fritz Rentals service desk. As we discussed, room reservations have been made at the Mahalo Hotel; directions to the hotel will be available at the car rental desk.

We pride ourselves on over twenty years of providing the highest level of customer satisfaction and would very much appreciate your feedback on your experience with Excelon Travel Services. To help us continue to improve, please visit our Web site at [www.excelonts.com](http://www.excelonts.com) and fill out our customer satisfaction survey.

Once again, thank you very much for your business.

Sincerely,

*Janet S. Ono*

Janet S. Ono

Customer Service Associate

Excelon Travel Services

17. Why will Mr. Mirza travel to Honolulu?

- (A) To conduct a business transaction
- (B) To attend a conference
- (C) To set up a Web site
- (D) To go on vacation with his family

18. Where will Mr. Mirza get directions?

- (A) At the travel agency
- (B) At the Fritz Rentals desk
- (C) At the Mahalo Hotel
- (D) At Excelon's Web site

19. What does Ms. Ono ask Mr. Mirza to do?

- (A) Call her when he gets to Honolulu
- (B) Send payment as soon as possible
- (C) Complete a survey
- (D) Give her his e-mail address

Questions 20-22 refer to the following schedule.

**Spelter Martial Arts Center**

Instructor Schedule: Monday, May 3

	Studio A	Studio B	Studio C
7 A.M.	Hapkido [Beginner] Eric Charron	Hapkido [Intermediate] Alicia Kent	Judo [Advanced] Jeffrey Mrianda
8 A.M.	KungFu [Intermediate] Jeffrey Mrianda	Taekwondo[Intermediate] Eric Charron	Taekwondo[Beginner] Veronica Lawson
9 A.M.	Hapkido [Intermediate] Veronica Lawson	Judo [Advanced] Ian Scalia	Hapkido [Beginner] Alicia Kent
1 P.M.	Taekwondo[Intermediate] Eric Charron	KungFu [Beginner] Alicia Kent	Judo [Intermediate] Ian Scalia
6 P.M.	Taekwondo [Beginner] Veronica Lawson	Krav Maga [Beginner] Ian Scalia	Taekwondo[Advanced] Raymond Alvarez
7 P.M.	KungFu [Intermediate] Jeffrey Mrianda	Judo [Beginner] Raymond Alvarez	KungFu [Advanced] Alicia Kent
8 P.M.	Judo [Beginner] Raymond Alvarez	[none]	Taekwondo[Advanced] Veronica Lawson
Notes: Since we've just added Krav Maga to our class list, we're not sure how many people will be in attendance. Eric Charron may take on another evening class in this discipline if it proves to be popular. Before each session, make sure the mats, head guards, and gloves (if used) are in a good state of repair.			

20. What is suggested about the center?

- (A) Advanced classes are held exclusively in Studio C.
- (B) Monday is its least busy day of the week.
- (C) Hapkido is available at three different levels.
- (D) Mr. Alvarez only teaches there in the evening.

21. Who is currently teaching the newest class?

- (A)Mr. Charron (C)Mr. Miranda  
(B)Ms. Lawson (D)Mr. Scalia

22. What are the instructors asked to do?

- (A) Report scheduling errors to a manager.  
(B) Lock each studio's door at night.  
(C) Track some student numbers.  
(D)Examine some gear for damage.

**Questions 23-25 refer to the following memorandum.**

**Memorandum**

To: Motor Pool Users

From: Hafid Benabou, Director Date: February 27

Subject: Motor Pool Checkout Card

Company policy states that everyone who uses a company vehicle must have a valid motor pool checkout (MPC) card. All MPC cards will expire April 30.

Current cardholders should apply for renewal by March 31. New cards will be approved only for employee drivers fulfilling the requirements below.

1. Vehicles are lent ONLY to carry out company business.
2. All drivers must be in compliance with all current motor vehicle laws.
3. All drivers must complete an eight-hour National Safety Council (NSC) defensive driving course before an MPC card will be issued.

Please fax MPC card requests to Mark Fernandez (1149 27384). Include your driver's license number and expiration date, a certified copy of your driving record (obtainable from the central police station), and a copy of your NSC defensive driving certificate. To enroll in the defensive driving course (next session, March 15), phone Jennifer Latourche (ext. 2525).



23. What is the purpose of the memo?
- (A) To announce a change in staffing assignments
  - (B) To notify employees of a new course
  - (C) To remind employees of a company policy
  - (D) To introduce new staff members
24. When does the next driving course start?
- (A) February 27
  - (B) March 15
  - (C) March 31
  - (D) April 30
25. What does NOT need to be faxed with the card request?
- (A) Driver's license information
  - (B) A copy of a driving course certificate
  - (C) A copy of a driving record
  - (D) A copy of the old MPC card

Questions 26-29 refer to the following e-mail.

To: Florian Krueger <[f.krueger@kruegersconfections.com](mailto:f.krueger@kruegersconfections.com)>

From: Hannah Choi <[choihannah@almontebank.com](mailto:choihannah@almontebank.com)>

Date: February 10

Subject: From Almonte Bank

Dear Mr. Krueger:

I'm sorry I missed your telephone call yesterday. In response to your question in the message that you left, I can confirm that your loan application is moving along nicely. We are awaiting confirmation of your credit score, and I have also determined that the debt-to-income ratio for this loan is reasonable.

There are a few documents that I still require. I know that you have six years' worth of business tax records, but we only require three for our purposes. These should be single certified copies of your yearly tax summary from the National Treasury Department. In addition, I need a detailed account of how the funds will be used. Your application only stated "building expansion," but we need a more thorough explanation, including an itemized list of services and materials. I've attached the form you need. You can visit [www.almontebank.com/forms/b451.html](http://www.almontebank.com/forms/b451.html) to see a sample form that is filled out so you know what to do.

All completed documents should be mailed to my office, the address for which appears at the top of the attached form. You may submit the documents anytime, but the sooner you do, the sooner we can issue the funds. If you have any questions, please do not hesitate to contact me.

