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Doctoral Thesis

The Impacts of Keyword Mnemonic and Mapping Techniques on L2 Vocabulary Learning and Retention of 6th Graders within a Group Learning Framework

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Declaration

I hereby declare that I have independently worked on my doctoral thesis, titled "**The Impacts of Keyword Mnemonic and Mapping Techniques on L2 Vocabulary Learning and Retention of 6th Graders within a Group Learning Framework,**" using only the sources cited in the bibliography. As the author of the doctoral thesis, I declare that the thesis does not break any copyrights.

In **Prague** Date **15 July 2024** Author's signature

Flora Keysan

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Abstract

Employing efficient and influential vocabulary learning strategies remains crucial for students to acquire new words and terms. Vocabulary instruction and development must commence at the preschool level and extend through school years. Regarding this, the present study explores the impacts of the keyword technique and mapping strategies on L2 vocabulary learning and retention among 120 female Iranian EFL 6th graders within a group learning framework. The study utilized a pre-test (a Standard English Placement Test) to ensure homogeneity and word knowledge pre-test to identify target words. The study's participants were assigned to three experimental groups, including keyword method, concept mapping, and mind mapping, and one control group. During 16 instructional sessions, each experimental group learned target words using instructions of the assigned techniques randomly, while the control group had no special treatment. Upon the instructional sessions, three post-tests evaluated students' vocabulary comprehension, production, and retention. The study employed three distinct one-way ANOVA procedures in order to assess and analyze the results. The outcomes demonstrated statistically meaningful differences among the groups in vocabulary comprehension, production, and retention. The mind mapping technique proved to be the most effective technique across all measures in comparison to the other two techniques. The group utilizing concept mapping also functioned well, while the group in the keyword technique indicated moderate effectiveness. The individuals in the control group showed the lowest performance across all post-tests. Consequently, the current study's outcomes emphasize the high efficacy of using mapping techniques in language teaching, especially mind mapping, to increase vocabulary comprehension, production, and retention in elementary students. The current study's findings offer helpful insights for educational systems, language teaching, institutes, teachers, students, and curriculum developers.

Keywords: Keyword Method, Concept Mapping, Mind Mapping, Mnemonic Technique, Mapping Techniques

Abstrakt

K učení nových slov je pro studenty klíčové efektivní používání strategií pro učení slovní zásoby. Výuka slovní zásoby a její rozvoj by měly začít již na úrovni předškolního vzdělávání a pokračovat po celou dobu školní docházky. Tato studie zkoumá dopady mnemotechniky klíčového slova a technik mapování na učení slovní zásoby v cizím jazyce (porozumění a produkce) a na její udržení u 120 iránských studentek v 6. ročníku anglického jazyka jako cizího jazyka v rámci skupinového učení. Studie využila pre-test (standardizovaný anglický rozřazovací test) k zajištění homogenity a pre-test znalosti slov k určení cílových slov. Účastnice byly rozděleny do tří experimentálních skupin včetně skupiny s metodou klíčového slova, pojmového mapování a myšlenkových map, a jedné kontrolní skupiny. Během 16 výukových sezení se každá experimentální skupina učila cílová slova s použitím náhodně přiřazených technik, zatímco s kontrolní skupinou se nijak speciálně nepracovalo. Po výukových sezeních byly provedeny tři následné testy k vyhodnocení porozumění, produkce a udržení slovní zásoby u studentů. Studie používala k analýze výsledků tři samostatné jednocestné postupy ANOVA.Výsledky odhalily statisticky významné rozdíly mezi skupinami v porozumění, produkci a udržení slovní zásoby. Technika myšlenkových map se ukázala jako nejefektivnější technika ve všech měřeních ve srovnání s ostatními dvěma technikami. Skupina s mapováním konceptů fungovala také dobře, zatímco skupina s metodou klíčového slova vykazovala střední efektivitu. Kontrolní skupina vykazovala nejnižší výkonnost ve všech následných testech. Proto závěry této studie zdůrazňují vysokou účinnost použití technik mapování při výuce jazyků, zejména myšlenkových map, k posílení porozumění, produkce a udržení slovní zásoby u žáků na základní úrovni. Výsledky této studie nabízejí užitečné poznatky pro vzdělávací systémy, výuku jazyků, instituce, učitele, studenty a tvůrce učebních plánů.

