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**A systematic review of empirical studies on the types of vocabulary
learning strategies used by EFL learners in higher education**

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ABSTRACT

Considering that many empirical studies on the types of vocabulary learning strategies used by EFL learners in higher education indicated similar and different results, this systematic synthesizes the findings of the included empirical studies on vocabulary learning strategies employed by EFL learners in higher education to provide a comprehensive understanding of the types of vocabulary learning strategies used by EFL learners across included countries, identify the similar and different results between the included studies, and explore potential reasons for the similarities and differences. A convergent qualitative synthesis approach was adopted for this systematic review. Inclusion and exclusion criteria were utilized in data collection process, and Excel was used as a tool for information recording and coding in data analysis. The data was collected within a time span from 2013 to 2022 in EBSCO (Education Source), resulting in 18 empirical studies being included. The findings of this study indicate that EFL learners in higher education mainly used seven types of vocabulary learning strategies including determination, cognitive, memory, metacognitive, social/affective, compensatory and technology-based strategies. Moreover, common trends were identified in using determination, social and technology-based strategies based on 18 included studies, and differences existed in using strategies such as memory and metacognitive strategies. The potential factors such as learning environments, academic majors, levels of English proficiency, previous learning experiences and beliefs for the similarities and differences were explored to provide a more comprehensive understanding of the similar and different results. Research gaps, future research directions and pedagogical implications were also explored and suggested.

Key words: vocabulary learning strategies, EFL learners, higher education, systematic review

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1 Introduction

Due to the process of globalization, English as a communication tool plays a crucial role for people from different world to communicate effectively. Thus, the significance of English language cannot be ignored nowadays. In various countries, English is taught as a subject at schools and universities, and students learn English as a foreign language (EFL). EFL learners who are at different levels are all encouraged to learn English to help them achieve their goals such as advancing studies in an English-speaking country where English level is a requirement for studying a programme. Having a good comprehension of English is necessary and useful for EFL learners to master English as a language, which can also ease their process of English learning (Krashen, 1982). To have a good comprehension of English language, EFL learners need to put efforts into different aspect of English learning such as grammar and vocabulary. However, among different aspects, vocabulary is considered as the most critical one in EFL learning. Zimmerman (1997) maintained that vocabulary is essential for EFL learners in language acquisition. Without sufficient vocabulary knowledge, EFL learners may have great difficulties understanding the received information (Alqahtani, 2015). Compared with grammar, which can be regarded as a limited set of rules and principles, vocabulary is a collection of thousands of words and phrases. Folse (2004) emphasized the importance of vocabulary in English language acquisition that learners can acquire new knowledge without grammar, but they cannot get new knowledge without using vocabulary, which Wilkins (1972) also asserted similarly that little knowledge can be transferred without using grammar, but no knowledge can be transferred without the help of vocabulary.

Gu (2012) maintained the importance of EFL learning is acknowledged, which indicates EFL learners have to make strenuous and never-ending efforts to master a large number of English words. According to Oxford English Dictionary (2022), there are at least 100,000-word families and 600,000 words. Nurmukhamedov and Webb (2019) reported that depending on the learners' goals, prior research studies have clarified the number of words English learners need to master so that they can do different activities such as listening, speaking and writing. Nation (2006) stated listening needs 6,000-7,000-word families, and reading requires 8,000-9,000. However, van Zeeland and Schmitt (2012) argued that only 2,000-3,000-word families are adequate to listening activity. Moreover, 2,000-3,000-word families are needed for daily communication (Schmitt, 2007), and 5,000-7,000-word families are recommended for speaking courses (Schmitt, 2008). Research studies have specifically clarified the percentage of vocabulary in materials that EFL learners are supposed to know and certain number of specific words learners need to master to build their vocabulary

knowledge (Schmitt, 2007), which emphasizes positive effects of vocabulary knowledge in EFL learning (Qian & Lin, 2019). Schmitt (2008) asserted that at the university level, several countries have given guidelines of minimum number of words with instruction hours to encourage EFL learners to acquire. For example, EFL learners in Oman need to acquire 2,000 words with 1350 instruction hours (Horst, Cobb, & Meara, 1998). In Thailand, university EFL learners are required to master 3,000 words in two years, with each semester 500 words (Waluyo, 2020). In China, learners need to acquire 4,000 words within 1,800-2,400 instruction hours (Laufer, 2001). In addition, university EFL learners must have to acquire 1,220 words within 900 instruction hours, and 2,000-2,300 English words within 800-1,200 instruction hours in Indonesia and Japan respectively (Nurweni & Read, 1999; Barrow, Nakashimi, & Ishino, 1999).

In higher education, one of the toughest tasks for EFL learners is that they need to master a large vocabulary (Nyikos & Fan, 2007). Vocabulary learning can be regarded as one of the biggest problems in EFL learning (Laufer & Sim, 1985), and it has been a key issue to EFL learners since English learning is based on new-word acquisition (Chin, 2002; Pae, 2016). Increasing learners' vocabulary knowledge is not only associated with vocabulary teaching, but vocabulary learning as well. Thus, learning vocabulary efficiently and effectively in EFL learning should address the significance of using vocabulary learning strategies. Vocabulary learning strategies which may help learners master meanings of new words and word structures for lexical knowledge inputs and outputs can play an essential role in EFL learning (Soureshjani, 2011). Effective vocabulary learning strategies facilitate learners' English proficiency. Adopting suitable vocabulary learning strategies, EFL learners are more motivated to organize their own vocabulary learning and achieve their goals (Scharle & Szabo, 2000). Research studies on vocabulary learning have received attention since the 1980s (Abid, 2012). McCarthy (1990) stressed prior studies related to vocabulary learning focusing on vocabulary learning strategies.

Researchers have paid more attention to EFL learners' utilization of vocabulary learning strategies than teachers' approaches for vocabulary teaching in higher education over the past decades. This may be due to the reason that university EFL learners are more likely to succeed in using vocabulary learning strategies actively than being taught vocabulary passively (Soureshjani, 2011). The results of these studies usually indicated the types of vocabulary learning strategies EFL learners used and their preferences. Previous research studies also explored the association between vocabulary learning strategies and their effectiveness on EFL learning (Kulikova, 2015). For example, researchers such as Oxford (1990), Nation (1990) and Schmitt (1997) conducted studies to do

investigation on vocabulary learning strategies and try to make development accordingly so that learners can be motivated to use strategies to learn vocabulary effectively and efficiently. Exploring the effectiveness of some specific vocabulary learning strategies such as metacognitive strategies in vocabulary acquisition and English proficiency has also been conducted by many researchers (Kulikova, 2015). Moreover, classifications of vocabulary learning strategies have been provided by different researchers and scholars based on their studies such as Schmitt's (1997) taxonomy of vocabulary learning strategies which is classified into two categories with six sub-categories. Many other researchers have conducted studies related to the correlation between vocabulary learning strategies and EFL learners' individual factors such as gender as well as contextual and social factors, and the findings of these empirical studies have made great contribution to the research on the topic of vocabulary learning strategies (Oxford, 1990; Cohen, 1998; Schmitt, 2008; Omaar, 2016).

Considering that many empirical studies have been organized to investigate the types of vocabulary learning strategies used by EFL learners in higher education, and these studies indicated similar or different results especially when concerning learners' preferences for employing vocabulary learning strategies, it is worthwhile to provide a comprehensive understanding of this topic and analyze the factors that may influence the similarities and differences. Thus, to fill the research gap stated above, a systematic review study which chose a convergent qualitative synthesis as an approach (Efron & Ravid, 2019) is conducted to analyze the previous empirical studies on the types of vocabulary learning strategies used by EFL learners in higher education. Moreover, this study also aims to support existing relationships between vocabulary learning strategies and some variables addressed in previous studies and provide practical implications for educators and researchers on the topic of vocabulary learning strategies. To achieve the research objectives, one main research question and two sub-questions based on the main research question were formed as follows:

1. What kinds of vocabulary learning strategies are used by EFL learners in higher education?
 - 1) What are the similarities and differences between the results of previous studies?
 - 2) What are the potential factors for the similarities and differences?

The structure of this paper includes five chapters. Chapter 1 is an introduction which provides an overview of the topic on vocabulary learning strategies in EFL learning and objectives of this systematic review study. Chapter 2 gives a review of literature related to vocabulary learning and vocabulary learning strategies. Chapter 3 is the methodology which describes the research design. Chapter 4 presents the results according to the research questions. The last chapter provides a discussion mainly based on the results of this study.

2 Literature Review

Language learning has shifted from the traditional perspective which emphasized the importance of teaching-orientated method to learner-centered approach from 1970 onwards (Cohen, 2007; Prichard, 2008). Researchers and teachers began to realize it is not realistic to encourage all language learners to rely on a common teaching method during their language-learning process to improve their linguistic competency and get other satisfactory learning outcomes regardless of their individual differences (Brown, Waring, & Donkaewbua, 2008). Moreover, regarding the circumstance that the number of foreign language learners has incredibly increased since late 20th century, researchers have paid closer attention to factors that may influence language learning process based on learners' differences during their research studies (Ayure, 2018). Factors such as learners' motivation, self-efficacy and gender have been investigated by a variety of researchers (Sahbazian, 2004). As the role of vocabulary learning has become a key issue especially in an EFL learning context (Hedge, 2000; Kwon, 2004) since vocabulary storage in language learning process became an essential part in the early 2000s (Decarrico, 2001), several studies have been conducted to discover methods to help learners increase their vocabulary knowledge in English learning. The issue on vocabulary learning strategies in EFL learning settings has especially aroused researchers' great interest. Vocabulary learning strategies are regarded as a fundamental and critical aspect in language learning strategies because vocabulary is considered as the biggest component in language learning and learners are more likely to have difficulties in mastering vocabulary (Yaacob et al., 2018). Without vocabulary, it is difficult to make communication happen in an EFL context even though learners have a good command of grammar and master good English pronunciation as well (Carranza et al., 2015). Therefore, vocabulary not only plays a critical role in learners' language learning process, but also benefits their communication. Various researchers such as Oxford (1990), Schmitt (1997) and Alqurni (2018) have done some research on the issue of vocabulary learning strategies in EFL learning contexts.

2.1 Vocabulary learning

Vocabulary is a basic communication tool which consists of groups of words a person knows in a particular language and facilitates knowledge acquisition and language proficiency. Cameron (2001) stated it is significant for foreign language learners to have a comprehensive vocabulary before reaching the goal of having a good acquisition of productive foreign language skills. Vocabulary acquisition is crucial for good comprehension and production in foreign language learning (Seddigh

& Shokrpour, 2012; Patahuddin, Syawal, & Taher, 2017). Schmitt (2000) and Rohmatillah (2017) made emphasis on the necessity for learners to acquire an extensive vocabulary in foreign language learning to improve their communication competence. Vocabulary has an essential effect on language learning process as it is a common phenomenon that learners, especially foreign language learners, with limited vocabulary often have communication problems even though they have initiative to communicate with others and express their thoughts (Nyikos & Fan, 2007). Oxford (2017) asserted that both grammatical knowledge and vocabulary storage are needed in communication. Boonnoon (2019) argued that it is necessary that learners pay attention to several aspects related to language knowledge including grammatical structures and vocabulary to master a foreign language. Yaacob et al. (2019) stated that, to some extent, vocabulary contributes more to the development of learners' language proficiency than other language skills. Expanding vocabulary knowledge can be considered as the most critical task that learners have to focus on in language learning (Hashemi & Hadavi, 2015). Therefore, communication problems are more likely to be solved after learners have sufficient vocabulary knowledge. The wider vocabulary a learner has, the more proficient a learner can be in communication. Moreover, vocabulary performs a critical role in every aspect of language learners' learning process. For example, a study was conducted (Khan, Radzuan, Shahbaz, Ibrahim, & Mustafa, 2018) to investigate the relationship between vocabulary knowledge and speaking proficiency, and the result revealed they are strongly related which means having good vocabulary knowledge improves the development of speaking skills. Speaking, listening, reading, and writing are the four basic aspects that language learners have to focus on. Learners who have a larger vocabulary storage are more likely to make language learning progress on the four aspects because they can have a better understanding and get more information from what they hear and read, which contributes to their use of vocabulary in speaking and writing (Hinkel, 2015; Viera, 2017).

Although vocabulary learning was neglected in previous language learning (Meara, 1980), it has regained a subordinate status in learning a foreign language as it plays a significant role in foreign language proficiency after plenty of empirical studies have been conducted to prove the importance of vocabulary in foreign language learning. Thus, more suitable vocabulary learning programmes can be carried out to help EFL learners to build a solid vocabulary foundation in the process of EFL learning (Ramos, 2015). For example, teachers put more emphasis on the fluency requirement in foreign language learning so that they started adopting a communicative teaching method to encourage learners to communicate with others actively instead of prioritizing accuracy which requires students spend most time remembering grammars. This leads to a result that helping learners with vocabulary learning becomes a significant aspect in foreign language teaching, which requires

teachers use a proper teaching method (Xu & Hsu, 2017). In addition to enhancing learners' vocabulary learning through language teaching, steps that students can use in vocabulary learning also make great contribution to their foreign language proficiency. For instance, there are five steps including using materials for identifying new words, getting familiar with the forms of new words, understanding the meaning of the words, connecting the forms and meaning of new words for self-memory and utilizing the words in real situations that learners can follow in the process of their foreign language learning (Brown & Payne, 1994). Research related to these five steps indicated that encountering new words and memorizing forms and meaning of these words help learners build and expand their vocabulary storage, and using new words in real conditions facilitates long-term memory in foreign language learning (Brown & Payne, 1994, Hashimi & Hadavi, 2015). Fan (2003) asserted vocabulary learning strategies utilized in foreign language learning should be more or less related to these five steps. Moreover, Smith (2008, p. 102) highlighted seven steps which include "rhyming words, association and organization, understanding the structure of words, using a dictionary, recognizing word families, understanding word's origin, and using analogies" (Smith, 2008, p. 102) to help learners improve their foreign language proficiency. The seven steps emphasize strategically mastering new words rather than memorizing their forms and meanings mechanically.

2.2 Definitions of vocabulary learning strategies

There has not been a fixed definition for vocabulary learning strategies because researchers usually define the definition of vocabulary learning strategies differently according to different principles such as contextual dependence, intentionality and learners' control (Nation, 2001; Oxford, 1990). However, among various definitions of vocabulary learning strategies, one common aspect that facilitating language learning is emphasized. Rubin (1975) explained that vocabulary learning strategies can be techniques or tools which facilitate learners to get new knowledge. Later, he proposed a new definition of vocabulary learning strategies, which is a learning process for learners to obtain, store, retrieve and use the knowledge (Rubin, 1987). Oxford (1990) defined vocabulary learning strategies as "actions" (Oxford, 1990, p. 136) that learners can use in their learning process and promote learning outcomes (as cited in Macaro, 2001, p. 17). Oxford (2017) offered a more comprehensive definition for vocabulary learning strategies, that is, vocabulary learning strategies are "dynamic ideas and actions" (Oxford, 2017, p. 244) that can be taught so that learners can use them deliberately to enhance their self-regulated vocabulary learning. It emphasizes that learners are able to increase their vocabulary knowledge effectively and efficiently and achieve desired goals through their own efforts (Gu, 2012). Schmitt (2000) asserted that vocabulary learning strategies are

approaches employed by learners to facilitate their vocabulary learning in the language learning process. Asgari and Mustapha (2011) regarded vocabulary learning strategies as steps learners take to acquire new words and improve lexical competence in language learning. Vocabulary learning strategies, as defined by Cohen (2014, p. 139), refer to “thoughts and actions, consciously chosen and operationalized by language learners, to assist them in carrying out a multiplicity of tasks from the very onset of learning to the most advanced levels of target-language performance” (Cohen, 2014, p. 139). In addition, more contemporary studies have defined vocabulary learning strategies as learners’ attempts to solve vocabulary problems and learn new words for their long-term language use (Folse, 2004; Zhang, 2008; Zhang & Elder, 2011).