Best regards,

Hannah Choi

Loan Agent, Almonte Bank

26. Why did Mr. Krueger call Ms. Choi on February 9?

- (A) To check the status of an application.
- (B) To introduce a small business.
- (C) To request a business loan.
- (D) To inquire about a tax document.

27. What is suggested about Mr. Krueger's business?
- (A) Its offices have undergone renovations.
  - (B) It has been in operation for six years.
  - (C) It supplies services to Almonte Bank.
  - (D) It recently moved to a different location.
28. Why should Mr. Krueger visit the Web site mentioned?
- (A) To view an example.
  - (B) To create an account.
  - (C) To upload a form.
  - (D) To see opening times.
29. What is indicated about the relevant paperwork?
- (A) It can be scanned and sent by e-mail.
  - (B) It must be signed in front of Ms. Choi.
  - (C) There must be multiple copies of each page.
  - (D) There is no deadline for its submission.

Questions 30-32 refer to the following information.

<p>Milltown Community Theater</p> <p>Board Meeting Minutes</p> <p>Sunday, November 16</p> <p>Milltown Public Library</p> <p><u>OPENING:</u> President Eliot Rogers conducted the meeting. He introduced the new board member, Anita Russell. Ms. Russell has volunteered at the theater since its beginning. She most recently worked to successfully secure financial support for next season's productions.</p> <p><u>MINUTES:</u> Minutes from the September 28 meeting were approved with minor corrections.</p> <p><u>FINANCIAL REPORT:</u> The financial statements from October were reviewed by Patty Schmidt, Treasurer. She explained that recent reductions noted in the operating fund were due to a rise in the price of heating oil. Schmidt noted that a grant has been received from the Acme Savings Bank. These funds will be used to initiate a summer program for children.</p> <p><u>DEVELOPMENT COMMITTEE:</u> Members of the committee led discussions of recent attempts to obtain new grants, other fund-raising possibilities, and an initiative to attract publicity for the theater through local businesses.</p> <p><u>NEXT BOARD MEETING:</u> The next meeting of the board will be on Sunday, January 25, at 2:00 P.M. in the Milltown Public Library.</p> <p>Meeting adjourned at 3:45 P.M.</p> <p>Respectfully submitted,</p> <p><i>Nancy Fordham</i></p> <p>Nancy Fordham</p>
---

30. Who was in charge of conducting the meeting?

- (A) Eliot Rogers
- (B) Anita Russell
- (C) Patty Schmidt
- (D) Nancy Fordham

31. What has recently increased?

- (A) The cost of gifts for new board members
- (B) Fees for administering a grant
- (C) Expenses for a summer program for children
- (D) The cost of heating fuel

32. What was NOT discussed in the meeting?

- (A) Efforts to increase funding
- (B) Advertising in the local community
- (C) Plans to attract new volunteers
- (D) The report of the September meeting

**Questions 33-36 refer to the following information.**

Peterson Turbines 500 Main Boulevard Peoria, IL 55490
June 20 Mr. Fred Higgins President First Rate Lawn Supply 31 Nightshade Street Peoria, IL 55490 Dear Mr. Higgins: <p>Three years ago, we chose to buy lawn sprinkler valves from you for our new headquarters because we knew of you as a neighborhood business that lives up to the reputation of its company slogan: "Quality is our main priority."</p> <p>As you may recall, your sales representative Andrew Peters spoke to me at length about our needs. I told him that we were more interested in durability than in saving a few dollars. Andrew said that you carried both brass and plastic valves, brass for \$75 each and plastic for \$50 each, both from reliable manufacturers. We knew that the brass is usually good for 6 years. Andrew assured us that the plastic would hold up as well, if not better.</p> <p>On Andrew's recommendation our company purchased 48 plastic automatic sprinkler valves from you. Over the past 3 months the sleeve connecting the top of the valve to the main water pipe has burst or cracked on 12 of the valves. Last Sunday one-third of the lawn was flooded for a full day, since 2 valves broke while our small maintenance crew was out handling a problem in another building across town. The result is that besides repairing considerable damage to the lawn (estimates run about \$1,000), we will need to replace the 12 valves.</p> <p>We are aware that our warranty expired a year ago. However, since the plastic valves were purchased on your recommendation, we think you should be willing to stand behind your work and provide the labor to install brass valves. We are willing to pay for the new valves themselves.</p> <p>Sincerely yours, <i>Maria Palmer</i> Maria Palmer Maintenance supervisor</p>

33. When did Peterson Turbines purchase valves from First Rate Lawn Supply?
- (A) Three months ago
  - (B) Six months ago
  - (C) One year ago
  - (D) Three years ago
34. Why did Peterson Turbines choose to do business with First Rate Lawn Supply?
- (A) First Rate had offered a substantial discount.
  - (B) First Rate had a reputation for commitment to quality.
  - (C) First Rate had the best selection of products.
  - (D) First Rate had relocated to a convenient neighborhood.
35. Who is Andrew Peters?
- (A) An employee of First Rate Lawn Supply
  - (B) The owner of Peterson Turbines
  - (C) A colleague of Maria Palmer
  - (D) A salesperson at the valve manufacturer
36. What does Maria Palmer ask Mr. Higgins to do?
- (A) Repair damage to her lawn
  - (B) Pay the water-damage bill
  - (C) Provide workers to replace the valves
  - (D) Pay for new brass valves



Questions 37-40 refer to the following information.

Department of International Business  
Bangkok Business University  
1855 Henry Dunant Road \* Bangkok 10330

March 30  
Ms. S. Veratanavanit  
Diwikar Oil and Gas Corporation  
Bangkok

Dear Ms. Veratanavanit,

I am writing to thank you for authorizing Mr. Shinawakra of your staff to arrange a very fruitful visit by fifteen graduate students and faculty from the Bangkok Business University to the Diwikar Oil and Gas Corporation. Mr. Shinawakra planned a very interesting round-table discussion in the morning with several of your senior executives responsible for strategy implementation, concentrating in particular upon consumer behavior, cost dynamics, and corporate social responsibility-some of my students, particular areas of interest.