Klíčová slova: Metoda Klíčového Slova, Pojmové Mapování, Myšlenkové Mapy, Mnemotechnika, Techniky Mapování

Table of Contents

List of Tables

List of Figures

Chapter One

Introduction

1.1 Introduction

Words are not mere memorized tokens for impressing others; rather, the words that constitute one's vocabulary form a component of an interconnected network of knowledge (Stahl, 2005). Vocabulary refers to one's understanding of word meanings. The complication of this definition is due to the emergence of words in both oral and written forms. Additionally, word knowledge encompasses two essential dimensions: receptive and productive. Receptive knowledge involves comprehension and recognition, while productive knowledge implies the application of vocabulary in both writing and speaking skills (Kamil & Hiebert, 2005). Moreover, knowledge of vocabulary encompasses the knowledge of understanding spoken and written words, their meanings, and morphology. The two concepts of receptive and productive vocabulary knowledge further intensify its complexity (Yalçın Tılfarlıoğlu & Bozgeyik, 2012).

Concerning the extensive range of vocabulary items in the English language, students often embark on learning many words independently. When they transition to middle school, they typically develop their own set of techniques to actively engage with and decipher the meanings of unfamiliar words, determining how, when, and where to apply these techniques. Effective independent Vocabulary Learning Strategies (VLS) play a pivotal role when students engage with new words in increasingly difficult activities across various subjects (Harmon, 2000).

When discussing vocabulary instruction, the notion of teaching individual words often comes to mind. As effective vocabulary instruction necessitates a long-term approach, vocabulary development must start at the pre-school stage and extend throughout the educational years. While the essence of effective instruction may vary across different grade levels, the commitment to instruct vocabulary remains a constant aspect of education (Nagy, 2005).

Throughout history, many methods for teaching vocabulary have evolved, each possessing its own strengths and weaknesses and offering diverse perspectives on effective vocabulary instruction. Language learners employ VLS, which can be broadly described as the actions undertaken to facilitate acquiring words in the desired language (Yalçın Tılfarlıoğlu & Bozgeyik, 2012).

1.2 Statement of the Problem

Poor performance exhibited by many students is the result of using inappropriate techniques to learn knowledge. Additionally, many teachers do not employ or even have lack of knowledge about the most important mnemonic strategies (Hodges, 1982). In the realm of language learning, promoting a wide spectrum of vocabulary is regarded as a primary goal and a continuous challenge in both first-language and second-language instruction (Belisle, 1997).

Some may believe that teaching vocabulary meanings is a straightforward process of identifying the necessary words and instructing them to children effectively. However, this approach encounters four key challenges: The first problem is the need for children to acquire a substantial amount of vocabulary items to comprehend and proficiently utilize in both oral and written forms. Secondly, children may encounter a gap in different levels of word knowledge. Thirdly, this gap may emerge before children start school. Finally, traditional vocabulary instruction often overlooks providing children with effective word learning strategies and fails to develop an appreciation for words (Stahl, 2005).

Some teachers may perceive that learning new words is straightforward, but in reality, it is always a challenging process for learners (Nemati, 2009). Moreover, vocabulary is broadly considered among the most difficult obstacles for language learners. Furthermore, vocabulary learning has become a crucial point in the field of L2 pedagogy and research. However, a controversial issue is to find an approach that enables students to acquire vocabulary items efficiently, and how it can be effectively instructed (Sahandri Gani Hamzah et al., 2009). Additionally, vocabulary learning is widely acknowledged as one of the foremost difficulties students encounter while learning a second language. In conclusion, vocabulary is crucial to language use and insufficient vocabulary knowledge results in challenges in second language learning. Therefore, students need instruction in VLS (Asgari & Ghazali Bin, 2011).

It is essential to highlight that within human mind, lexical units are not stored in a disorganized manner. An organization of vocabulary knowledge in any manner contributes to minimizing the cognitive load which enables language learners to store lexical items in an effective way. Learning challenges may stem from various factors including the attributes of language learners, for example their language proficiency and motivation levels, as well as the attributes of the target words themselves (Yalçın Tılfarlıoğlu & Bozgeyik, 2012).

Additionally, it is widely held that students demonstrating lower levels of self-efficacy tend to perform poorly when they employ language learning strategies (Heidari et al., 2012).

1.3 Significance of the Study

Vocabulary learning constitutes an essential component in order to effectively increase students' communication and literacy abilities (Belisle, 1997). In the last decade, researchers have acknowledged the significance of mnemonic techniques in learning and education. Mnemonics serve as learning strategies to increase both knowledge acquisition and information recall. Thus, utilizing specific mnemonic strategies contributes to achieving impressive outcomes in memory recall (Bellezza, 1981). For this purpose, teachers instruct students to utilize effective memorization methods to accomplish high quality results (Hodges, 1982). Furthermore, introducing mnemonic techniques to primary students helps them better realize the significance of these techniques in reinforcing their memory. Possessing a strong memory enables the conversion of information from short-term into long-term memory (Latiff Azmi et al., 2016).