Based on these definitions, vocabulary learning strategies can be regarded as techniques, actions, thoughts, approaches, steps or attempts to facilitate language learners’ vocabulary learning. Vocabulary learning does not mean only knowing words’ meanings or remembering their forms. Hurd and Lewis (2008) argued that learning words is a cumulative process which involves understanding words’ meanings, remembering forms and using words in different situations. Therefore, vocabulary learning strategies which facilitate language learning can be considered as an indispensable and integral component in the whole learning process. Research studies related to vocabulary learning strategies have risen dramatically since vocabulary has become an inevitable and key aspect in language learning. Various studies on vocabulary learning strategies have found foreign language learners commonly select and use vocabulary learning strategies, some even create vocabulary learning strategies for their explicit and implicit learning. Moreover, researchers such as Schmitt (1997), Griffiths (2008) and Gu (2012) have found learners who employ diverse vocabulary learning strategies in a proper way are more likely to be successful than those who have no awareness of adopting vocabulary learning strategies in foreign language learning. Thus, it seems significant to clarify the classifications of vocabulary learning strategies based on the evidence of their advantages for language learners.

2.3 Classifications of vocabulary learning strategies

Researchers and scholars have made great contributions to the taxonomies of vocabulary learning strategies by using various ways to classify them (Intaraprasert, 2000). Some typical classifications of vocabulary learning strategies that researchers used different principles and terminologies to categorize them are provided. Cohen (1990) developed the preliminary taxonomy of vocabulary learning strategies which includes word-remembering strategies, word-practicing strategies and

learning vocabulary strategies. Word-remembering strategies comprise several sections including making connections between words and their sounds, explaining meanings of words, identifying structures of words, connecting words with specific topics and contexts, associating words with physical dimensions and mental images, considering isolated words and occurrences of other words in texts, and getting keywords to represent words. Word-practicing strategies concludes three sections comprising utilizing flashcards, putting words into different groups, and using words in different situations. Learning vocabulary strategies also includes three components consisting of word analysis, word-derivative study and dictionary usage skills. Rubin and Thompson (1994) considered directed approach, indirect approach and mnemonics as the classification of vocabulary learning strategies because these three approaches were investigated to be productive after being used by language learners. Stoffer (1995) introduced nine groups of vocabulary learning strategies including 1) self-motivation strategies, 2) memory strategies, 3) authentic language use strategies, 4) physical action strategies, 5) visual and auditory strategies, 6) anxiety-overcoming strategies, 8) creative activity strategies, 8) strategies for creating mental linkages and 9) strategies for organizing words. Based on the results from a study which used think-aloud approach and interviewed 15 participants who were studying Italian in Australia, Lawson and Hogben (1996) classified repetition, analyzing word features, simple elaborations and complex elaborations as four categories of vocabulary learning strategies. In the same year, Gu and Johnson (1996) proposed a taxonomy of vocabulary learning strategies including beliefs about vocabulary learning, activation strategies, meta-cognitive regulation strategies, cognitive strategies and memory strategies. Activation strategies are strategies that learners use new words in different situations. Meta-cognitive regulation strategy encourages using various ways to make vocabulary items clear. Cognitive strategies include three sub-categories of vocabulary learning strategies including guessing, using dictionaries and taking notes. Encoding and rehearsal strategies belong to the category of memory strategies.

Based on the vocabulary learning strategies identified in previous studies, researchers asserted some other noteworthy classifications of vocabulary learning strategies. Nation (2001) offered a taxonomy which consists of three general categories - planning, sources and processes. "Planning" means learners plan to choose vocabulary items to focus on. "Sources" involves methods that help to understand new words such using dictionaries and analyzing word meanings based on specific contexts. "Processes" refers to building vocabulary knowledge through useful processes such as attention, retrieval and generation. Fan's (2003) classification of vocabulary learning strategies includes guessing, using known words, sources and dictionaries, repeating, associating, grouping, analyzing and making regulation. Similar to Fan's taxonomy, Jones (2006) also included guessing

strategies and dictionary strategies in his classification. The left six strategies that Jones (2006) proposed are study preferences strategies, note-taking strategies, autonomy strategies, selective attention strategies, memory strategies and social strategies. Guessing strategies mean guessing meanings of words according to the contexts or based on structures of words. Dictionary strategies encourage learners to use monolingual and bilingual dictionaries according to their needs. Study preferences strategies refer to whether learners prefer individual learning or learning vocabulary in pairs or in groups. Note-taking strategies highlight learning vocabulary mechanically and help learners to make structures for new words (Seddigh & Shokrpur, 2012). Autonomy strategies emphasize that learners have self-motivation to take responsibility in the process of vocabulary learning. Selective attention strategies need learners to plan, regulate and evaluate their vocabulary learning. Memory strategies are related to skills or techniques that learners use to help memorize words. Social strategies refer to asking other people for help during vocabulary learning. Gu (2013) regarded beliefs, metacognitive strategies and cognitive strategies as three major categories of vocabulary learning strategies. Selective attention and self-motivation are metacognitive strategies; cognitive strategies comprise guessing, using dictionaries, rehearsal, taking notes, encoding and activation (Gu, 2018).

In addition to these taxonomies, Schmitt's (1997) classification of vocabulary learning strategies has been frequently cited in the literature on the studies related to vocabulary learning strategies, and his taxonomy seems more popular among active researchers. Schmitt's (1997) taxonomy of vocabulary learning strategies was partly based on the categorization of language learning strategies presented by Oxford (1990) who classified language learning strategies into two categories including direct and indirect strategies. Direct strategies comprise memory, cognitive and compensation strategies; Indirect strategies involve metacognitive, social and affective strategies. Schmitt's classification provides a broader and more comprehensive scale of vocabulary learning (Al Shuwairekh, 2001). Schmitt (1997) proposed that discovery strategies and consolidation strategies are two types of vocabulary learning strategies. The first category, discovery strategies, includes determination strategies and social strategies. Determination strategies are used to determine different information of new a word including its meaning, form and context, which help to facilitate getting knowledge of new words. Social strategies involve a discovery step which encourages learners cooperate with other people to get meanings of new words. For example, teachers can explain meanings of new words in learners' native languages and ask learners to put new words into sentences. Discussing meanings of new words in pairs or groups is also a typical type of social strategy. Consolidation strategies are considered as the second category of vocabulary learning strategies in Schmitt's (1997) classification,

which involve memory strategies, cognitive strategies, metacognitive strategies and social strategies. Memory strategies refer to associating materials such as pictures, stories, synonyms and activities with learners' existing knowledge to help learners remember new words and form new knowledge maps. Cognitive strategies involve learners using target languages to do repetitions in such as listening, speaking and taking notes. Metacognitive strategies involve “planning, monitoring and evaluating the best way” (Schmitt, 1997, p. 208) to study vocabulary at any stages in vocabulary learning process. Social strategies in the category of consolidation strategies are different from those in the type of discovery strategies, which aim to help learners practice and consolidate currently new words instead of discovering. Speaking with native speakers is regarded as a good social strategy to do practice. Figure 1 displays taxonomy of vocabulary learning strategies provided by Schmitt (1997).

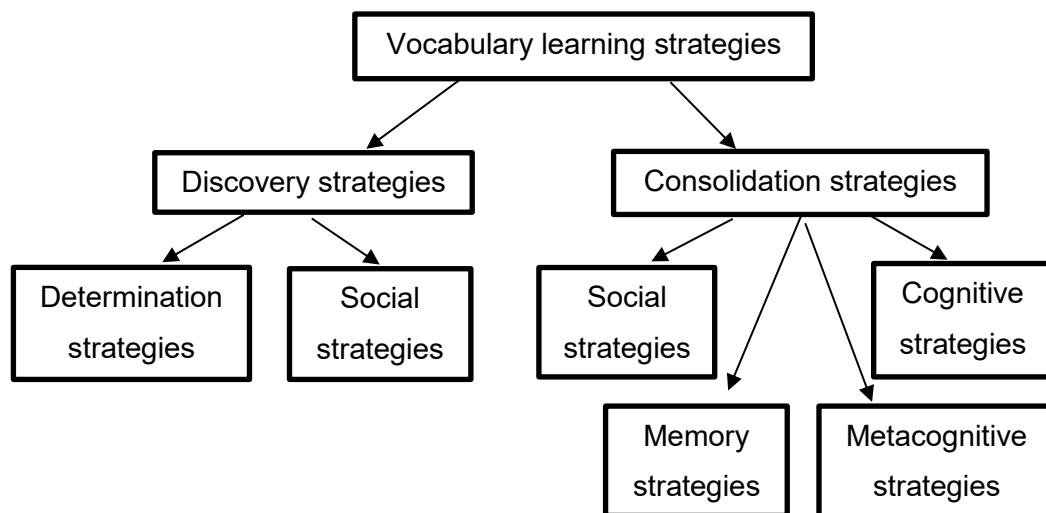


Figure 1 Schmitt's taxonomy of vocabulary learning strategies (Schmitt, 1997, pp. 205-210)

2.4 Previous studies on vocabulary learning strategies in EFL contexts

Previous research studies related to vocabulary learning strategies used in learning English as a foreign language (EFL) context have been conducted at different levels such as in elementary schools, secondary schools and higher education. With a specific focus on higher education settings, various empirical studies on vocabulary learning strategies EFL context have been conducted in different countries such as China, Japan and Vietnam. This section aims to synthesize the main topics that have been addressed in previous studies. A number of researchers focused on the topic of EFL learners' utilization of vocabulary learning strategies. Factors such as culture, learning environment, age, gender, self-efficacy, level of language proficiency, motivation and academic majors should be

considered because they may influence learners' employment of vocabulary learning strategies (Mizumoto & Takeuchi, 2009b; Schmitt, 2000; Jassim & Dzakiria, 2019). Several of these variables will be addressed in detail in the following through the evidence from previous studies. Moreover, some research studies explored the impacts of vocabulary learning strategies on vocabulary acquisition (Lawson & Hogben, 1996) such as vocabulary size. Topics on the correlation between vocabulary learning strategies and learning outcomes and the relationship between vocabulary learning strategies and learners' autonomy have also been highlighted in existing research studies.

As for how EFL learners use vocabulary learning strategies in higher education, some prior studies can be presented as examples. Lawson and Hogben (1998) conducted a research study among 40 EFL learners and found most learners were familiar with different vocabulary learning strategies from which repetition was the most frequently used strategies. In Fan's (2003) study, 1067 college students in Hong Kong were the participants, and the results indicated the students used contextual guessing and dictionary as strategies. Marin's (2005) study had the similar finding which revealed dictionary, contextual guessing and repetition were strategies which were the most commonly used by students at Quintana University in their English learning. Balidede and Lokmacioglu (2014) found EFL undergraduate students were more frequently used cognitive and meta-cognitive vocabulary learning strategies, and intermediate-level students employed more vocabulary learning strategies than elementary-level undergraduates. However, Brisiti (2015) had different findings which indicated determination strategies were the most preferable vocabulary learning strategies, while cognitive strategies were the least commonly used.

Factors such as self-efficacy, academic majors and gender have been emphasized in previous research studies to investigate affective variables influencing EFL learners' adoption of vocabulary learning strategies. Self-efficacy can be regarded as an individuals' beliefs in their ability to organize actions and accomplish special tasks or challenges in a certain situation (Bandura, 1995, cited in Mizumoto, 2012). Mizumoto (2012) conduct a study to examine whether self-efficacy affects EFL learners' employment of vocabulary learning strategies, and the findings indicated students who had high self-efficacy were more likely to use vocabulary learning strategies actively, especially deeper strategies. Moreover, students with medium self-efficacy adopted shallower strategies frequently, and students who had low self-efficacy preferred to adopt vocabulary learning strategies passively. Academic majors have also received researchers' attention. For instance, Gu (2002) did a survey among Chinese EFL learners who were divided into two groups, with one group of science students and the other group of arts students. The results revealed the differences of using vocabulary learning strategies

between the two groups of students, that is, science students preferred note-taking strategies than arts students, and science students more frequently used word-structure and word-formation strategies. Bernardo and Gonzales (2009) conducted a survey among 202 university EFL learners across five fields of study in the Philippines. The findings revealed students across the five disciplines had no significant differences in using memory, cognitive and metacognitive strategies, while determination and social strategies were found to be differently used across the five majors of students. Therefore, it is possible that different academic majors may incorporate different vocabulary learning strategies.

In addition to self-efficacy and fields of studies, researchers also tried to investigate the significance of gender in EFL learners' employment of vocabulary learning strategies. Sunderland (2000) stated that gender has been considered as a determining factor in EFL learners' choices of utilizing vocabulary learning strategies, and to some extent, female learners are usually more likely to be successful in English acquisition than male learners. Compared with male students, female students show a higher percentage of using vocabulary learning strategies (Catalan, 2003). Female students have been found to favor a wide range of strategies such as guessing, using dictionaries, taking notes, rehearsal and metacognitive strategies, which facilitate their vocabulary acquisition and the whole language learning process (Gu, 2002; Fan, 2020). Studies related to gender factor were conducted in many countries, and results have shown differences in adopting vocabulary learning strategies between female EFL learners and their counterparts (Kobayashi & Little, 2020). For example, Omaar (2016) conducted a survey at Libyan university and analyzed how gender factor influenced students' choices of vocabulary learning strategies. Significant disparities were found that a higher proportion of female students favored social strategies and determination strategies. Ng's (2018) study conducted in Thailand found female students more frequently used meaning-focused cognitive and metacognitive planning strategies, while male students preferred to use form-focused cognitive, metacognitive monitoring and evaluation strategies.

Previous considerable research studies regarding the relationships between vocabulary learning strategies and learning outcomes have proved insightful results. For example, Gu and Johnson (1996) conducted a survey among 850 Chinese university learners and found a positive association between certain vocabulary learning strategies and vocabulary knowledge that using contextual guessing, dictionaries and note-taking facilitated students' vocabulary learning. Moreover, Gu and Johnson (1996) also found that these three vocabulary learning strategies which positively associated with students' English scores, while repeating new words indicated a negative relationship with vocabulary size and students' test scores. Mizumoto and Takeuchi (2008) conducted a study on the correlation

between vocabulary learning strategies and learning outcomes which were measured by TOEIC scores among 300 university EFL learners in Chinese context. The results revealed learners who got higher scores used metacognitive strategies such as self-management consciously. Another study was also conducted among Chinese university students to investigate the significance of utilizing vocabulary learning strategies in language learning proficiency, and the results stated that effective EFL learners used more strategies than ineffective students (Lin et al., 2013). Learners' autonomy has also been highlighted and investigated in the studies which explored the function of employing vocabulary learning strategies. Nunan (2000) and Benson (2001) stated that learners' autonomy refers to their capabilities to put their studies and efforts into effect. Thus, it is significant to help EFL learners enhance their autonomy in vocabulary learning. Littlewood's (2000) study revealed that using metacognitive strategies actively helped to enhance EFL learners' autonomy. Autonomous EFL learners are more likely to set goals and select methods and materials in English learning, which can increase their likelihood of language learning success.