After eating lunch with the group, Mr. Shinawakra presented a very professional summary of career opportunities in corporate Thailand, especially at Diwikar Corporation. As a former executive of Diwikar, I was pleased that he did such an excellent job representing the company. We were all extremely impressed by his professional demeanor and the attention he gave to many details of the visit.

Very truly yours,  
*Thaksin Panupong*  
Thaksin Panupong

37. What is the purpose of this letter?

- (A) To commend a company employee
- (B) To authorize an official visit
- (C) To arrange for a discussion
- (D) To explore future collaborations

38. Where does Thaksin Panupong work?
- (A) At an accounting office
  - (B) At a travel agency
  - (C) At a university
  - (D) At an engineering firm
39. Which of the following did the visitors NOT do in the afternoon?
- (A) Eat lunch with Mr. Shinawakra
  - (B) Take a tour of Diwikar Corporation
  - (C) Learn about corporate Thailand
  - (D) Hear about career opportunities
40. What does Thaksin Panupong say about Mr. Shinawakra?
- (A) He works in the human resources department.
  - (B) He has a good sense of humor.
  - (C) His position is senior executive.
  - (D) He is attentive to detail.

**Questions 41–45 refer to the following advertisement and e-mail.**

**Graphic Designer** wanted. Design and create graphics for weekly newspaper. University degree in communication art or design necessary, plus one year of job-related experience. Familiarity with publishing helpful. Applicants should also possess knowledge of current trends in technology. Send resume by July 5 to Betty Kang, *Computer Times Weekly*, 225 Gamble St., Vancouver, BC V5Z1M2 or [bkang@computertw.com](mailto:bkang@computertw.com)

From: Tanaka, Stephen  
 To: Kang, Betty  
 Cc:  
 Subject: Graphic Designer Position Sent: Fri 6/15 11:33 AM  
 Dear Ms. Kang:

I am writing in response to your advertisement for a graphic designer that appeared in the May 30 issue of the *BC Bulletin*. I believe I am very qualified for this position. As you will see from my attached résumé, I have a college degree in communication design and have worked as a graphic designer in Los Angeles for the past two years. I will be relocating to the Vancouver area on August 1, and I am available for employment from that time.

Please do not hesitate to contact me if you need additional information. I will be happy to supply references and to submit a portfolio of my designs.

Sincerely,  
 Stephen Tanaka  
 stanaka@email.net

41. Where does Betty Kang work?

- (A) At a university (C) At a computer store  
 (B) At a public-relations firm (D) At a newspaper

42. What is NOT mentioned as a requirement for the position?

- (A) Former employment in graphic design  
 (B) Knowledge of computer programming  
 (C) A college degree in the field  
 (D) Familiarity with recent developments in technology

43. By what date should applicants respond to Betty Kang?

- (A) May 30 (C) July 5  
 (B) June 15 (D) August 1

44. Why does Stephen Tanaka mention his work in Los Angeles?

(A) He has more experience than the minimum amount required.

(B) He met Betty Kang once at his office there.

(C) He needs more advice about a project he is doing.

(D) He is not sure if his background is appropriate.

45. What did Stephen Tanaka enclose with his letter?

(A) An advertisement

(C) Some references

(B) Some designs

(D) A résumé

Questions 46-50 refer to the following two memos.

MEMO

TO: All Staff

FROM: Norma Nguyen, product-development team

DATE: May 13

RE: Request for new product ideas

---

I would like to announce that a product-development team has been formed to review new product ideas for personal-care products. We strongly encourage you to submit any ideas you have for new products. One advantage of submitting your ideas through the team is that we make your participation in the development of the product possible, giving you valuable insights into the development process as a whole.

The team has created an idea submission guide, which outlines the kind of information necessary for the team to review your new product idea, offer you feedback, and move your idea forward toward implementation. Please contact me if you would like me to send you a copy of the guide.

Please do not hesitate to contact me, or any member of the team, if you have questions about the new product-submission procedures. We look forward to your participation!

TO: Norma Nguyen

FROM: Sam Patel

DATE: May 17

RE: Request for new product ideas

---

I have little experience in the area of developing personal-care products, but I have been thinking about the potential of a hair-care product line for men that might interest the product-development team. Please forward a copy of the idea submission guide to me. In addition, I would like to talk with you to make sure this is the type of product your team is interested in developing. Please contact me at extension 553 at your earliest convenience.

Thank you.

46. What is the purpose of Norma Nguyen's memo?
- (A) To announce a new line of personal-care products
  - (B) To tell staff about a new product-development team**
  - (C) To encourage staff to buy personal-care products
  - (D) To ask staff to review competitors' products
47. What is a stated advantage of contacting the product-development team?
- (A) Employees can receive a bonus for developing a successful product.
  - (B) Employees can participate in developing the products they have proposed.**
  - (C) Employees can meet regularly to come up with new product ideas.
  - (D) Employees can get discounts on new products.
48. What can be inferred about the idea submission guide?
- (A) It is being sent to every employee.
  - (B) It gives examples of new products.
  - (C) It is attached to Ms. Nguyen's memo.
  - (D) It explains the new product-development process.**
49. Who is Sam Patel?
- (A) An applicant for a job
  - (B) A member of the product-development team
  - (C) An employee with an idea**
  - (D) A hair-care specialist
50. What will Norma Nguyen probably do when she receives the memo from Sam Patel?
- (A) Send him the idea submission guide**
  - (B) Contact him for a job interview
  - (C) Ask him to submit a cost analysis of his idea
  - (D) Ask him about his experience working on personal-care products

**Questions 51-55 refer to the following advertisement and invoice.**

**Medolant**

Medolant, a trusted name for commercial cleaning products, is pleased to announce an upgrade to our cleaning solutions. We've taken harmful substances out of our formulas and replaced them with non-toxic alternatives. Our cleaners remain affordable, however and we still offer 15% off to registered charities, public schools, and aid organizations.