Moreover, vocabulary knowledge extends beyond mere definitions; it involves understanding how words connect to the world. Deepening knowledge of a concept contributes to expanding more words to comprehend that concept (Stahl, 2005). Among the significant advantages of possessing an extensive range of vocabulary is its contribution to comprehension. Therefore, a primary aim of vocabulary teaching is to enhance students' comprehension abilities (Nagy, 2005). Furthermore, explicit vocabulary instruction is effective in enhancing students' comprehension (Kamil & Hiebert, 2005).

It is crucial to underscore that language learning strategies are widely identified as crucial processes in second and foreign language learning. Additionally, these language strategies include various methods and components relying on the language learner, such as personality attributes, learning styles, age, gender, and cultural background (Dóczi, 2011). Furthermore, VLS are a subset of learning strategies and hold utmost significance because vocabulary learning is an infinite process and frequently presents sophisticated challenges for language students (Dóczi, 2011). Moreover, the effectiveness of VLS is closely tied to two key factors: language proficiency levels and the specific sort of vocabulary knowledge (Yalçın Tılfarlıoğlu & Bozgeyik, 2012).

Many researchers have drawn particular attention to VLS, trying to identify and categorize them (Letchumanan et al., 2016). Furthermore, constructing a powerful vocabulary necessitates learning a wide range of words. While instructing students on individual words is considered a valuable attempt at education, equipping them with independent word learning strategies provides them with influential tools that they can utilize throughout their schooling. Moreover, word learning strategies can be defined as mental procedures to be used by language learners when they encounter unfamiliar words (Graves et al., 2017). Additionally, instructing word learning strategies possesses unique significance since it empowers learners with influential tools, enabling them to become word learners on their own and utilize these tools throughout their lives. Furthermore, learning how to utilize VLS effectively and efficiently can greatly benefit all learners, particularly those having considerably low levels of vocabulary compared to their peers (Graves et al., 2017).

In addition to VLS, student collaboration among small groups enables learners to express ideas, understand concepts, reveal main presumptions and misunderstandings, and collaborate with peers to create products or achieve agreements with others (Gautam, 2018). Group activities enable students to delve into content meanings deeply and foster critical thinking abilities. Employing group work is more effective when it involves students in content at higher levels, such as topics that are thought-provoking, which are challenging to grasp, or have various interpretations (Gautam, 2018).

1.4 Description of the research Questions and Hypotheses

1.4.1 Research Questions

The present study seeks to address the research questions as follows:

1. Do significant differences exist in the impacts of the chosen techniques, including the keyword technique, concept mapping technique, and mind mapping technique, on L2 vocabulary comprehension among 6th-grade primary students within a group learning framework?

2. Do significant differences exist in the impacts of the chosen techniques, including the keyword technique, concept mapping technique, and mind mapping technique, on L2 vocabulary production among 6th-grade primary students within a group learning framework?

3. Do significant differences exist in the impacts of the chosen techniques, including the keyword technique, concept mapping technique, and mind mapping technique, on L2 vocabulary retention among 6th-grade primary students within a group learning framework?

1.4.2 Research Hypotheses

Null hypotheses are subsequently crafted regarding the preceding questions:

1. There are insignificant differences in the impacts of the chosen strategies, including the keyword technique, concept mapping technique, and mind mapping technique, on the vocabulary comprehension of 6th-grade primary students within a group learning framework.

2. There are insignificant differences in the impacts of the chosen strategies, including the keyword technique, concept mapping technique, and mind mapping technique, on the vocabulary production of 6th-grade primary students within a group learning framework.

3. There are insignificant differences in the impacts of the chosen strategies, including the keyword technique, concept mapping technique, and mind mapping technique, on the vocabulary retention of 6th-grade primary students within a group learning framework.

1.5 Definition of the Key Terms

Below are the definitions that aim to shed light on the chosen techniques—keyword method, concept mapping, and mind mapping—carefully selected for investigation in their effect on L2 vocabulary learning and retention of primary learners within a group learning framework.

Keyword method: In the instructional text, the keyword mnemonic strategy is renowned as it effectively both increases students' learning speed and enhances immediate retention of L2 word. A keyword is defined as a known word that is acoustically similar to a new vocabulary (Wang et al., 1992). Additionally, the keyword strategy is considered a mnemonic strategy that is frequently utilized for vocabulary learning. This method transforms unfamiliar information into more tangible and meaningful information, thereby facilitating easier retention (Bakken & Simpson, 2011).