Chapter 2 gives a comprehensive review of this research topic, which helps to address the research gap and connect theories and previous research to the aims of this systematic review study. Next, the methodology used for this research design will be discussed in chapter 3.

3 Methodology

In this study, a systematic literature review was chosen as a research approach to answer research questions. Several aspects will be discussed in this chapter. First, it starts with the features of a systematic literature review and reasons why such an approach is suitable for the focus of this research. Next, it presents how the data is collected with sample search and sample screen. After that, the data analysis part will discuss how to code collected articles to generate new findings. The research questions for this study include one main research question and two sub-questions as follows:

1. What kinds of vocabulary learning strategies are used by EFL learners in higher education?
 - 1) What are the similarities and differences between the results of previous studies?
 - 2) What are the potential factors for the similarities and differences?

3.1 Methodological approach

Fisch and Block (2018) stated that a systematic literature review offers a broad knowledge map on a specific topic that has been studied by researchers. Davies (2000) argued that a systematic review offers a comprehensive summary of a certain topic because it allows for the discovery of both consistent and changing aspects through the analysis of prior studies. Therefore, based on previously transparent findings about what has been known and what needs further studies, a systematic review can lead to a reproducible process for research questions. Based on the facts that research studies related to vocabulary learning strategies in EFL context in higher education have risen, especially regarding the types of vocabulary learning strategies since vocabulary has become an inevitable and key aspect in the language learning progress, and Schmitt (2000) asserted that vocabulary learning strategies are approaches which facilitate learners' vocabulary learning in language learning process, a systematic literature review plays a critical role to advance studies on the topic of vocabulary learning strategies.

Denyer and Tranfield (2009, p. 671) explained a systematic review as “a self-contained research project” (p. 671), which is an explicit and essential feature to differentiate it from a literature review. Distinguishing from a literature review that is an overview of current knowledge and theories on a specific topic, a systematic review not only presents existing knowledge on a specific topic, but also put emphasis on an individual's effort to develop practical recommendations for further research issues that attention can be paid next (Pittaway, 2008), which enables a researcher to understand a

specific research topic deeply and helps to solve conflicts and prevent duplicated knowledge (Booth, Papaioannou, & Sutton, 2012).

This study is an example of a systematic review which seems essential to consolidate and synthesize the existing knowledge on a specific topic. Conducting a systematic review on the types of vocabulary learning strategies employed by EFL learners makes it more available to get detailed information about EFL learners' utilization of vocabulary learning strategies. The purpose of this study is not only to provide a comprehensive understanding of different types of vocabulary learning strategies adopted by EFL learners in higher education through investigating previous studies, but also to analyze and synthesize the data from previous studies to descriptively present the similar and different results in learners' adoption of vocabulary learning strategies between prior empirical studies as well as potential factors for the similarities and differences. Furthermore, it also aims to support the findings of previous studies, provide suggestions for EFL educators, and outline future research avenues to advance research achievement on this topic after this study.

Considering the features of a systematic literature review and research method employed in prior studies on this topic, this study was conducted as a mixed-studies review (Booth, Papaioannou, & Sutton, 2013) which involves reviewing previous related studies conducted in three different manners, qualitative, quantitative and mixed-methods. Three different approaches have their own strengths in explaining results. Mixed-studies review helps to clarify and explain relationships between variables (Fraenkel, Wallen, & Hyun, 2019). Thus, it enables a researcher to have a better understanding of a complex phenomenon on a specific topic (Pluye & Hong, 2014), which makes contribution to significant and insightful results this systematic review aims to achieve.

Based on the research objectives of this study, a convergent qualitative synthesis approach was used. A convergent qualitative synthesis approach leads included qualitative, quantitative and mixed-methods studies to a qualitative synthesis process (Efron & Ravid, 2019) which indicates comparing and contrasting findings of prior studies to enable the objectives of this study to be achieved. The qualitative synthesis process is presented in Figure 1. Efron and Ravid (2019) maintained that selected studies for a review are distinguished based on their findings instead of the methods they adopted. In addition, a convergent qualitative synthesis approach indicates that findings of three types of studies, qualitative, quantitative and mixed-methods researches, are synthesized into various aspects such as patterns and concepts in a qualitative approach to help answer research questions (Pluye & Hong, 2006). In the process of systematic review, several steps need to be followed and clarified, including generating research questions, identifying research according to research questions, selecting and

evaluating studies, analyzing and synthesizing the results of included studies and presenting and using findings (Denyer & Tranfield, 2009). These first four steps were presented in detail in the following three sections. Step five was conducted in chapter 4.

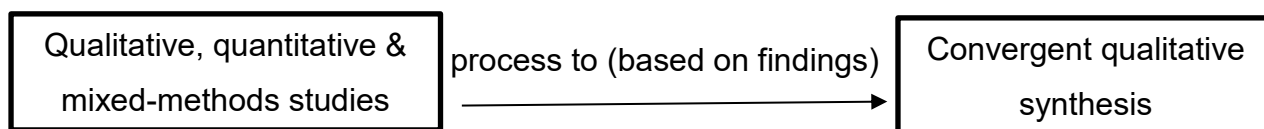


Figure 2 Qualitative synthesis process (cf. Efron & Ravid, 2019, p. 199)

3.2 Sample search

The sample search process includes the first two steps, generating research questions and identifying research according to research questions. Generating appropriate and answerable research questions is significant in a systematic review in terms of the whole process of systematic review needs a focus to follow (Booth et al., 2012; Fisch & Block, 2018). Developing research questions makes search process be possible and helps to identify research because key concepts, search terms, search syntaxes and search strings can be developed to locate related studies based on the research questions though developing research questions is not really a part of search process. Meanwhile, to some extent, the process of identifying research also helps research questions to be developed and improved. Thus, the close relationship between generating research questions and identifying research can be presented in Figure 3.

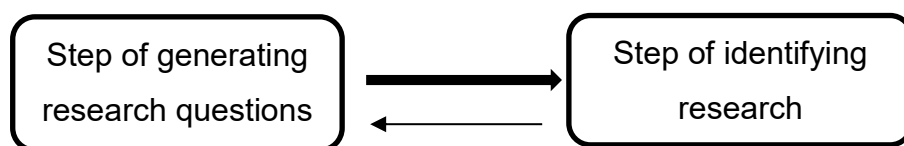


Figure 3 Sample search process

When defining research questions, scope review may be needed to ensure the research questions to be suitable (Booth et al., 2012; Denyer & Tranfield, 2009). Scope review helps to explain the connections between developing research questions and identifying research. The initial research question was as follows: What are the most and least frequently used vocabulary learning strategies by EFL learners in higher education? However, scope review indicated the original research question is infeasible to be followed in a systematic review as the findings of previous empirical studies have

revealed that even the same vocabulary learning strategy could produce completely opposite results in different studies. For example, some empirical studies used the same taxonomy of vocabulary of vocabulary learning strategies such as Schmitt's (1997), the results could be different such as memory strategies were the most preferred strategies in one study, while in other studies, memory strategies could be the least commonly used strategies. Factors such as learning settings, gender and learners' English proficiency levels may have an impact on these results. The initial research question may work well in a specific empirical study, while it is neither inappropriate nor impossible to give a general answer from the perspective of a systematic review. Multiple modifications related to research questions have been done. Research questions have been modified and changed into one main research question and two sub-questions. To map and synthesize the existing knowledge in a systematic review to advance the research on a specific topic, the importance of research questions has been considered.

The sample search process proceeded to the second step, identifying research, after appropriate research questions were decided. All relevant studies are supposed to be included in a systematic review (Denyer & Tranfield, 2009). Database research was considered as a suitable way to identify research because it enables relevant existing studies to be included. One database provided by the University of Turku library, EBSCOhost (Education Source), was utilized to get comprehensive studies. After choosing a database, it is significant to define key concepts and related search terms (Booth et al., 2012). Key concepts which were defined based on main research question are vocabulary learning, learning strategies and EFL learners. According to the main research question, the level of EFL learners is also one significant aspect that should be considered when defining key concepts. Although it wasn't given a certain key concept or search terms in sample search stage, the level of EFL learners was considered as a criterion in sample screen based on the related words from titles, abstracts, keywords fields and full texts. For example, if the title of an article indicates participants were primary school students, that article was excluded. Two rounds were conducted in sample screen process to ensure the level of EFL learners is what this research requires. Search terms based on key concepts and search syntaxes based on search terms are all presented in table 1.

Table 1 Key concepts, search terms and search syntaxes

Key concepts	Search terms	Search syntaxes
Vocabulary learning	“vocabulary learning”	“vocabulary learning”
Learning strategies	“learning strategies” “learning styles” “learning approaches” “learning methods”	“learning strateg*” OR “style*” OR “approach*” OR “method*”
EFL learners	“EFL” “English as a foreign language”	“EFL” OR “English as a foreign language”

Note. The abbreviation, substitute search terms, quotes, asterisks and Boolean operator “OR” were considered in identifying search terms and search syntaxes.

1. EFL meaning: English as a Foreign Language is learning English in a non-English-speaking country such as in China, Japan and Middle East. EFL is distinguished from other terms such as ESL, ELL, ESOL and ESP based on their usages in different settings. (e.g. ESL meaning: English as a Second Language is learning English in a country where English is dominantly spoken or as an official language such as in the UK, the U.S and Australia.)
2. “Learning styles”, “learning approaches” and “learning methods” are also commonly used as terms and they have similar meaning as “learning strategies”. Thus, these three terms were regarded as substitute search terms for “learning strategies”.
3. To maintain a balance between specificity and sensitivity of the search scope, quotes, asterisks and Boolean operator “OR” were used in search syntaxes for fixed phrase search. Asterisks “*” were used to avoid grammatical singular and plural problems of the search terms. For example, “learning approach(es)” was changed into “learning approach*”. Boolean operator “OR” was used to combine all substitute search terms to form three search syntaxes.

Based on these three search syntaxes, multiple search trials were performed on the chosen database EBSCO (Education Source), to confirm reproducibility through sample demonstration. Finally, a search string used Boolean operator “AND” was formed as follows: “vocabulary learning” AND (“learning strateg*” OR “style*” OR “approach*” OR “method*”) AND (“EFL” OR “English as a

foreign language”). To reduce the impact of the author’s status as a novice researcher on data collection (Booth et al., 2012), key words, search terms, search syntaxes and search string were presented to an experienced researcher before final sample search for this study. As an early stage of data collection, sample search plays a significant role in locating potential previous studies. A systematic review requires clear inclusion or exclusion criteria for selecting relevant results (Denyer & Tranfield, 2009). Several search criteria during the sample search process on the database were emphasized. Inclusion criteria at this stage were included as follows:

- (1) peer-reviewed academic journals;
- (2) sample search within time span 2013-2022;
- (3) written in English;
- (4) related words in titles or abstracts or keywords field;
- (5) empirical papers

The first criterion was that the documents must be peer-reviewed academic journals. It helped to exclude journals that may have quality issues and guaranteed the quality of potential documents even though this criterion restrained the principle of equality between various publications that Pittaway (2008) stated. The second criterion required potential journals to be published from 2013-2022 because after several search trials, the author found the publication data on EBSCO (Education Source) became frequently since 2013, and there was no publication in early 2023. The third criterion was set due to the author’s language limitations. According to the search results on EBSCO (Education Source), only publications in English were included, and several publications were written in other languages. Therefore, the third criterion did not have much negative impact on the accuracy of results of this study. The fourth criterion was considered at this stage is due to the reason that if studies are relevant to the topic of this research, it is very likely that related words are stated in their titles, abstracts or keywords fields. The last criterion required potential papers to be empirical studies rather than literature review. This criterion was used due to the reason that this research needed to be conducted based on empirical data from previous studies. Moreover, it helped to avoid the problem of data duplication. Eventually, the search string resulted in 203 results on EBSCO (Education source). The whole process of identifying research in the sample search is presented in Figure 4.

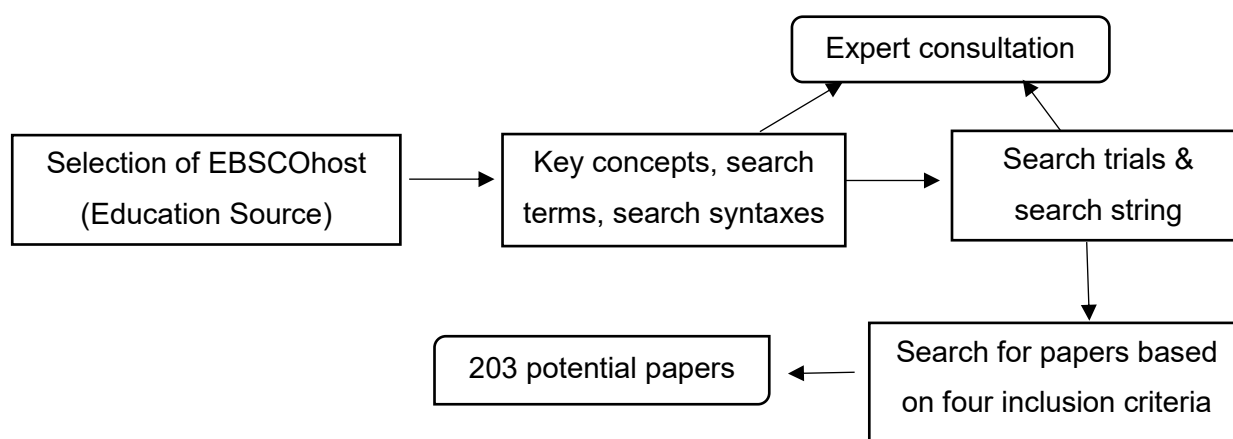


Figure 4 Process of identifying research

3.3 Sample screen

Sample screen started after potential related publications were retrieved in sample search. It is the third step – selecting and evaluating studies in the systematic review process. Sample screen included two rounds of screening against inclusion and exclusion criteria utilized at this stage. During the first-round screening, the author focused on the titles, abstracts and keywords fields of retrieved journals. Full texts of potential journals were evaluated during second-round screening. Potential articles can be eligible if they met two criteria (1) empirical studies rather than literature review and (2) relevant to the research questions of this study. The first criterion was utilized in both sample search and sample screen processes. The second criterion was considered to answer research questions and achieve the goal of this study. Potential papers were excluded if they met any of the exclusion criteria. Exclusion criteria for screening process are as follows:

- (1) Not in an EFL context;
- (2) No learning strategies in vocabulary learning in an EFL context;
- (3) No learning strategies and vocabulary learning in an EFL learning context;
- (4) Focus on instruction or training of vocabulary learning strategies;
- (5) Level of EFL learners – lower than students in higher education;
- (6) Duplicate copies or no full texts.