We welcome orders online at [www.medolant.com](http://www.medolant.com) or by phone at 555-0178. Customers may settle up-front or request to be billed once their goods have arrived. Those whose delivery address is within the state of California will receive two-day delivery. All other orders will be delivered approximately five days after the order is received. The shipping fee for bulk orders will be waived.

**PRODUCTS:**

**Carpet Cleaners:** Carpet Shampoo (#093), Odor-Absorbing Powder (#097)

**Bathroom, Cleaners:** All-Purpose Surface Cleaner (#113), Soap Scum Remover (#114), Mirror and Window Cleaner (#118), Toilet Bowl Cleaner (#119), Sink and Drain Gel (#120)

**Kitchen Cleaners:** All-Purpose Counter Cleaner (#124), Stainless Steel Polish (#125), No-Scrub Oven Cleaner (#129)

—NEW!!!— **Stain Removers:** Carpet Spot Treatment (#136), Upholstery Stain Remover (#137)

[www.medolant.com/myorders/1021](http://www.medolant.com/myorders/1021)

**Customer:** Salguero Hotel

**Phone Number:** 555-0191

**Shipping Address:** 501 Saint Clair Street, Fresno, California, 93705

**Billing Type:** Credit Card XXXX-XXXXXXX-8859

**Order Date:** March 18

Product Code	Quantity	Price Per Unit	Total
093	3	\$14.99	\$44.97
113	2	\$3.99	\$7.98
114	4	\$9.99	\$39.96

Product Code	Quantity	Price Per Unit	Total
120	1	\$12.99	\$12.99
125	2	\$29.99	\$59.98
136	4	\$8.99	\$35.96

[Click for Delivery Fees and Timing Estimates]

If you are not completely satisfied with your purchase, you may return it within 30 days for a full refund.

51. What has Medolant recently done?

- (A) Adopted recyclable packaging.
- (B) Added new kitchen cleaners.
- (C) Started offering different bottle sizes.
- (D) Modified its products' ingredients.

52. What is suggested about Medolant?

- (A) It gives discounts to nonprofit organizations.
- (B) It has the best-selling cleaning products on the market.
- (C) It makes a separate line of residential cleaners.
- (D) It also advertises via television commercials.

53. What is NOT indicated in the advertisement?

- (A) Customers can pay after receipt of an order.
- (B) There are two ways to place orders.
- (C) Orders come with instructional booklets.
- (D) Delivery is free for large orders.

54. Which type of item did Salguero Hotel purchase the most of?

- (A) Carpet Cleaners
- (B) Bathroom Cleaners
- (C) Kitchen Cleaners
- (D) Stain Removers



55. When most likely will Salguero Hotel receive its goods?

- (A) On March 18
- (B) On March 19
- (C) On March 20
- (D) On March 23

**Questions 56-60 refer to the following Web page and e-mails.**

<https://www.grandeylandscaping.com>

For the past 20 years, Grandey Landscaping has been providing top-quality lawn and garden maintenance for both residential and commercial properties. We offer a wide range of services, including the following:

- Lawn seeding and mowing
- Garden design and plant care
- Weed treatments
- Tree removal and brush clearing

We provide landscaping services to Lynchburg, Bloomington, Finwood, and the surrounding areas. Please note that weekend services are available to customers in the town of Finwood only.

Not sure if Grandey Landscaping is right for you? One of our experienced employees will visit your site and advise you about your property's needs. This is done at no cost to you. We hope to hear from you soon!

TO: Robert Hernandez

From: Luisa Schroeder

Date: March 25

Subject: Grandey Landscaping

Dear Mr. Hernandez,

I manage a small commercial property in the northwest area of Bloomington, and I am considering changing my landscaping service provider because the owner has recently cut the budget. I asked Grandey Landscaping for a testimonial from someone who is currently using its service, and an employee directed me to you. I'm wondering if you could tell me about the company's process for designing a flower garden. I'd also like to know how you receive your bills and how accurate these are. In addition, I'm concerned that the equipment will be too noisy for my workers. Please let me know your opinions about this. I would be very grateful for your taking the time to answer my questions.

Thank you,

Luisa Schroeder

To: Luisa Schroeder  
From: Robert Hernandez  
Date: March 26  
Subject: RE: Grandey Landscaping  
Dear Ms. Schroeder,  
I would not hesitate to recommend Grandey Landscaping. The company designed a flowerbed for my backyard and made recommendations based on the amount of shade the area receives. There was an extra charge for this service, but I think it was well worth it. I also had a dead tree between my house and my neighbor's fence, and the company's employees were able to remove it without any damage to the surrounding structures. I currently have my lawn mowed and garden weeded twice a month, usually on Saturdays. The equipment is not very noisy, and the workers always clean up the lawn clippings and other debris before leaving. If you use this service, you will not be disappointed.  
Best of luck,  
Robert Hernandez

56. What is indicated about Grandey Landscaping?

- (A) It has recently opened new branches in other towns.
- (B) It offers a free consultation to new customers.
- (C) It primarily provides maintenance for corporations.
- (D) It has been in business for over three decades.

57. How did Ms. Schroeder obtain Mr. Hernandez's contact information?

- (A) Through a commercial association
- (B) Through a neighbor of Mr. Hernandez
- (C) Through a hobby club for gardeners
- (D) Through Grandey Landscaping

58. In the first e-mail, the word "cut" in paragraph 1, line 3, is closest in meaning to

- (A) discontinued
- (B) pierced
- (C) decreased
- (D) shortened

59. What topic mentioned by Ms. Schroeder is NOT addressed by Mr. Hernandez?

- (A) Tree removal
- (B) Billing methods
- (C) Garden design
- (D) Noise levels

60. What does the second e-mail imply about Mr. Hernandez?

- (A) He is currently living in Finwood.
- (B) He property was photographed for a Web site.
- (C) He will visit Ms. Schroeder.
- (D) His lawn was seeded by Grandey Landscaping.