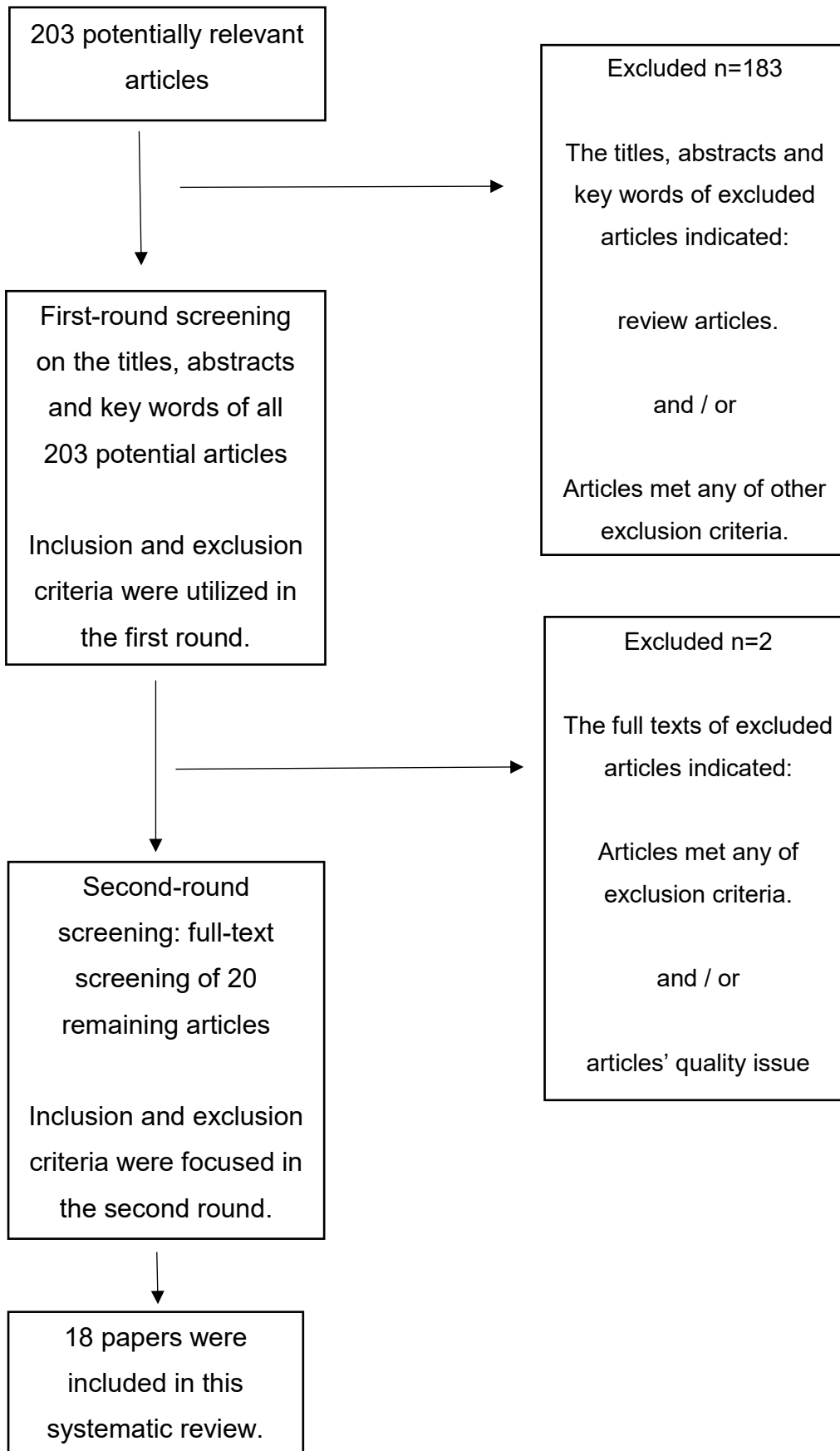


Figure 5 *Sample selection process*

Careful evaluation was performed in two rounds of sample screening. During the first-round screening, the abstracts of 203 potential articles were read carefully. Some abstracts were read several times before being included or excluded. After first-round screening, only 20 articles remained, with 183 articles being excluded based on the inclusion and exclusion criteria. Several excluded articles were review journals, duplicate copies or without full texts. Many articles were excluded due to the reason that studies were not conducted in an EFL setting, such as in an ESL context where learners learn English in an English-speaking country or where English is an official language in a country. Some studies were conducted in EFL learning contexts, while vocabulary learning strategies were not discussed. Instead of focusing on vocabulary learning, many excluded studies focused on instruction of vocabulary learning strategies. The level of EFL learners was also a focus during the first-round screening. Many studies were excluded as their participants were students in primary or secondary schools. At the second stage in sample screen, full-text careful reading was performed, which resulted in 2 journals being eliminated because the quality of excluded journals was questionable. The two articles were excluded due to ambiguous reporting of research methods and findings. 18 articles were included for this systematic review after two rounds of sample screening. Detailed information for each article, including paper title, author(s), journal, year of publication, country, methodology, is provided in Appendix 1.

3.4 Data analysis

The fourth step of analysis and synthesis in the process of systematic review began after selecting and appraising articles. Denyer and Tranfield (2009) argued that results from selected articles also need to be analyzed and synthesized to generate new results that individual articles cannot present. Synthesis plays a fundamental and critical role in making new findings available at this stage (Pittaway, 2008). Bottom-up synthesis was a method utilized to summarize results of included articles with words and texts in different columns, put summarized results of individual articles into categories for coding, and extract new results through details of categories. Apart from synthesis approach, it was also quite crucial to adopt an appropriate synthesis strategy at the step of analysis and synthesis to plan well-organized synthesis procedures (Booth et al., 2012). Excel was a tool used to perform synthesis strategy at this stage. Information recording and coding were the main tasks of bottom-up synthesis. Different columns were set in an Excel sheet to record details of included individual articles, including title, author, journal, year of publication, abstract, key concepts, research purpose, methodology, main findings, and some other thoughts that may arise when reading and analyzing articles. An Excel sheet with information in various columns performed as a structure for

data analysis and coding (Bodoliga & Spraggon, 2018). 18 articles were arranged in order from the oldest to the latest based on their years of publication. The analysis details of each article recorded in different columns can be words, phrases, sentences, or even one or several paragraphs (Allard-Poesi, Drucker-Godard, & Ehlinger, 2001). To display accurate and concise details for later coding, the author tried to briefly summarize details instead of presenting a few paragraphs of details.

All articles were coded with a bottom-up approach which indicated careful reading and information recording were conducted before coding. To code successfully for generating new findings, it was essential that codes were distinguished, and details of articles were placed into different codes (Allard-Poesi et al., 2001). Based on the research questions of this study, details attained through careful reading and information recording, categories used for coding were as follows: (1) descriptive data (journals, year of publication, research methods and countries), (2) similarities (for the sub-question), (3) differences (for the sub-question), (4) potential factors for the similarities, and (5) potential factors for the differences. Excel was also utilized during the coding process because the Excel sheet was clear and concise to display coding details (Bodolica & Spraggon, 2018). The five codes indicated coherence between the main research question and two sub-questions. A key function of coding was to synthesize useful information and extract new results for the final step of a systematic review, presenting and using findings. Chapter 3 ends with the evaluation of the research design.

3.5 Evaluation of the research design

An evaluation of research design is an integral part of this systematic review study. Firstly, the research questions were generated based on the literature review related to vocabulary learning strategies and EFL learners in higher education; and scope review was used to clarify clear, specific, relevant and answerable research questions for this study. The research questions addressed specific aspects that this systematic review study needed to focus on, and they provide a solid foundation for this study. Secondly, the data collection strategy was comprehensive, rigorous and reliable. In sample search process, a certain database for educational source was used, and key concepts, search terms, search syntaxes, a search string and inclusion criteria related to research questions were clarified to ensure comprehensiveness and reliability. In sample screen process, more inclusion and exclusion criteria were defined to be aligned with research questions, and they were utilized in two-round screening related to the titles, abstracts, keywords fields and full texts of potential included papers to get a rigorous and reliable sample. However, sample selection was mainly finished carefully by one

independent novice researcher, and transparency can be better ensured if this process was done by two or three researchers to resolve discrepancies. Moreover, if more databases are used, comprehensiveness and reliability of the sample will also increase. Thirdly, a bottom-up strategy and an Excel tool were employed in the process of convergent qualitative synthesis where information such as titles, authors and journals of included papers were extracted rigorously and transparently, and information including types of vocabulary learning strategies used by EFL learners in higher education, similar and different results of previous findings as well as potential factors for the similarities and differences was also effectively summarized to ensure reproducibility. Lastly, the findings of this study were integrated to achieve research objectives, and they provided implications for future research and EFL educators.

4 Results

After selecting relevant empirical studies for this research topic, and doing information recording and coding, this chapter proceeds to the presentation of the findings from included 18 studies according to the research questions. These studies were conducted in different countries, which helps to offer a diverse and comprehensive understanding of vocabulary learning strategies used by EFL learners in higher education. This section starts with the presentation of descriptive data of the included studies, which consists of journals where the studies were published, publication years of included studies, countries where these studies conducted, sample sizes and research approaches these studies adopted. The overview of the previous empirical studies on this research topic makes it possible to do subsequent analysis. After presenting the descriptive data, the author presents the types of vocabulary learning strategies employed by EFL learners in higher education based on the findings from the included studies and categorizes these strategies into several key categories. After this, similar and different results between these included studies will be presented according to the information from coding, which helps to identify the consistency and variability on the employment of vocabulary learning strategies among EFL learners in higher education and encourages the author to explore the potential factors for the similarities and differences. Moreover, the results found from the included studies make a good contribution to the existing knowledge on this topic, and practical implications can be generated for educators and future research.

4.1 Descriptive data from the included studies

Table 2 presents nine different academic journals where the 18 included empirical studies were published, which indicates these journals are related to the topic of vocabulary learning strategies and EFL learners in higher education. The order of these journals in the table was based on their publication frequency, with some journals published many studies, while other journals only published one or two studies. According to the table information, most included studies were published in two journals, including *Arab World English Journal (AWEJ)* with 6 journals and *Journals of Language Teaching and Research* with 4 journals. The two journals account for around 56% of 18 included studies. In addition, the third order *Theory and Practice in Language Studies* with 2 included studies, and the rest journals such as *Theory and Practice in Language Studies* and *Journal of Education and Instructional Studies in the World* have also published a small number of studies and made contributions to the topic. The studies were distributed across different journals, which indicates researchers can take the chance to collaborate and exchange knowledge on this topic

to explore their findings and generate more valuable insights. The detailed information about names of journals and number of studies published in these journals is presented in table 2 as follows:

Table 2 *List of journals and number of studies*

Names of Journals	Number of studies
Arab World English Journal (AWEJ)	6
Journal of Language Teaching and Research	4
Theory and Practice in Language Studies	2
TESOL Journal	1
Cogent Education	1
Theory and Practice in Language Studies	1
International Forum of Teaching and Studies	1
Malaysian Journal of ELT Research	1
Journal of Education and Instructional Studies in the World	1

As the time span used for the data search is from 2013-2022 where the author found the publication data on EBSCO (Education Source) becomes more frequently since 2013 after several search trial, it is significant to present the publication frequency across these years. The expansion of research between 2013-2022 may be distributed to the reasons such as: 1) an increasing awareness of the significance and usefulness of vocabulary learning strategies in EFL learning, 2) the reformation of curriculum and changes of educational policies, 3) Evolution of EFL teaching methods. Figure 6 presents the overview of distribution of 18 included studies, with horizontal line indicating the years of publication and vertical line indicating the number of studies published each year. The detailed information is displayed as follows:

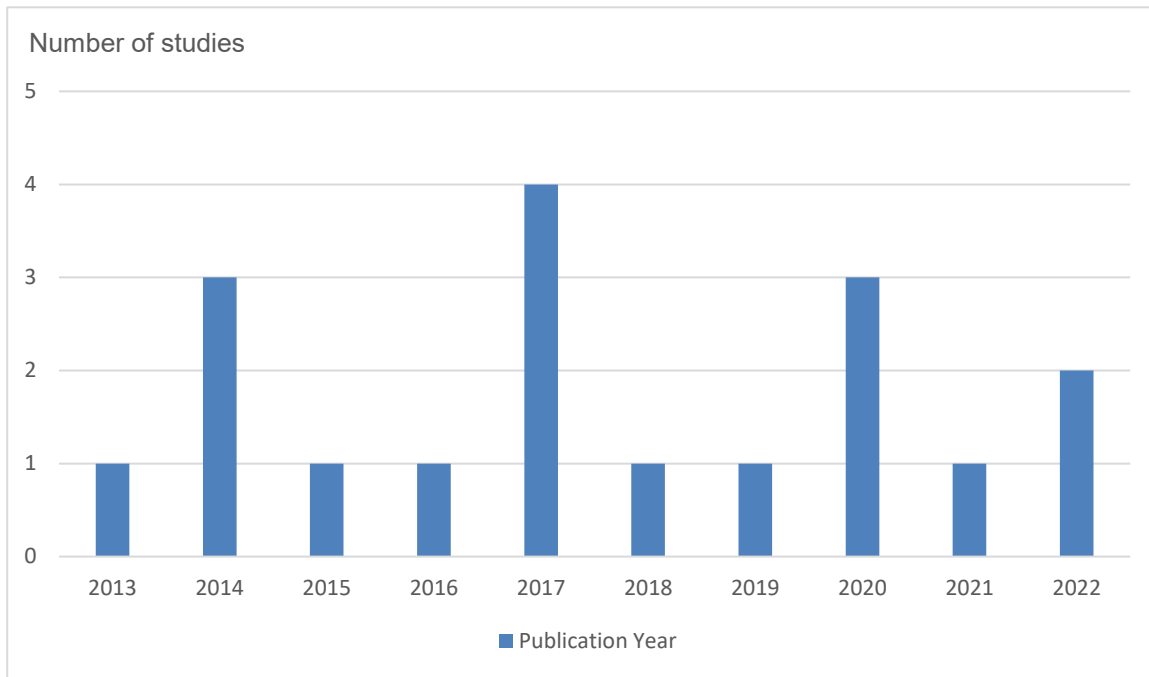
Figure 6 *Publication years and number of studies*

Figure 6 illustrates the variation in the number of studies published in the time frame 2013-2022. Studies on the vocabulary learning strategies used by EFL learners in higher education were conducted frequently between 2013-2022. Through analyzing the chart, variability in the research publication has been observed and they need to be addressed. The chart does not indicate a specific trend of publications, but with several years publishing more than other years, that is, in year 2017, four studies were published, which indicates studies were conducted most frequently in this year. In year 2014 and year 2020, the number of studies were published equally with each year 3 studies, which indicates a high level of focus on this research topic in both two years. In 2022, studies were published one less than 2014 and 2020. In the rest of the years, only one study was published each year. Thus, figure 6 demonstrates the research output well between the year 2013 and the year 2022.

In addition to displaying information about distribution of studies in a period of 10 recent years, the countries where the included 18 studies were conducted also need to be analyzed. Table 3 presents the information including countries, along with publication years and the number of studies from the highest number to the smallest one. The information is presented as follows:

Table 3 *List of countries, publication years, sample sizes and number of studies*

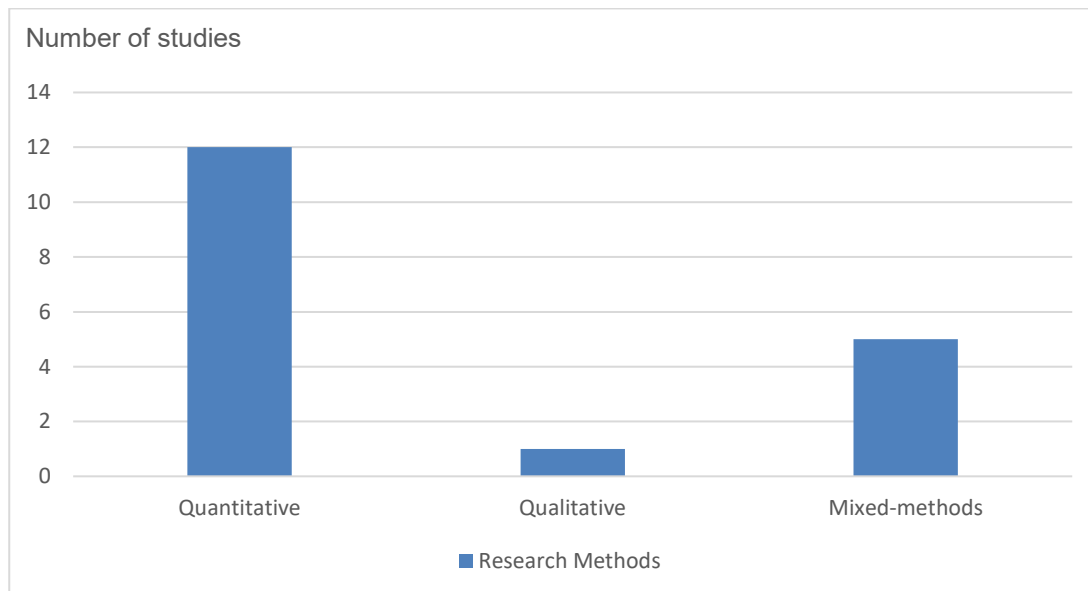
Countries	Publication years	Sample sizes	Number of studies
Iran	2013 & 2014	74 & 449	2
Thailand	2014 & 2019	63 & 267	2
Turkey	2014 & 2017	80 & 40	2
Iraqi	2017 & 2020	118 & 30	2
Saudi Arabia	2021 & 2022	119 & 20	2
Japan	2015	38	1
China	2017	250	1
Sudan	2017	60	1
The Republic of Cyprus	2016	76	1
Vietnam	2018	132	1
Afghanistan	2020	177	1
Jordan	2020	87	1
Oman	2022	42	1

Table 3 displays that 18 included recent studies were conducted in 13 different countries, including Iran, Thailand, Turkey, Iraqi, Saudi Arabi, Japan, China, Sudan, The Republic of Cyprus, Vietnam, Afghanistan, Jordan and Oman, which indicates there is an international interest in the topic of types of vocabulary learning strategies employed by EFL learners in higher education, and provides a research landscape on this topic. The included studies are demonstrated to be mostly conducted in five countries including Iran, Thailand, Turkey, Iraqi and Saudi Arabia within 2013-2022, with each country 2 studies. Moreover, majority of the included studies were conducted in Asian countries such as Thailand, Iran and Saudi Arabia, which may be due to several reasons such as: 1) Asian countries have larger populations of EFL learners in higher education; 2) Asian EFL learners in higher education may face more challenge in EFL learning due to cultural backgrounds; 3) Research on the topic of vocabulary learning strategies has received more priorities and fundings in some Asian countries. However, it helps to provide a more comprehensive understanding of the types of vocabulary learning strategies adopted by EFL learners in higher education if the future research can be conducted in more various countries such as in European countries. In addition, table 3 also presents the number of participants in 18 included studies. The smallest and largest sample sizes vary widely, with 20 and 449 participants respectively. The average number of participants indicates a

moderate sample size with approximately 118 participants. It is important to acknowledge that the included studies with bigger sample sizes are more likely to provide more robust findings to increase generalizability and reliability. The considerable variation in sample sizes of the included studies may be due to factors such as research approaches adopted for the studies and research funding for recruiting target participants.

In addition to the four aspects of descriptive data presented above, methodology used in the included studies is also one aspect that needs to be discussed in this section. Among 18 studies, three types of research methods including quantitative, qualitative and mixed-methods were used. However, the number of studies used these research methods varies. Figure 7 presents the distribution of the three research methods among 18 included studies as follows:

Figure 7 *Distribution of research approaches and number of studies*



The bar chart displayed in Figure 7 offers a clear presentation of the distribution of three research approaches. The highest bar chart indicates that a quantitative research method was the most commonly used among 18 included studies, with 12 studies adopted this research approach. The second preferred research method was mixed-methods approach, with 5 empirical studies. The least used research method was qualitative method, with only one study among 18 studies. Questionnaires were widely used as preliminary tools in 12 quantitative studies and 5 mixed-methods studies, which help to collect data from a big sample of EFL learners in higher education effectively and efficiently. Thus, researchers can infer the common types of vocabulary learning strategies used by EFL learners in higher education across a larger population and provide practical implications for educators.

Among these questionnaires, Schmitt's (1997) taxonomy of vocabulary learning strategies questionnaire was most popular, which may distribute to the reason that his questionnaire consists of more comprehensive vocabulary learning strategies compared with questionnaires proposed by other researchers. A mixed-methods approach with a questionnaire and a semi-structured interview or an observation used in 5 included studies helps to strengthen the validity of findings and offers a more comprehensive understanding on the types of vocabulary learning strategies used by EFL learners in higher education.

The five aspects discussed above in this section enhance transparency of this systematic review study, which also helps to strengthen reliability of this study. After presenting descriptive data, the presentation of findings proceeds to the research questions of this study, including the types of vocabulary learning strategies used in EFL learners in higher education, similarities and differences between the results of 18 included studies, and potential factors for the similarities and differences.

4.2 Types of VLSs used by EFL learners in higher education

The main research question is analyzed in this section, that is, to present an overview of the types of vocabulary learning strategies (VLSs) adopted by EFL learners in higher education based on information recording and careful analysis of 18 included empirical studies. To provide a more detailed presentation, understanding the results of each included study is emphasized first, then vocabulary learning strategies found in the included studies will be categorized into several key categories to give a more concise and comprehensive presentation, which helps to display a general trend of employing vocabulary learning strategies by EFL learners in higher education across 18 studies. The studies that used Schmitt's (1997) taxonomy of vocabulary learning strategies will be presented first because most included studies employed Schmitt's (1997) taxonomy. Then the author will describe the studies which used other taxonomies such as Jones's (2006) classification, as well as studies that specific taxonomies were not utilized.

Ten studies which utilized Schmitt's (1997) taxonomy of vocabulary learning are presented in order based on publication years. Amirian and Heshmatifar (2013) did a research study among 74 Iranian EFL learners. The findings indicated the order from the most preferred to the least preferred strategies was determination, cognitive, memory, metacognitive and social strategies. Using a monolingual dictionary and guessing from contexts were the most popular determination strategies, and asking teachers or classmates were ranked at the bottom in social strategies. Tanyer and Ozturk (2014)

conducted a study among 80 EFL learners in Turkey. The findings revealed that all vocabulary learning strategies were used moderately. Determination strategies were the most used strategies, with guessing and dictionary strategies being used most frequently, while social strategies were the least frequently used strategies. Behbahani (2016) did a research study among 76 EFL learners in the Republic of Cyprus. The study indicated learners preferred metacognitive strategies, while social strategies were the least used strategies. Three studies were conducted in 2017. Mahmood and Arslan (2017) did a research study among 118 Iraqi EFL learners. They found memory strategies such as studying new words' sounds were the most frequently used strategies. The second and third preferred strategies were metacognitive strategies (watching English TV channels) and cognitive strategies (repeating new words) respectively. The least favored strategies were social strategies, with asking teachers for paraphrasing and studying meanings of new words in a group being ranked the highest. Apart from Schmitt's (1997) taxonomy, Hamza, Yasin, and Aladdin (2017) also utilized taxonomy from Nation's (2001) and conducted a survey among 60 EFL learners in Sudan. They found learners preferred metacognitive strategies, of which word list, dictionary, free reading and using TV channels were the most frequently used strategies. Moreover, discovery strategies were the second preferred, and consolidation strategies such as written repetition were the least used strategies. Mutaf (2017) did a survey among 40 Turkey EFL learners. The findings revealed that determination strategies were the most preferred strategies. Social, memory, and metacognitive strategies were the second, third and fourth strategies preferred by learners. Cognitive strategies were the least used strategies. Huong (2018) also adopted two more taxonomies (Bramki & Williams, 1984; Chung & Nation, 2004) and conducted a study among 132 university EFL learners in Vietnam. The findings indicated that 6 types of strategies including determination strategies, device-assisted strategies, memory strategies, social strategies, cognitive strategies and metacognitive strategies were used. Device-assisted strategies including using online dictionaries and Apps to assist EFL learners' vocabulary learning were the most preferred vocabulary strategies. Determination strategies (guessing from contexts) were the second most commonly used. As for social strategies, learners preferred to study with their friends to solve problems instead of asking teachers for help. Metacognitive strategies were the least used strategies. Two years later, Jassim (2020) conducted a survey among 30 university EFL learners in Iraqi. The results revealed determination strategies were adopted most frequently, with guessing from contexts and analyzing pictures being highly used. Social strategies were the second preferred, with asking teachers for help in translation and paraphrasing being ranked highest. Metacognitive strategies such as using flash cards making word lists were the least frequently used strategies. The last two studies that used Schmitt's (1997) taxonomy were conducted in 2022. Zahrani and Chaudhary (2022) did a survey among 20 EFL learners in Saudi Arabia. They found guessing from contexts and

note-taking which can be categorized into determination strategies and cognitive strategies respectively were the most favored strategies. Memory strategies and social strategies were also popular. In using memory strategies, EFL learners preferred to make pictures and images as well as grouping words to help them remember vocabulary and making use of acronyms (memory strategies) was the least preferred strategy. In using social strategies, they preferred to ask classmates for help rather than consult their teachers. Behforouz and Ghaithi (2022) conducted a survey among 42 Omani university EFL learners. They found EFL learners' preferences in using vocabulary learning strategies were ranked as cognitive strategies, determination strategies, memory strategies, metacognitive strategies and social strategies. Additionally, repetition and using dictionaries were the most preferred cognitive and determination strategies respectively.

Apart from Schmitt's (1997) taxonomy, taxonomies from Jones's (2006), Mizumoto and Takeuchi's (2009a) and Gu's (2013) were also adopted among the included studies. Hadavi and Hashemi (2014) adopted Jones's (2006) taxonomy of vocabulary learning strategies and did a survey among 449 Iranian EFL learners from eight study fields. They found all eight vocabulary learning strategies were used, and learners in the first year used more strategies than senior learners. Memory strategies, in which recording new words, reviewing new words and repeating new words were the most favored strategies among all learners. Besides, using dictionaries and note-taking (cognitive strategies) were also two strategies preferred by these learners. Moreover, EFL learners were unaware of social strategies, and learners in the field of surgical technology employed more dictionaries, memory strategies and note-taking strategies than learners in other fields. Boonnoon (2019) also used Jones's (2006) taxonomy and did a research study among 267 Thai university EFL learners. The findings revealed eight vocabulary learning strategies were all used. Moreover, note-taking strategies were the most popular strategies, and selective attention strategies were the least used strategy. Little and Kobayashi (2015) adopted Mizumoto and Takeuchi's (2009a) taxonomy and conducted a study among 38 Japanese university learners. They found that cognitive strategies were more frequently used than memory strategies. In using cognitive strategies, writing rehearsal and vocalization were employed more frequently than word cards; in using memory strategies, association and imaginary strategies were more commonly used than mnemonics. Hadi and Guo (2020) employed Gu's (2013) taxonomy of vocabulary learning strategies and conducted a survey among 177 Afghanistan EFL learners. They found that learners preferred cognitive strategies such as inferring and note-taking, and metacognitive strategies such as selective attention were the least preferred strategies. The rest four studies that no specific taxonomies of vocabulary learning strategies were used are described in order based on their publication years. Saengpakdeejit (2014) used semi-structured interviews to conduct

research among 63 EFL university students in Thailand and found that strategies can be categorized into 6 categories including discovery, social, support, memory, cognitive, and metacognitive strategies, which are similar to Schmitt's (1997) taxonomy of vocabulary learning strategies. Additionally, using dictionaries (support strategies) and guessing from contexts (discovery strategies) were the most used strategies. Zou and Zhou (2017) conducted a study among 250 Chinese university EFL learners and found Chinese EFL learners preferred to use vocabulary learning strategies including guessing, dictionaries, selective attention, sound association and mother tongue. Ethnic minority students used more strategies than Han students, and Han learners preferred to use guessing strategies, while ethnic minority learners favored strategies such as mother tongue, using dictionaries, selective attention and sound association. Haddad (2020) developed an EFL Vocabulary Learning Inventory to measure the types of vocabulary learning strategies adopted by 87 EFL learners in Jordan. The study revealed EFL learners highly used affective strategies and social strategies. Furthermore, memory strategies, cognitive strategies, metacognitive strategies and compensatory strategies were moderately used, and the least preferred strategies were memory strategies. Shamsan, Ali, and Hezam (2021) conducted a study among 119 EFL learners during Covid-19 pandemic in Saudi Arabi, and the results revealed that guessing, dictionaries and google translate were the most frequently used strategies among EFL learners in online vocabulary learning. EFL learners didn't ask teachers, classmates, or friends for getting meanings of new words. Compared with non-English majors, English majors employed more strategies, and they used bilingual dictionaries and written repetition more frequently.

The findings of each included study indicated EFL learners in higher education in recent decade utilized a variety of vocabulary learning strategies, and most strategies they employed can be categorized into several categories based on Schmitt's (1997) taxonomy of vocabulary learning strategies because his classification was widely used in 18 included studies. Moreover, EFL learners in higher education have preferences in using strategies. For example, Amirian and Heshmatifar (2013) found Iranian EFL learners used determination strategies most frequently, of which using dictionaries and guessing from contexts were the most preferred items. Thus, it is significant to provide synthesized knowledge of the types of vocabulary learning strategies EFL learners used as well as learners' preferences in using certain items related to certain types of strategies, which require to synthesize the findings of 18 included studies. The key categories used to classify the types of vocabulary learning strategies are mainly based on Schmitt's (1997) taxonomy because his taxonomy is more comprehensive, and it was more popular among the included studies than classifications of vocabulary learning strategies from other researchers such as Jones's (2006) and Gu's (2013). Table

4 presents the synthesized results which offer a deeper understanding of the overview of vocabulary learning strategies used by EFL learners in higher education in the included countries.

Table 4 *Types of vocabulary learning strategies and preferred items*

No.	Vocabulary learning strategies	Preferred items
1	Determination strategies	1) Using dictionaries (monolingual & bilingual) 2) Guessing from contexts 3) Analyzing pictures
2	Cognitive strategies	1) Taking notes 2) Writing rehearsal 3) Vocalization 4) Inferring 5) Written repetition
3	Memory strategies	1) Recording, reviewing, or repeating new words 2) Sound association 3) Imaginary strategies 4) Studying new words' sounds 5) Making pictures and images 6) Grouping words
4	Metacognitive strategies	1) Watching English TV channels 2) Word list 3) Free reading 4) Selective attention
5	Affective/Social strategies	1) Ask teachers for help in new words / translation 2) Ask teachers for paraphrasing 3) Ask classmates / friends for new words 4) Study with friends to solve problems (e.g. meaning of new words)
6	Compensatory strategies	1) Using mother tongue 2) Using word families
7	Technology-based strategies:	1) Using applications 2) Google translator

Note: Vocabulary learning strategies classified above were based on the taxonomies from Schmitt's (1997), Oxford's (1990) and Nation's (2013).