**Thank you for your time to fill in this reading test**

### **Appendix II-A: The Cognitive and Metacognitive Strategy Questionnaire**

This study is a part of a research project which is in partial fulfillment of the requirements for Master of Education program in English Language Teaching, Mahasarakham University. The purpose of this questionnaire is to collect information about the various strategies when you use when you read the test (doing the test).

Please kindly complete all items in this questionnaire and note that your answers will be kept confidential and used only for academic purpose.

**The questionnaire is divided into two parts as follows.**

Part 1: Participant's background information

Part 2: The cognitive and metacognitive strategy questionnaire

---

**Part 1:** Participant's background information

**Directions:** Please read each question carefully, put a checkmark ( ✓ ) or fill in the blank that corresponds to your personal information.

1. Gender

( ) Male

( ) Female

2. Age: \_\_\_\_\_ years

3. No. of year learning English: \_\_\_\_\_

4. Affiliation/ Institution/Company: \_\_\_\_\_

5. Major: \_\_\_\_\_

6. Are you willing to participate in a voluntary interview? (Please provide your email address if you volunteer to be interviewed)

\_\_\_\_\_

## Part 2: The cognitive and metacognitive strategy questionnaire

**Directions:** The questions in this part aim to investigate strategies when you use when you read the test (doing the test).

After reading each statement, please indicate how you thought during the test by ticking ( ✓ ) in each item provided within 15 minutes.

The criteria used in scoring are as follows:

1 = Never

2 = Sometimes

3 = Often

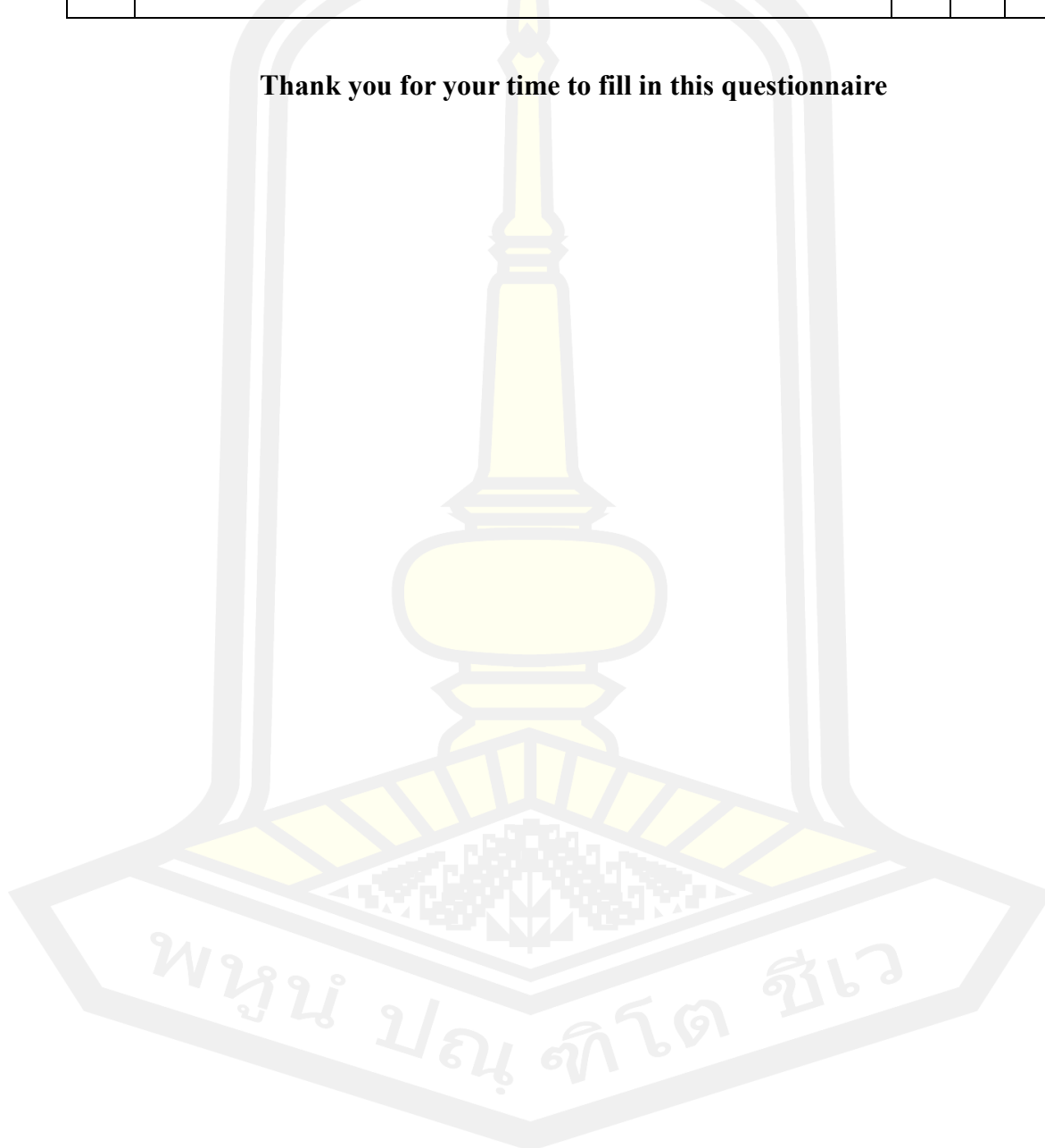
4 = Usually

5 = Always

	Your thinking	1	2	3	4	5
1.	I translated the reading texts into Thai.					
2.	I made sure I was clear on the objectives of the test assignment.					
3.	I wondered what I should do to do well in this test.					
4.	I tried to understand the test and the questions, rather than knowing every word.					
5.	I tried to understand the relationship between the thoughts in the test and the test questions.					
6.	I tried to find topics and main ideas by scanning and skimming.					
7.	I thought through the meaning of the test tasks/questions before answering them.					
8.	I read the texts and questions several times to better understand them.					
9.	I used my prior knowledge to help understand the reading test.					
10.	I tried to identify easy and difficult test tasks.					
11.	I spent more time on difficult questions.					
12.	I was aware of the need to plan a course of action.					
13.	I evaluated whether the plan I desired was effective.					
14.	I evaluated whether the strategies I was using were effective.					
15.	I reread the test questions when I felt I didn't understand them.					
16.	I attempted to identify main points of the given reading texts and tasks.					
17.	I used context clues to guess the meaning of words I didn't know.					
18.	I know when I should complete a task faster or more carefully.					
19.	I know which information is more or less important.					
20.	I know how many items still need to be completed while taking the test.					
21.	I immediately corrected my mistakes when I found them.					