According to the analysis in table 4, seven categories of vocabulary learning strategies including determination, cognitive, memory, metacognitive, affective/social, compensatory and technology-based strategies can be classified (Schmitt, 1997; Oxford, 1990; Nation, 2013) after synthesizing the findings of 18 included empirical studies. Table 4 also indicates EFL learners in higher education had their preferred items when using a certain type of strategy. For example, using dictionaries, guessing from contexts and analyzing were found to be three preferred determination strategies than other determination strategies (Amirian & Heshmatifar, 2013; Saengpakdeejit, 2014; Tanyer & Ozturk, 2014; Zou & Zhou, 2017; Jassim, 2020; Shamsan et al., 2021; Zahrani & Chaudhary, 2022). Regarding the features of seven types of vocabulary learning strategies and EFL learners had their preferences when using each type of strategies, these seven types of vocabulary learning strategies can be considered as a combination of active strategies and passive strategies (Nation, 2013). For example, determination strategies such as using dictionaries and analyzing pictures require learners' initiative to identify and clarify the meanings of new words or phrases. Cognitive strategies such as taking notes, inferring and writing rehearsal also involve EFL learners' active processing to acquire new words. Metacognitive strategies such as making word lists and selective attention require EFL learners to be aware of their learning processes. Affective/social strategies such as asking teachers for help in translation and studying with friends to discover meanings of new words require learners to engage emotions and interact with others. Memory strategies such as making pictures and grouping words need learners to make efforts for long-term memory. Therefore, these preferred items are more associated with EFL learners' active engagement. However, some preferred items in the seven categories are more related to learners' passive engagement. For example, memory strategies such as repeating new words require learners to memory definitions or structures of new words without deep understanding. Compensatory strategies such as using mother tongue need learners to use alternative ways to overcome limitations instead of being actively involved in the comprehension process. Technology-based strategies such as using google translator require learners to use technological tools to assist vocabulary learning. Thus, to some degree, learners passively rely on these tools. It is significant to note that EFL learners in higher education are more likely to use both active and passive strategies in vocabulary learning, with some learners may more rely on active strategies and other learners may more rely on passive strategies, which may be due to factors such as learning environments and individual differences. Figure 8 displays these seven types of vocabulary learning strategies are a combination of active and passive strategies.

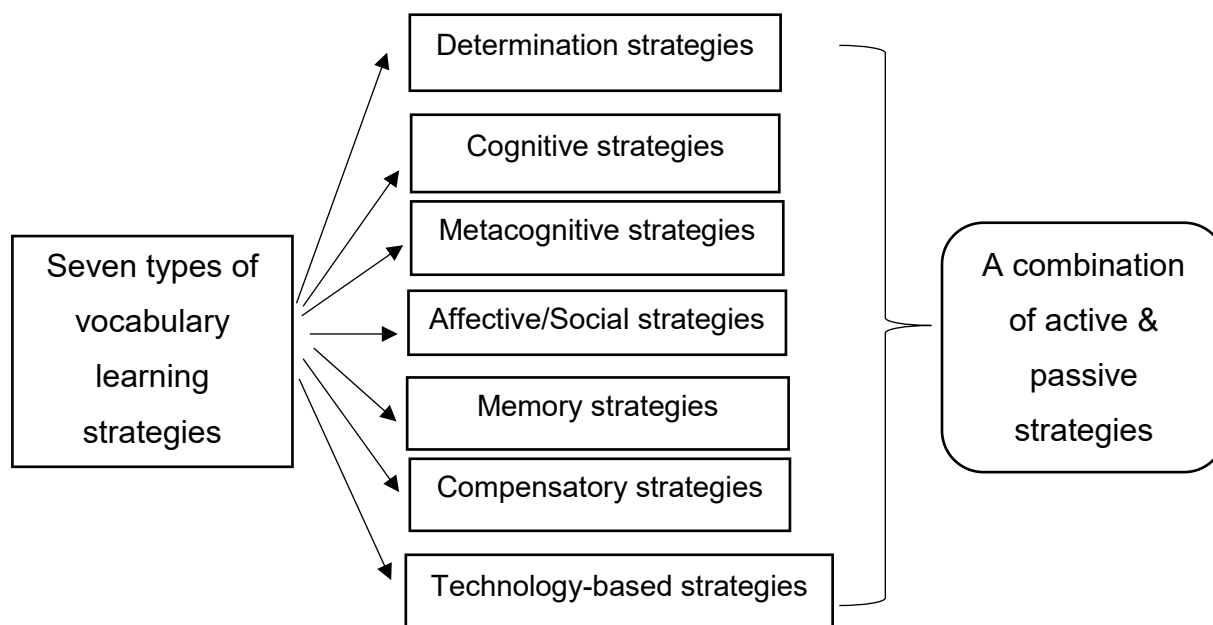


Figure 8 *A combination of active and passive vocabulary learning strategies (Nation, 2013)*

In addition to presenting the overall types of vocabulary learning strategies used by EFL learners through analyzing 18 included studies, the presentation of similar and different results from included studies is also part of this systematic review study. Similarities and differences between 18 empirical studies will be discussed in the following section - 4.3 similarities and differences based on included studies.

4.3 Similarities and differences based on the included studies

The similarities and differences in employing vocabulary learning strategies by EFL learners in higher education are explored in this section based on the findings of 18 included studies listed in section 4.2. It is crucial to present the similar and different results between these included studies so that a more comprehensive understanding of this research topic can be offered. Firstly, exploring the similarities helps to identify common trends of using vocabulary learning strategies by EFL learners in higher education and highlight the effectiveness of employing certain strategies in EFL learning. Moreover, identifying the similarities in using vocabulary learning strategies by EFL learners in higher education across different studies enhances generalizability, which may indicate some certain strategies may be suitable for a wider range of EFL learners as well as learning contexts. Secondly, examining the differences encourages to explore factors such as EFL learners' English proficiency levels and previous learning experiences that may influence their choices in adopting vocabulary learning strategies across included studies. Therefore, the differences can provide evidence for the

roles of these potential factors in vocabulary learning and the associated practical implications as well. Thirdly, after identifying the similarities and differences, research gaps on this topic may be identified, and future research directions may be proposed. In addition to informing future research, identifying similarities and differences also helps to inform instructional practices, which indicates educators pay more attention to design and use appropriate vocabulary teaching methods to help EFL learners in higher education meet specific goals based on the effectiveness of some strategies and potential factors that may affect learners' choices. The detailed information of each included study in section 4.2 helps to answer the first sub-question, exploring the similarities and differences between 18 included studies. Table 5 displays the included countries with the most frequently used and least used vocabulary learning strategies as follows:

Table 5 *Countries with the most preferred and the least used strategies*

Studies	Countries	The most used strategies	The least used strategies
Amirian and Heshmatifar (2013)	Iran	Determination	Social
Hadavi and Hashemi (2014)	Iran	Memory	Social
Saengpakdeejit (2014)	Thailand	Determination (Support & Discovery)	-
Tanyer and Ozturk (2014)	Turkey	Determination	Social
Little and Kobayashi (2015)	Japan	Cognitive	-
Behbahani (2016)	The Republic of Cyprus	Metacognitive	Social
Mahmood and Arslan (2017)	Iraqi	Memory	Social
Zou and Zhou (2017)	China	Determination, Memory, and Compensatory	-
Hamza et al. (2017)	Sudan	Metacognitive	Cognitive
Mutaf (2017)	Turkey	Determination	Cognitive

Studies	Countries	The most used strategies	The least used strategies
Huong (2018)	Vietnam	Technology-based	Metacognitive
Boonnoon (2019)	Thailand	Determination	Metacognitive
Jassim (2020)	Iraqi	Determination	Metacognitive
Hadi and Guo (2020)	Afghanistan	Cognitive	Metacognitive
Haddad (2020)	Jordan	Social/Affective	Memory
Shamsan et al. (2021)	Saudi Arabia	Determination and Technology-based	Social
Zahrani and Chaudhary (2022)	Saudi Arabia	Determination and Cognitive	Memory
Behforouz and Ghaithi (2022)	Oman	Cognitive	Social

Note: 1) The “country” column provides a geographical review on the distribution of 18 included studies, which helps to reveal the similarities and differences in a context-specific perspective. 2) “-” indicates no information related to the least used vocabulary learning strategies were found in the included studies.

Table 5 provides a comprehensive overview of the most used vocabulary learning strategies as well as the least used strategies by EFL learners in higher education across different included countries. It is obvious that both similarities and differences can be observed through this table. Thus, it is significant to address the noteworthy common trends for the similarities and notable variations for the differences among these included studies. The similarities and differences make it necessary to explore factors which may influence EFL learners in higher education to employ vocabulary learning strategies. According to the information presented in table 5, the most frequently used vocabulary learning strategies across 18 included studies can be divided into 7 categories, and the least used strategies across included countries can be divided into 4 categories. In addition, four countries including Iran, Turkey, Thailand and Iraqi are specifically emphasized because each country has 2 included studies. Thus, if different findings exist in the same country, it is necessary to identify the possible reasons for the differences. Detailed information with related studies is presented in table 6, and table 7 as follows:

Table 6 *The most preferred vocabulary learning strategies and studies*

The most preferred vocabulary learning strategies	Studies
Determination strategies	(Amirian & Heshmatifar, 2013; Saengpakdeejit, 2014; Tanyer & Ozturk, 2014; Zou & Zhou, 2017; Mutaf, 2017; Boonnoon, 2019; Jassim, 2020; Shamsan et al., 2021; Zahrani & Chaudhary, 2022)
Memory strategies	(Hadavi & Hashemi, 2014; Mahmood & Arslan, 2017; Zou & Zhou, 2017)
Cognitive strategies	(Little & Kobayashi, 2015; Hadi & Guo, 2020; Zahrani & Chaudhary, 2022; Behforouz & Ghaithi, 2022)
Metacognitive strategies	(Behbahani, 2016; Hamza et al., 2017)
Technology-based strategies	(Huong, 2018; Shamsan et al., 2021)
Compensatory strategies	(Zou & Zhou, 2017)
Social strategies	(Haddad, 2020)

Table 7 *The least used vocabulary learning strategies and studies*

The least used vocabulary learning strategies	Studies
Social strategies	(Amirian & Heshmatifar, 2013; Hadavi & Hashemi, 2014; Tanyer & Ozturk, 2014; Behbahani, 2016; Mahmood & Arslan, 2017; Shamsan et al., 2021; Behforouz & Ghaithi, 2022)
Metacognitive strategies	(Huong, 2018; Boonnoon, 2019; Jassim, 2020; Hadi & Guo, 2020)
Cognitive strategies	(Hamza et al., 2017; Mutaf, 2017)
Memory strategies	(Haddad, 2020; Zahrani & Chaudhary, 2022)

Based on the information above, three types of strategies including determination strategies, social strategies and technology-based strategies can be addressed for the similarities, which offer valuable insights into common trends in employing vocabulary learning strategies by EFL learners in higher education. The differences can be examined through using memory, cognitive, metacognitive strategies and four specific countries. The variations indicate EFL learners' choices in adopting strategies may be influenced by some factors. The similarities and the differences are presented as follows.

Similarities in using determination, social and technology-based strategies: Firstly, EFL learners in various studies across 6 different countries including Iran, Thailand, Turkey, China, Iraqi and Saudi Arabia highlighted that determination strategies were the most frequently used strategies. The use of determination strategies such as using dictionaries, guessing from contexts and analyzing pictures were the most favored by learners. The prominent similarity in utilizing determination strategies indicates a shared trend that EFL learners in higher education are more likely to rely on determination strategies in vocabulary acquisition. Secondly, social strategies which emphasize the collaborative learning environments and learners' engagement in meaningful interactions were the least used strategies by EFL learners in higher education in many countries including Iran, Turkey, the Republic of Cyprus, Iraqi, Oman and Saudi Arabia. The limited adoption of social strategies reveals that EFL learners in higher education are less relying on social strategies in vocabulary learning. The popularity in using social strategies in Jordan may be due to specific reasons, which cannot be regarded as a common trend. Thirdly, technology-based strategies such as using learning applications and Google translator were identified to be the most preferred strategies by EFL learners in higher education in two countries including Vietnam and Saudi Arabia. Learners' high frequency of using technology-based strategies in the two countries indicates a small trend that they integrate technology into their vocabulary learning process.

In addition to the similarities, differences found in the included studies are related to the varying preferences of EFL learners through three types of strategies and the different results in four specific countries. Firstly, memory strategies were the most frequently used strategies by Iranian, Iraqi and Chinese EFL learners in higher education, while they were the least used strategies by EFL learners in Jordan and Saudi Arabia. Secondly, cognitive strategies were the most favored strategies by learners in Japan, Afghanistan, Oman and Saudi Arabia, while learners in Sudan and Turkey were the least likely to use cognitive strategies. Thirdly, EFL learners in the Republic of Cyprus and Sudan used metacognitive strategies frequently, while metacognitive strategies were the least used strategies

by EFL learners in Vietnam, Thailand, Iraqi and Afghanistan. Fourthly, the variations are related to four different countries. In Iran, determination strategies were the most frequently used strategies by EFL learners in one study (Amirian & Heshmatifar, 2013), while in the other study (Hadavi & Hashemi, 2014), memory strategies were the most preferred strategies by Iranian learners. In Turkey, social strategies were the least used strategies in one study (Tanyer & Ozturk, 2014), while cognitive strategies were indicated as the least used strategies in the other study (Mutaf, 2017). In Saudi Arabia, one study (Shamsan et al., 2021) found social strategies were the least used, while in the other study (Zahrani & Chaudhary, 2022) the least used strategies were memory strategies. In Iraqi, one study (Mahmood & Arslan, 2017) revealed memory strategies were the most used strategies and social strategies were the least preferred strategies, while the other study (Jassim, 2020) indicated that EFL learners preferred determination strategies, and the least used strategies were metacognitive strategies.

Information about the similarities and differences is also provided in Appendix II and Appendix III. After presenting the similar and different results of the included studies, it is equally important to explore potential reasons which contribute to the similarities and differences. In section 4.4, potential reasons are analyzed to offer a more comprehensive understanding of the similarities and differences in employing vocabulary learning strategies by EFL learners in higher education.

4.4 Potential factors for the similarities and differences

The similarities and differences identified in section 4.3 encourage the second sub-question to be answered, that is, to explore the underlying potential factors that may influence EFL learners' adoption of vocabulary learning strategies. Factors including age and gender were not considered as potential reasons because all EFL learners were university students with a similar age range and some included studies which explored the gender factor in learners' employment of vocabulary learning strategies indicated very weak associations or insignificant relationships. Factors including cultural backgrounds, educational systems, learning environments, teaching methods, English proficiency levels, previous learning experiences, academic majors, beliefs and motivations were considered as potential factors which can influence EFL learners' use of vocabulary learning strategies by several researchers (Schmitt, 2008; Oxford, 1990; Cohen, 1998; Boonkongsan, 2012). Thus, special attention was mainly paid to these factors. To explore potential reasons for the different results in specific four countries, factors such as sample size and research method were also analyzed. Potential reasons are analyzed thoroughly to uncover the factors that may influence EFL learners' choices in using vocabulary learning strategies, thereby revealing the similarities and differences observed in

section 4.3.

4.4.1 Potential factors for the similarities

Possible factors for the similarity that determination strategies were the most frequently used in Iran, Thailand, Turkey, China, Iraqi and Saudi Arabia can be attributed to academic majors, learners' levels of English proficiency, previous learning experiences and educational backgrounds. Four studies (Amirian & Heshmatifar, 2013; Tanyer & Ozturk, 2014; Mutaf, 2017; Shamsan et al., 2021) which recruited English majors as participants all revealed English majors were more likely to use determination strategies. English majors usually need to master wider vocabulary knowledge to meet academic requirements so that they may adopt determination strategies such as using dictionaries and guessing from contexts to expand their vocabulary. Three studies (Saengpakdeejit, 2014; Tanyer & Ozturk, 2014; Boonnoon, 2019) had participants with advanced English proficiency, and these studies indicated EFL learners who had high level of English proficiency preferred determination strategies. With high English proficiency level, learners may be more aware of the importance of vocabulary acquisition so that they may use determination strategies to overcome the gaps in the process of expanding their vocabulary. Moreover, three studies (Tanyer & Ozturk, 2014; Jassim, 2020; Zahrani & Chaudhary, 2022) indicated that EFL learners' employment of determination strategies were related to the significant factor of previous learning experiences such as over 10 years' English learning and previous studies related to instruction of vocabulary learning strategies, especially determination strategies. Thus, EFL learners may be more familiar with determination strategies, which influenced their adoption of vocabulary learning strategies in current English learning. Lastly, one study conducted in China (Zou & Zhou, 2017) revealed both Han and Ethnic minority EFL learners used determination strategies the most frequently. However, compared with Ethnic minority students, Han EFL learners employed determination strategies more frequently due to educational backgrounds. Han students in the studies received more educational support and chances for English learning, which may motivate Han learners to employ determination strategies.

The similarity that social strategies were the least used strategies by EFL learners in Iran, Turkey, the Republic of Cyprus, Oman, Iraqi and Saudi Arabia can be associated with learning environments, educational systems, teaching methods, previous learning experiences and curriculum. Three studies (Amirian & Heshmatifar, 2013; Shamsan et al., 2021; Behforouz & Ghaithi, 2022) stated learning environments in three countries did not support learners' use of social strategies. In Iran, Oman and Saudi Arabia (Amirian & Heshmatifar, 2013; Shamsan et al., 2021; Behforouz & Ghaithi, 2022),

vocabulary learning was considered as an individual activity, and interaction with others when encountering new words were neglected. Moreover, online learning environment during Covid-19 pandemic in Saudi Arabia caused social distance for interactions (Shamsan et al., 2021). One study in Iran (Amirian & Heshmatifar, 2013) indicated educational system and teaching method were the variables for the least use of social strategies. Teacher-oriented approach was supported in the Iranian educational system, which led to a fact that teachers provided all knowledge that learners needed, and learners passively accepted knowledge such as taking notes. Thus, EFL learners were less likely to have activities such as discussions and group work. The other study conducted in Iran (Hadavi & Hashemi, 2014) revealed EFL learners' least adoption of social strategies was also attributed to their previous learning experiences because they did not receive enough training of using social strategies so that they were not familiar with social strategies in EFL learning. Furthermore, three studies (Tanyer & Ozturk, 2014; Behbahani, 2016; Mahmood & Arslan, 2017) conducted in Turkey, the Republic of Cyprus and Iraqi indicated that curriculum design did not support collaborative EFL learning. For example, English programme for English majors in Turkey lacked instruction of vocabulary learning, and EFL learners were not aware of social strategies (Tanyer & Ozturk, 2014). Class size in the curriculum in Iraqi EFL context was big so that social strategies were inconvenient to be used in class (Mahmood & Arslan, 2017), which may cause a fact that learners were not familiar with social strategies.

Potential factors for the small trend that technology-based strategies were the most preferred strategies by EFL learners in higher education in Vietnam and Saudi Arabia can be related to technological development and online learning environment. In Vietnam (Huong, 2018), technological development was considered as an attribution that helped EFL learners get access to educational devices such as online applications. It is flexible for EFL learners in higher education to use technology-based strategies because these strategies allow for autonomy so that learners can study according to their own schedules and personal paces anytime, anywhere. The other study (Shamsan et al., 2021) conducted in Saudi Arabia indicated that online learning environment during Covid-19 pandemic could be a factor that enabled EFL learners to use technology-based strategies. During Covid-19 pandemic, self-learning in an online learning environment was encouraged. Technology-based strategies such as online vocabulary applications are adaptive according to EFL learners' learning process so that they could help with personalized learning during that specific period.

4.4.2 Potential factors for the differences

Potential factors for the difference that memory strategies were the most used strategies in Iran, Iraqi and China, while they were the least used strategies in Jordan and Saudi Arabia can be attributed to English proficiency levels, previous learning experiences, educational backgrounds, academic majors, learning environments and beliefs. Studies (Hadavi & Hashemi, 2014; Mahmood & Arslan, 2017) conducted in Iran and Iraqi indicated that learners' low level of English proficiency could be a factor for the preference of memory strategies. EFL learners with low level of English proficiency are more likely to use less-thinking strategies such as memory strategies (Boroujeni & Koosha, 2013). Schmitt (2000) also stated learners with low English proficiency favor memorization skills to assist their learning. The study (Hadavi & Hashemi, 2014) conducted in Iran also revealed that previous learning experiences could be a factor because most learners were instructed memory strategies in prior studies so that they were more familiar with the adoption of memory strategies. The study (Zou & Zhou, 2017) conducted in China indicated that educational background and academic major could be two factors for the preference of memory strategies. Non-English majors may have low English proficiency so that they preferred memory strategies. However, based on the limited information found from the study, further studies can be conducted to explore how educational background influenced Chinese Han and Ethnic minority EFL learners' preference of using memory strategies. The studies (Haddad, 2020; Zahrani & Chaudhary, 2022) found the least preference of memory strategies in Jordan and Saudi Arabia could be attributed to learning environment and belief. A learning environment for individual memorization was not encouraged in Jordan EFL context (Haddad, 2020). Instead, an interactive and cooperative learning environment was provided (Haddad, 2020). The study (Zahrani & Chaudhary, 2022) conducted in Saudi Arabia revealed that learners' belief about learning vocabulary is through using instead of mechanical memorization. Thus, it was possible that learners did not think memory strategies were very useful so that they used memory strategies the least.

Possible factors for the difference that cognitive strategies were the most preferred strategies by EFL learners in Japan, Afghanistan, Oman and Saudi Arabia, while Sundanese and Turkey EFL learners were not aware of cognitive strategies can be related to previous learning experiences, beliefs, levels of English proficiency, learning environments, teaching methods, curriculum and learning styles. The study (Little and Kobayashi, 2015) conducted in Japanese EFL context revealed learners were taught two cognitive strategies including vocalization and writing rehearsal in secondary school so that they were more familiar with cognitive strategies and used this kind of strategies most frequently.

Afghanistan EFL learners had a good belief about cognitive strategies to regulate their learning process (Hadi & Guo, 2020). Two studies (Zahrani & Chaudhary, 2022; Behforouz & Ghaithi, 2022) had participants with advanced and intermediate proficiency, and the two studies revealed that higher level of English proficiency could be a significant factor for the preference of using cognitive strategies in Saudi Arabia and Oman, which aligned with Gu and Johnson's (1996) finding that learners with higher level of English proficiency were more likely to adopt cognitive strategies. Moreover, the least use of cognitive strategies in Sudan could be related to the factors of learning environment and teaching methods (Hamza et al., 2017), and Turkish EFL learners used cognitive strategies the least frequently could be attributed to factors of curriculum and learning styles (Mutaf, 2017). The learning environment provided for Sundanese EFL learners did not support the use of cognitive strategies because of facility shortages such as insufficient computer labs, and teachers were unaware of the instruction of vocabulary learning strategies so that learners were unfamiliar with cognitive strategies. The study (Mutaf, 2017) conducted in Turkish revealed the curriculum did not emphasize the importance of in-depth mental processing in vocabulary learning, which may cause a result that EFL learners lacked knowledge of how to use cognitive strategies. Furthermore, EFL learners in Turkish context preferred tactile learning style (Mutaf, 2017) which could be a factor that learners disliked cognitive strategies that required in-depth mental regulation.

Potential factors for the difference that metacognitive strategies were the most favored strategies in the Republic of Cyprus and Sudan, while they were the least used strategies in Vietnam, Thailand, Iraqi and Afghanistan can be associated with the factors of English proficiency levels, technology development, previous learning experiences, academic majors and beliefs. Two studies (Behbahani, 2016) conducted in the Republic of Cyprus and Sudan revealed high level of English proficiency could be a critical factor for the preference of metacognitive strategies. The participants in the Republic of Cyprus and Sudan were preparatory master and doctor learners who met the English requirements and the 4th year of English majors respectively, and learners in two studies had advanced English proficiency (Behbahani, 2016; Hamza et al., 2017). Thus, they were more likely to use metacognitive strategies which require in-depth mental processing. One study (Huong, 2018) conducted in Vietnam revealed technology development could be a factor that learners preferred less-thinking strategies instead of metacognitive strategies which require in-depth mental learning processing. Another study (Boonnoon, 2019) indicated metacognitive strategies were not instructed in previous learning experiences among most Thai EFL learners so that learners were unaware of metacognitive strategies in vocabulary learning. Moreover, one study (Jassim, 2020) conducted in Iraqi revealed academic major could be a factor that led to the least use of metacognitive strategies

because participants from 3 different academic fields were non-English majors with intermediate English proficiency. Lastly, the study (Hadi & Guo, 2020) investigated Afghanistan EFL learners' belief about metacognitive strategies, and learners were unaware of using metacognitive strategies to plan and regulate their vocabulary learning. Thus, learners' belief could be a crucial factor for the least adoption of metacognitive strategies.

As for 4 specific countries including Iran, Turkey, Saudi Arabia, and Iraqi, potential reasons for the differences can be associated with factors such as sample sizes, research approaches and learners' academic fields. The potential factors for the difference in Iranian EFL context could be related to different sample sizes, research methods, participants' English proficiency levels and study fields. One study (Hadavi & Hashemi, 2014) had a bigger sample with 449 Iranian EFL learners who majored in 8 study fields, and learners had low English proficiency level. In this study, a quantitative method was employed, and the questionnaire was based on Jones's (2006) taxonomy of vocabulary learning strategies. In the other study (Amirian & Heshmatifar, 2013), a smaller sample with 74 EFL learners majoring in English with higher English proficiency were emphasized. In addition, a mixed-methods was used to collect data, and the questionnaire used was based on Schmitt's (1997) vocabulary learning strategy questionnaire. Thus, these aspects could be the potential factors for the difference that one study (Amirian & Heshmatifar, 2013) indicated determination strategies were the most used strategies, while the other study (Hadavi & Hashemi, 2014) revealed memory strategies were the most preferred strategies. The difference found in Turkish EFL context could be due to sample size and learners' English proficiency. The two studies (Tanyer & Ozturk, 2014; Mutaf, 2017) conducted in Turkey used the same research method and the participants were all English majors. However, one study (Tanyer & Ozturk, 2014) had a bigger sample size and learners' English proficiency level was higher than the participants in the other study (Mutaf, 2017). Thus, sample size and learners' English proficiency levels could be the potential factors for the difference of the least used social strategies and cognitive strategies in two studies. Thirdly, the difference between two studies (Shamsan et al., 2021; Zahrani & Chaudhary, 2022) on the least used strategies including social and memory strategies in Saudi Arabia could be attributed to the factors of sample sizes, research methods and learning environments. One study (Zahrani & Chaudhary, 2022) used a mixed-methods approach and had a sample size with 20 participants, while the other study (Shamsan et al., 2021) adopted quantitative method and had a sample size with 119 EFL learners. Moreover, learners had online learning environment during Covid-19 pandemic (Shamsan et al., 2021) while the other study (Zahrani & Chaudhary, 2022) indicated a traditional learning environment in Saudi Arabia. The three different aspects could be the reasons that led to the different results on the least used strategies

in the same countries. Lastly, the potential factors for the differences in Iraqi EFL context could be related to sample size, learners' English proficiency, teacher training and research instrument. One study (Mahmood & Arslan, 2017) had a bigger sample with 118 EFL learners who had high English proficiency. In addition, they were trained to be teachers. The other study (Jassim, 2020) had a smaller sample with 30 non-English undergraduates, and learners had intermediate level of English proficiency. The two studies adopted two different questionnaires. These different aspects may lead to the differences in the most frequently used and the least used strategies in both two studies.

Chapter 4 ends with the exploration of potential factors which mainly included contextual factors and individual factors for the similarities and differences. Educational backgrounds, learning environments, teaching methods, educational systems, curriculum and technology development were the contextual factors for the similarities and differences. Individual factors for the similarities and differences were related to academic majors, levels of English proficiency, previous learning experiences, beliefs and learning styles. However, limited information about cultural backgrounds and learners' motivations can be found in 18 empirical studies, which may limit the analysis of potential factors for the similarities and differences. Thus, further studies can focus on these two aspects to help explain and understand the similar and different results between these studies. Moreover, the analysis of four specific countries resulted in additional reasons such as sample size and research methods for the similarities and differences. The potential factors and limited information help to provide detailed research gaps. Chapter 5 will summarize the findings of this research, explore research gaps, and provide implications for EFL educators and future research avenues.

5 Discussion

To recall the research questions of this systematic review study, the findings of this study indicated seven types of vocabulary learning strategies including determination, cognitive, memory, metacognitive, affective/social, compensatory and technology-based strategies were synthesized (Schmitt, 1997; Oxford, 1990; & Nation, 2013) based on 18 included studies to answer the main research question. The similarities across different countries showed common trends of using determination and social strategies as well as a small trend of using technology-based strategies in two countries including Vietnam and Saudi Arabia. The differences existed in the adoption of memory, cognitive and metacognitive strategies across different countries. Different results in specific four countries were also provided. Moreover, the potential factors such as educational systems, learning environments, teaching methods, levels of English proficiency, previous learning experiences, academic majors and beliefs for the similarities and differences were also explored based on information recording and coding. This chapter is an essential part of this systematic review study because the significance of the findings is emphasized, and it provides a critical analysis of the findings to explore practical implications including future research directions for researchers and pedagogical implications for educators. Besides, the limitation of this study is also analyzed in this section. A comprehensive discussion is provided in this section to make contribution to the research advancement on the employment of vocabulary learning strategies by EFL learners in higher education and offer implications for EFL educators.

5.1 Future research implications

Even though the findings of this study make contributions to the research topic on vocabulary learning strategies used by EFL learners in higher education, research gaps found through this study should be addressed and future research directions should be highlighted. Therefore, in this section, research gaps are identified based on general information of 18 included studies, results on the types of vocabulary learning strategies employed by EFL learners in higher education and the similarities and differences across different countries. Moreover, potential future research avenues in relation to research gaps and findings of this study are explored to deepen understanding of this research topic.

One research gap identified is about the countries where these empirical studies were conducted based on the descriptive information from 18 included studies that majority of these included studies were conducted in Asian countries such as Iran, Thailand, Vietnam, China and Saudi Arabia, while the

studies conducted in other countries or regions such as European countries and African countries were limited. Research gaps explored through this study are also related to the impact of potential factors including cultural backgrounds and motivations in EFL learners' employment of vocabulary learning strategies. The common trends of using vocabulary learning strategies and different results between the included studies indicated factors such as educational systems, academic majors and previous learning experiences could influence EFL learners' adoption of vocabulary learning strategies. However, the 18 empirical studies were all conducted in specific settings such as in Iran and Thailand, the impact of cultural backgrounds were not analyzed in these studies. Information related to learners' motivations of using vocabulary learning strategies in the included studies was unclear. Moreover, the information on the impact of educational background in Chinese Han and Ethnic minority EFL learners' employment of memory strategies (Zou & Zhou, 2017) was very limited, even though the study indicated educational background could be a factor for the preference of memory strategies, especially for Ethnic minority learners. Research gaps are also related to the significance of conducting longitudinal research studies and mixed-methods studies. Among 18 included studies, most studies provided cross-sectional data, and no longitudinal studies were conducted to help track whether EFL learners' adoption of vocabulary learning strategies changed over time, which limits the analysis of potential factors that may influence learners' use of strategies. Lastly, the majority of 18 included studies used a quantitative research method, which limits the analysis of factors that may influence learners' adoption of strategies. A mixed-methods approach such as a semi-structured interview is also conducted along with a questionnaire can provide more crucial information that helps to analyze the potential factors for the preferences of vocabulary learning strategies. These aspects can be considered to bridge the research gaps on the topic of vocabulary learning strategies.