	Your thinking	1	2	3	4	5
22.	I checked my performance and progress in doing the test tasks.					
23.	I thought about what would happen next when I finished the test questions.					
24.	I estimated the percentage of my correct answers.					
25.	I used multiple thinking strategies to help answer the test questions.					
26.	I knew when I lost concentration while completing this test.					

**Thank you for your time to fill in this questionnaire**



## Appendix II-B: The Cognitive and Metacognitive Strategy Questionnaire (Thai version)

แบบสอบถามกลวิธีด้านความรู้ความคิดและกลวิธีที่นำไปสู่ความสำเร็จ

**จุดประสงค์** แบบสอบถามนี้จัดทำเพื่อเป็นส่วนหนึ่งของการศึกษาระดับปริญญาโท สาขาการสอนภาษาอังกฤษ มหาวิทยาลัยมหาสารคาม จุดประสงค์เพื่อรวบรวมข้อมูลเกี่ยวกับกลวิธีที่คุณใช้เมื่อคุณทำข้อสอบการอ่าน กรุณาตอบคำถามในแบบสอบถามทุกข้อซึ่งข้อมูลที่ได้จากท่านจะเก็บไว้เป็นความลับ โดยจะนำเสนอผลที่ได้ไปใช้ในการศึกษาเท่านั้น

**แบบสอบถามแบ่งออกเป็น 2 ตอน ดังนี้**

ตอนที่ 1: ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

ตอนที่ 2: แบบสอบถามเกี่ยวกับกลวิธีด้านความรู้ความคิดและกลวิธีที่นำไปสู่ความสำเร็จ

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**ตอนที่ 1:** ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

**คำชี้แจง:** โปรดทำเครื่องหมาย ลงใน ✓ หน้าข้อความ และกรอกข้อมูลให้ครบทุกข้อตามความเป็นจริงเกี่ยวกับตัวท่าน.

1. เพศ

( ) ชาย

( ) หญิง

2. อายุ: \_\_\_\_\_ ปี

3. จำนวนปีที่เรียนภาษาอังกฤษ: \_\_\_\_\_

4. สังกัด (มหาวิทยาลัย/วิทยาลัย): \_\_\_\_\_

5. สาขา : \_\_\_\_\_

6. ท่านต้องการเป็นอาสาสมัครในการให้สัมภาษณ์หรือไม่ หากต้องการ กรุณาระบุอีเมล

\_\_\_\_\_



**ตอนที่ 2:** แบบสอบถามเกี่ยวกับกลวิธีด้านความรู้ความคิดและกลวิธีที่นำไปสู่ความสำเร็จ

**คำชี้แจง:** คำถามในแบบสอบถามในตอนที่ 2 นี้ เพื่อสอบถามเกี่ยวกับกลวิธีที่คุณใช้เมื่อคุณทำแบบทดสอบการอ่าน หลังจากที่คุณอ่านแต่ละประโยคแล้วภายใน 15 นาที กรุณาเลือกข้อที่อธิบายเกี่ยวกับคุณว่าคุณคิดอย่างไรขณะทำแบบทดสอบโดยการทำเครื่องหมาย ( ✓ ) ลงในช่องว่าง

เกณฑ์การให้คะแนนดังนี้:

1 = ไม่เคย

2 = บางครั้ง

3 = บ่อยครั้ง

4 = โดยปกติ

5 = เสมอ

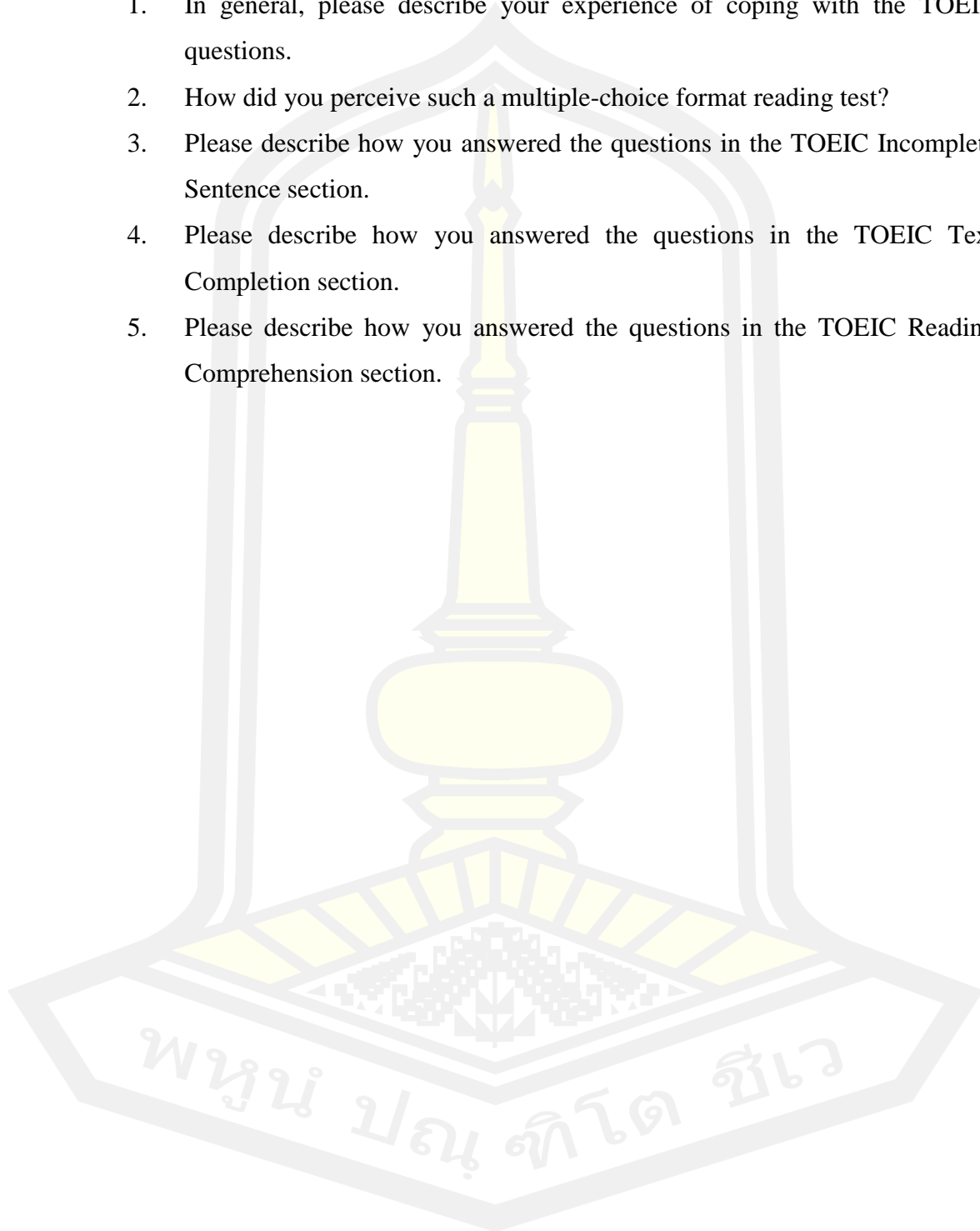
	ความคิดของคุณ	1	2	3	4	5
1.	ฉันแปลบทความและภาษาอังกฤษเป็นภาษาไทย					
2.	ฉันแน่ใจว่าฉันเข้าใจวัตถุประสงค์ของแบบทดสอบอย่างชัดเจน					
3.	ฉันรู้สึกสงสัยกับตนเองว่าฉันควรทำอะไรจึงจะทำแบบทดสอบนี้ได้ดี					
4.	ฉันพยายามที่จะทำความเข้าใจกับแบบทดสอบและคำถามมากกว่าจะรู้คำศัพท์ทุกคำ					
5.	ฉันพยายามทำความเข้าใจความสัมพันธ์ระหว่างความคิดขณะทำข้อสอบและข้อคำถามในแบบทดสอบ					
6.	ฉันพยายามที่จะหาหัวข้อเรื่องและใจความสำคัญโดยการการกวาดสายตาเพื่อค้นหาข้อมูลเฉพาะและอ่านเนื้อหาทั้งหมดแบบคร่าวๆ ผ่านๆ เพื่อค้นหาประเด็นและใจความสำคัญของบทความนั้นๆ					
7.	ฉันคิดทบทวนความหมายของบทความในแบบทดสอบและคำถามอย่างรอบคอบก่อนที่จะตอบ					
8.	ฉันอ่านบทความและคำถามหลายครั้งเพื่อให้เข้าใจบทความและคำถามมากยิ่งขึ้น					
9.	ฉันใช้ความรู้เดิมเพื่อที่จะช่วยให้เข้าใจแบบทดสอบการอ่าน					
10.	ฉันพยายามจำแนกบทความที่ง่ายและยากในแบบทดสอบ					

	ความคิดของคุณ	1	2	3	4	5
11.	ฉันใช้เวลาในการทำแบบทดสอบในข้อที่ยากหรือทำไม่ได้					
12.	ฉันได้ตระหนักเกี่ยวกับความจำเป็นของการวางแผนในการทำข้อสอบ					
13.	ฉันได้ทำการประเมินว่าแผนที่ฉันตั้งเป้าไว้นั้นมีประสิทธิภาพหรือไม่					
14.	ฉันได้ประเมินว่ากลยุทธ์ที่ฉันใช้ในการทำข้อสอบนั้นมีประสิทธิภาพหรือไม่					
15.	ฉันอ่านคำถามในแบบทดสอบซ้ำๆ เมื่อฉันไม่เข้าใจกับคำถามเหล่านั้น					
16.	ฉันได้พยายามที่จะหาประเด็นสำคัญที่บทความให้มา					
17.	ฉันใช้วิธีการเดาความหมายของคำศัพท์ที่ไม่รู้จักบริบท					
18.	ฉันรู้ว่าฉันควรทำแบบทดสอบให้เสร็จเร็วขึ้นและตอบคำถามอย่างรอบคอบ					
19.	ฉันรู้ว่าข้อมูลใดมีความสำคัญมากหรือน้อย					
20.	ในขณะที่ทำข้อสอบฉันรู้ว่ายังเหลือคำถามอีกกี่ข้อที่ต้องทำให้แล้วเสร็จ					
21.	ฉันแก้ไขข้อผิดพลาดที่เมื่อพบข้อผิดพลาด					
22.	ฉันตรวจสอบข้อสอบที่สามารถทำได้และกระบวนการในขณะที่ทำแบบทดสอบ					
23.	ฉันได้คิดเกี่ยวกับสิ่งที่เกิดขึ้นต่อไปเมื่อฉันทำข้อสอบเสร็จแล้ว					
24.	ฉันได้ประเมินร้อยละของข้อคำตอบที่ตอบถูกต้อง					
25.	ฉันใช้กลยุทธ์คิดที่หลากหลายมาช่วยตอบข้อคำถามในแบบทดสอบ					
26.	ฉันรู้ตัวว่าตนเองสูญเสียสมาธิขณะทำข้อสอบนี้					