Based on the research gaps explored above and findings of this systematic review study, future research directions can be outlined into several aspects. Future research on the types of vocabulary learning strategies employed by EFL learners in higher education can be conducted in a wider range of different countries and regions such as in European countries to provide a more comprehensive understanding of learners' employment of vocabulary learning strategies across different parts of the world, common trends, and differences in using vocabulary learning strategies as well as potential factors for the similarities and differences. A broader scope can be provided, and the applicability of the findings can be enhanced if future studies highlight the importance of taking EFL learners in diverse countries and regions into consideration. Future research can focus on EFL learners' cultural backgrounds, which can help to understand how cultural contexts influence learners' adoption of

vocabulary learning strategies and how this factor contributes to the effectiveness of certain strategies. Having a better understanding of the impact of culture on the EFL learners' adoption of vocabulary learning strategies can also help EFL educators adjust their teaching approaches to meet EFL learners' needs, especially when learners have different cultural backgrounds. Apart from cultural contexts, EFL learners' motivations can be another focus, and future studies can be conducted to explore the relationships between learners' motivations and their adoption of vocabulary learning strategies. EFL learners' engagement and persistence in vocabulary learning are very likely to be influenced by their motivations. Understanding the relationship between EFL learners' motivations such as intrinsic motivation and extrinsic motivation and their employment of vocabulary learning strategies can provide a valuable understanding of their preferences in using some certain strategies. As a factor, educational background can be investigated in future studies to explore the relationships between educational backgrounds and Chinese Han and Ethnic minority EFL learners' employment of vocabulary learning strategies. A special focus can be put on the differences of educational backgrounds between Chinese Han and Ethnic minority EFL learners in higher education due to the limited information found in the existing included study. Longitudinal studies can be conducted in the future research to track changes and development of using vocabulary learning strategies by EFL learners after they get progressed in vocabulary learning such as their English proficiency gets advanced. Longitudinal studies may provide a comprehensive understanding of the relationships between some potential factors and learners' use of strategies. More mixed-methods research such as a questionnaire and a semi-structured interview or observations can be conducted in the future on this research topic so that more potential factors may be explored to provide a more comprehensive understanding. In addition to these aspects, instruction of vocabulary learning strategies can also be a special focus on this research topic because EFL learners who received instruction of certain vocabulary learning strategies in previous studies were more likely to use those strategies in current vocabulary learning. Thus, future research can investigate how explicit strategy instruction influences learners' awareness and utilization of vocabulary learning strategies, and the relationship between strategy instruction and learners' learning outcomes. Moreover, factors from teachers such as teachers' beliefs and knowledge of vocabulary learning strategies can be also investigated to identify the relationships between teacher factors and learners' use of strategies. As technology-based strategies indicated a small trend in two countries (Huong, 2018; Shamsan et al., 2021), and it is convenient for EFL learners to get access to technology resources, tools and platforms, it can be significant that future research investigates the effectiveness of using technology-based strategies in vocabulary acquisition and EFL learning outcomes. The findings of this study indicated the differences in the preferences of vocabulary learning strategies by EFL learners in the same country such as in Iran and

Turkey. Factors such as sample size, learners' English proficiency and research instruments may result in the different results. Thus, replication studies which have a similar research design can be conducted in the future to explore the effectiveness of these factors and provide general findings.

Research gaps and future research directions identified above are related to many aspects such as diverse countries, cultural backgrounds, motivations, instruction of vocabulary learning strategies, technology tools, sample sizes and research methods. It is much likely that future research focusing on these aspects can deepen our understanding of using vocabulary learning strategies effectively.

5.2 Pedagogical implications

Based on the findings, EFL learners in higher education across different countries mainly employed seven types of vocabulary learning strategies. However, learners commonly had their preferences in the employment of vocabulary learning strategies and many EFL learners were unaware of all types of strategies, which could be due to factors such as teaching methods, academic majors, leaning environments, learners' previous learning experiences and levels of English proficiency. Thus, teachers can take these significant factors into consideration in their teaching design to help learners in higher education be aware of different types of vocabulary learning strategies and select the most efficient and effective strategies based on their individual differences. Instruction of vocabulary learning strategies can be a significant method to help learners get familiar with various strategies and learn how to use them. Teachers can teach learners different vocabulary learning strategies such as memory, cognitive and metacognitive strategies through offering learners necessary learning environments, activities and tools. For example, teachers can incorporate the instruction of cognitive strategies into vocabulary lessons. Activities can be designed to take notes efficiently and effectively, practice written repetition or utilize inferring skills to encourage learners to be aware of the significance of cognitive strategies and learn some effective cognitive strategies suitable for their learning styles. Moreover, implementing vocabulary learning strategies, teachers can take factors such as learners' academic majors, previous learning experiences and levels of English proficiency into consideration and provide appropriate vocabulary learning strategies for certain groups of EFL learners in higher education. Recognizing individual differences is also crucial in teaching vocabulary learning strategies. Teachers can provide EFL learners with opportunities and encourage them to explore their favored vocabulary learning strategies based on some factors such as their learning styles and encourage learners to use their preferred strategies.

The similarities found in this study revealed a common trend of employing determination strategies

and a small trend of using technology-based strategies by EFL learners in higher education in some countries, which indicate teachers need to support learners in using determination strategies and technology-based strategies and integrating both two types of strategies in vocabulary learning. To support determination strategies, teachers can encourage learners' self-oriented learning through enhancing learners' motivations, helping them set specific goals and fostering their perseverance. For example, teachers can offer learners possible opportunities to encourage them to set possible goals and monitor their learning process to get achievements so that learners are motivated to learn independently. Furthermore, teachers can teach determination strategies explicitly such as analyzing pictures, utilizing dictionaries and guessing from contexts. The purpose of teaching determination strategies is to help learners be familiar with a wide range of determination techniques so that learners can choose some effective determination strategies for self-learning. In addition to supporting determination strategies, making emphasis on technology-based strategies is also significant, which requires teachers to integrate technology into teaching. For example, teachers can use digital resources such as online flashcards and videoclips and tools such as English learning applications and websites in vocabulary lessons. Technology-based learning strategies are flexible so that learners can also learn independently after class. Moreover, integrating determination strategies and technology-based strategies effectively, teachers can design specific activities which require learners to use technology tools to regulate vocabulary learning and achieve goals, such as using applications to track vocabulary learning progress.

Pedagogical implications can also be provided based on the finding that social strategies were the least used strategies in many countries. However, learning vocabulary is not isolated from real communication, which indicates social interactions are needed for vocabulary learning. Thus, it is necessary for teachers to support learners with social strategies. Teachers can help learners be aware of the importance of social strategies through providing examples and organizing discussions to explain and discuss how social strategies work in vocabulary learning. Furthermore, teachers can encourage learners to learn and practice vocabulary cooperatively such as in pairs or in groups. For example, teachers offer learners a supportive learning environment and design group activities for learners to interact with other learners and practice vocabulary so that learners are motivated to use social strategies actively in vocabulary learning. Last but not least, teachers can motivate learner to use technology tools and platforms to facilitate social interaction because technology tools and platforms such as online communication communities and video chatting applications provide learners an interactive learning environment and allow learners to connect with other people from different countries, which contributes to vocabulary learning. Chapter 5 ends with analyzing the

limitations of this study.

5.3 Limitations of this study

In addition to research gaps, future research directions and pedagogical implications, acknowledging certain limitations of this study is also essential. Firstly, the database and search string used in this study may limit data collection and therefore influence the findings of this research study. A single database, EBSCO (Education Source), was used to collect data, which may result in some relevant studies on this topic being missing. Although the search string was used after several trials, it may still limit the scope of the studies that should be included. Secondly, the time span for the is from 2013-2022, which may limit the relevant studies before 2013 and after 2022, though after several search trials in EBSCO (Education Source), studies before 2013 are not published frequently. Thirdly, data collection for this systematic review was mainly finished by a novice researcher who may have subjective when selecting studies. Lastly, the research gaps explored in this study also limited the author's analysis. Therefore, future systematic review study on this research topic can use more database and search strings to search the data, use a broader time span and more researchers can be involved in the data collection process. Moreover, future research studies can be conducted based on the research gaps identified in this systematic review.

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Appendices

Appendix 1 The included academic journals

No.	Journal title	Year	Author(s)	Journal	Country	Methodology
1	A Survey on Vocabulary Learning Strategies: A Case of Iranian EFL University Students	2013	Seyyed Mohammad Reza Amirian & Zahra Heshmatifar	Journal of Language Teaching and Research	Iran	Mixed-methods
2	Comparative Analysis of Vocabulary Learning Strategies in Learning English as a Foreign Language among Freshmen and Senior Medical Sciences Students Across Different Fields of Study	2014	Maryam Hadavi & Zahra Hashemi*	Malaysian Journal of ELT Research	Iran	Quantitative
3	Awareness of Vocabulary Learning Strategies among EFL Students in Khon Kaen University	2014	Rakchanok Saengpakdej	Theory and Practice in Language Studies	Thailand	Qualitative
4	Pre-service English Teachers' Vocabulary Learning Strategy Use and Vocabulary Size: A Cross-	2014	Seray Tanyer & Yusuf Ozturk	Journal of Language Teaching and Research	Turkey	Quantitative

	sectional Evaluation					
5	Vocabulary Learning Strategies of Japanese Life Science Students	2015	Andrea Little & Kaoru Kobayashi	ESOL Journal	Japan	Quantitative
6	A Survey of University Students' Knowledge of Vocabulary Learning Strategies and Influential Factors in Middle East	2016	Amin Rasti Behbahani	Journal of Language Teaching and Research	The Republic of Cyprus	Mixed-methods
7	A Study of English Vocabulary Learning Strategies Used by Ethnic Minority Students in Leshan Normal University, Sichuan, China	2017	Li zhou & Ye Zhou	Theory and Practice in Language Studies	China	Mixed-methods
8	The Use and Evaluation of Vocabulary Learning Strategies among Sudanese EFL Learners	2017	Fatima Salaheldeen Ahmed Hamza, Mohamad Subakir Mohd Yasin & Ashinida Aladdin	Arab World English Journal (AWEJ)	Sudan	Mixed-methods
9	Perceptual Learning Styles Impacts on Vocabulary Learning Strategies Of Turkish EFL learners	2017	Betül Mutaf	Journal of Education and Instructional Studies in the World	Turkey	Quantitative

10	The Relationship between Iraqi EFL Learners' Vocabulary Learning Strategies Use and Their Receptive Vocabulary Size	2017	Adil Muhammd Ameen Mahmood & Fadime Yalci Arslan	Arab World English Journal (AWEJ)	Iraq	Quantitative
11	A Survey Study on Academic Vocabulary Learning Strategies by EFL University Students	2018	Le Pham Hoai Huong	Journal of Language Teaching and Research	Vietnam	Quantitative
12	Vocabulary Learning Strategies Employed by Thai University Students across Four Academic Profiles	2019	Sichabhat Boonnoon	Theory and Practice in Language Studies	Thailand	Quantitative
13	Methods for Learning English Vocabulary Employed by Iraqi EFL Learners at University of Technology	2020	Lina Lafta Jassim	Arab World English Journal (AWEJ)	Iraq	Quantitative
14	A survey of beliefs and vocabulary learning strategies adopted by EFL learners at Shaikh Zayed University	2020	Hadi ur Rahman Hadi & Xihuang Guo	Cogent Education	Afghanistan	Quantitative

15	Vocabulary Learning Strategies of EFL Undergraduate Students at Al Balqa Applied University in Jordan	2020	Maram Teimeh Atallah Haddad	International Forum of Teaching and Studies	Jordan	Quantitative
16	Online Learning amid COVID-19 Pandemic: A Case Study of Vocabulary Learning Strategies	2021	Muayad Abdulhalim Ahmad Shamsan, Jamal Kaid Mohammed Ali & Taha Ahmed Hezam	Arab World English Journal (AWEJ)	Saudi Arabia	Quantitative
17	Vocabulary Learning Strategies in ESP Context: Knowledge and Implication	2022	Sahar M. Al Zahrani & Anjum Chaudhary	Arab World English Journal (AWEJ)	Saudi Arabia	Mixed-methods
18	Omani EFL Learners' Vocabulary Learning Strategies	2022	Behnam Behforouz, Shinas & Ali Al Ghaithi	Arab World English Journal (AWEJ)	Oman	Quantitative

Appendix 2 The similarities and potential factors

Studies	Countries	Similarities	Potential factors
1, 3, 4, 7, 9, 12, 13,16,17	Iran, Thailand, Turkey, China, Iraqi, Saudi Arabia	Determination strategies - The most frequently used strategies	Academic majors, levels of English proficiency, previous learning experiences, educational backgrounds
1, 2, 4, 6, 10, 16, 18	Iran, Turkey, the Republic of Cyprus, Iraqi, Oman, Saudi Arabia	Social Strategies - The least used strategies	Learning environments, educational systems, teaching methods, previous learning experiences and curriculum
11, 16	Vietnam, Saudi Arabia	Technology-based strategies - The most frequently used strategies	Technology development, online learning environment

Appendix 3 The differences and potential factors

Studies	Countries	Differences	Potential factors
2, 7, 10 15, 17	Iran, China, Iraqi Jordan, Saudi Arabia	Memory strategies - the most frequently used Memory strategies - the least used	Levels of English proficiency, previous learning experiences, educational backgrounds, academic majors, learning environments, beliefs
5, 14, 17, 18 8, 9	Japan, Afghanistan, Oman, Saudi Arabi Sudan, Turkey	Cognitive strategies – the most frequently used Cognitive strategies – the least used strategies	Previous learning experiences, beliefs, levels of English proficiency, learning environments, teaching methods, curriculum and learning styles
6, 8 11, 12, 13, 14	The Republic of Cyprus, Sudan Vietnam, Thailand, Iraqi, Afghanistan	Metacognitive strategies – the most frequently used Metacognitive strategies – the least used	Levels of English proficiency, technology development, previous learning experiences, academic majors, beliefs
1 2	Iran	Determination strategies – the most used Memory strategies – the most used	Sample size, research methods; levels of English proficiency, study fields

Studies	Countries	Differences	Potential factors
4	Turkey	Social strategies – the least used	Sample size, level of English proficiency
9		Cognitive strategies – the least used	
16	Saudi Arabia	Social strategies – the least frequently used	Sample size, research methods, Learning environments
17		Memory strategies – the least used	
10	Iraqi	1) Memory strategies – the most used;	Sample size, learners' English proficiency levels, teacher training, research instruments
13		2) Social strategies – the least used strategies	
		1) Determination strategies – the most frequently used;	
		2) Metacognitive strategies – the least used	