ขอขอบคุณที่สละเวลาในการทำแบบสอบถามนี้

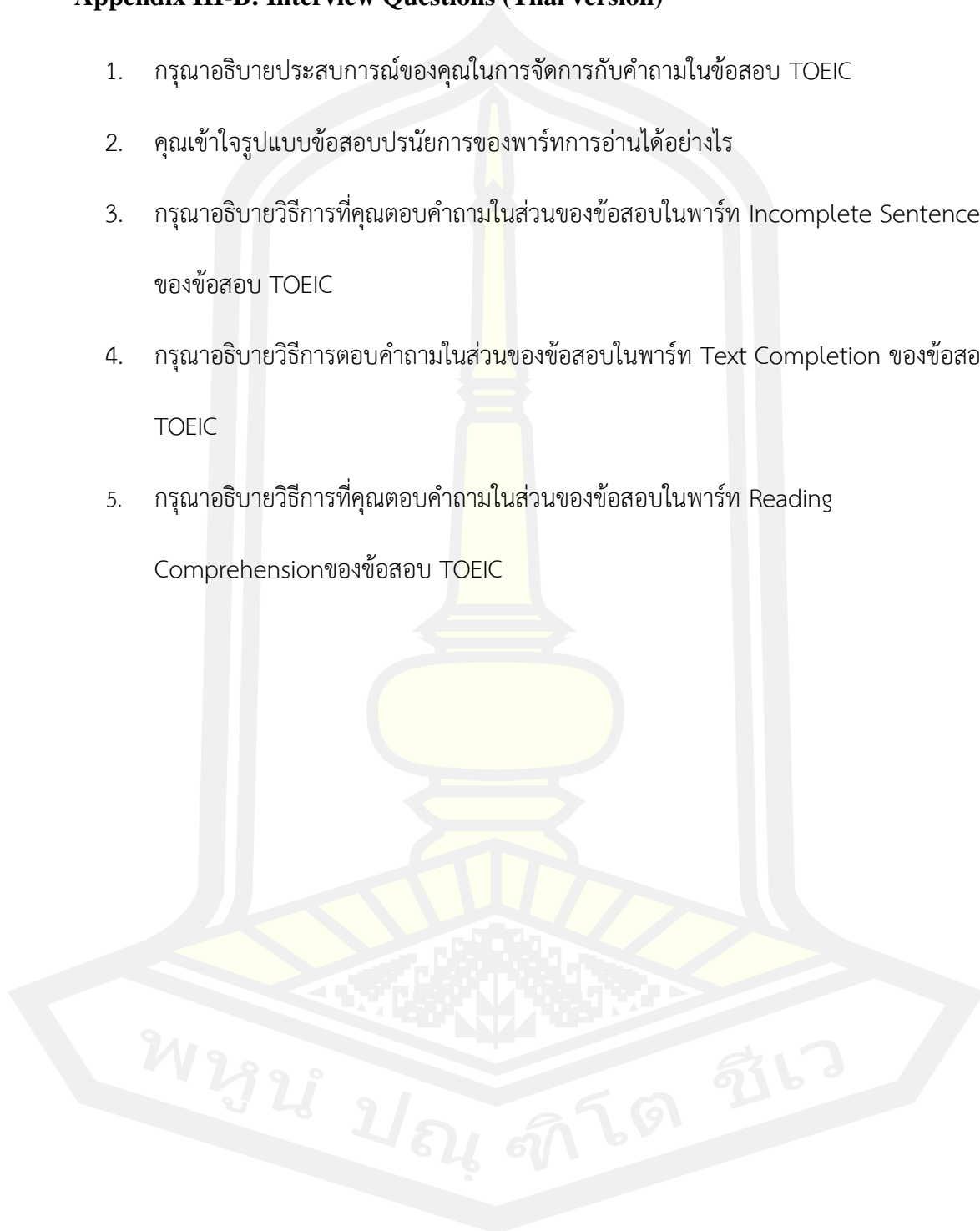
**Appendix III-A: Interview Questions**

1. In general, please describe your experience of coping with the TOEIC questions.
2. How did you perceive such a multiple-choice format reading test?
3. Please describe how you answered the questions in the TOEIC Incomplete Sentence section.
4. Please describe how you answered the questions in the TOEIC Text Completion section.
5. Please describe how you answered the questions in the TOEIC Reading Comprehension section.



**Appendix III-B: Interview Questions (Thai version)**

1. กรุณาอธิบายประสบการณ์ของคุณในการจัดการกับคำถามในข้อสอบ TOEIC
2. คุณเข้าใจรูปแบบข้อสอบปรนัยการของพาร์ทการอ่านได้อย่างไร
3. กรุณาอธิบายวิธีการที่คุณตอบคำถามในส่วนข้อสอบในพาร์ท Incomplete Sentence ของข้อสอบ TOEIC
4. กรุณาอธิบายวิธีการตอบคำถามในส่วนข้อสอบในพาร์ท Text Completion ของข้อสอบ TOEIC
5. กรุณาอธิบายวิธีการที่คุณตอบคำถามในส่วนข้อสอบในพาร์ท Reading Comprehensionของข้อสอบ TOEIC



**Appendix IV: Ethics Approval**

**MAHASARAKHAM UNIVERSITY ETHICS COMMITTEE FOR  
RESEARCH INVOLVING HUMAN SUBJECTS**

**Certificate of Approval**

Approval number: 334-349/2021

Title : The Relationships between Cognitive and Metacognitive Strategies and EFL Reading Test Performance of Thai University Learners.

Principal Investigator : Lingqing Zhang

Responsible Department : Faculty of Humanities and Social Sciences

Research site : Mahasarakham Province

Review Method : Exemption review

Date of Manufacture : 18 October 2021      expire : 17 October 2022

This research application has been reviewed and approved by the Ethics Committee for Research Involving Human Subjects, Mahasarakham University, Thailand. Approval is dependent on local ethical approval having been received. Any subsequent changes to the consent form must be re-submitted to the Committee.

  
.....  
(Asst. Prof. Ratree Sawangjit)  
Chairman

Approval is granted subject to the following conditions: (see back of this Certificate)

**BIOGRAPHY**

<b>NAME</b>	Ms. Lingqing Zhang
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