Concept mapping: Concept mapping strategies are considered visual devices utilized to arrange, organize, and demonstrate connections among concepts utilizing linking lines that connect two concepts. Connecting words and phrases, known as words on the lines, indicate the connections linking the two concepts. Generally, concepts and propositions are structured in a layered or hierarchical order, representing from the broadest to the most detailed (Novak

& Cañas, 2007). Teachers employ concept mapping strategy to assess learners' previous knowledge, promote meaningful learning, and enhance their accomplishment. Additionally, this strategy assists learners in addressing challenges in comprehending concepts and fosters the development of critical, creative, as well as meta-cognitive thinking abilities. Moreover, concept maps serve as assessment tools during the learning process and as early indicators for identifying and addressing learners' misconceptions (Pangestuti & Zubaidah, 2018).

Mind mapping: Mind mapping strategy engages the entire brain in the learning process, increasing students' enjoyment and interest in studying the English language, particularly in vocabulary learning (Sahrawi, 2013). Additionally, mind mapping is a remarkably efficient technique for processing information into and out of the brain. This method serves as a creative and logical tool for note-taking and organizing a student's ideas. A common feature of all mind maps is a structure organized naturally that emanates from the centre and utilizes lines, various symbols, multiple words, diverse images, and different colors based on straightforward, brain-aligned concepts. Moreover, mind maps transform a set of repetitive and boring information into a diagram arranged in vivid, colorful, engaging, impressive, and systematic manners that align with inherent brain processes (Masoud & Ibrahim, 2017).

1.6 Objectives of the Study

The purposes of the present study align with the central aim of promoting effective vocabulary instruction and enhancing language learning outcomes in educational settings. The primary objective is to examine the efficacy of three specific vocabulary learning techniques—the keyword mnemonic strategy, concept mapping technique strategy, and mind mapping strategy—on L2 vocabulary learning and retention among 6th-graders within a group learning framework. This examination aims to determine the most efficient techniques for enhancing vocabulary comprehension, production, and retention among primary students. Valuable insights of this study equip teachers with evidence-based methods to foster vocabulary education in a second language learning environment.

Furthermore, the study evaluates whether there exists statistically meaningful differences in the efficacy of these techniques on L2 vocabulary learning and retention. This comparative analysis indicates which techniques are most beneficial for specific dimensions of vocabulary instruction. Thus, it enables teachers to adjust their teaching strategies to meet the individual needs and learning styles in elementary students.

Moreover, the goal of the study is to explore the fundamental function of group learning framework in the vocabulary learning process and elucidate its contribution to the efficiency of these strategies in the field of L2 pedagogy. The integration of mnemonic and mapping techniques within a collaborative learning context is likely to enhance the learning experience for primary students, and improve vocabulary mastery.

Finally, the study attempts to present practical recommendations for educators on employing effective vocabulary learning strategies. A detailed analysis of these techniques will provide teachers with the necessary knowledge to foster a constructive vocabulary learning context. Implementing these recommendations will support teachers in selecting appropriate strategies, creating an engaging and consistent learning environment, and consequently enhancing vocabulary knowledge of primary students.

1.7 Outline of the Study

The first chapter, Introduction, delves into the complexities of vocabulary learning, emphasizing its fundamental role within a broader network of interconnected knowledge. It briefly highlights the crucial need for learners to employ efficient independent vocabulary learning strategies. Additionally, the chapter emphasizes the necessity of continuous vocabulary acquisition from preschool through school years. Furthermore, it identifies significant gaps in vocabulary knowledge and challenges of ineffective learning techniques, especially vocabulary learning. The introduction underscores the application of mnemonic techniques and mapping strategies, integrating collaborative group learning to enhance memory, comprehension, and critical thinking abilities. Moreover, this chapter poses questions and hypotheses, and defines main terms relevant to this study. It investigates how the selected techniques, including the keyword mnemonic method, concept mapping technique, and mind mapping technique, impact second language vocabulary comprehension, production, and retention among 6th-grade students within a group learning framework.

Chapter two provides a comprehensive Literature Review organized into six main sections. It offers a thorough overview of vocabulary learning and is designed to explore various aspects of vocabulary strategies and mnemonic techniques. The initial part introduces the concept of vocabulary learning, the fundamental principles of vocabulary learning strategies, in addition to mnemonic techniques, elucidating their characteristics and types. The second part focuses mainly on the Keyword Mnemonic Method, encompassing its definition, stages, features, key role and usage in the classroom, advantages, and some conducted studies on its

effectiveness. The third part delves into the Concept Mapping Technique, detailing its definitions, types of concept maps, crucial role and applications in educational contexts, advantages, and studies conducted on its effect on vocabulary learning. The fourth section discusses the Mind Mapping Technique, emphasizing its features, advantages, fundamental role in classroom settings, and its efficacy in the relevant studies. The fifth part specifically compares concept mapping and mind mapping techniques, highlighting studies that examine their similarities, differences, and effectiveness in enhancing vocabulary learning. Finally, the sixth part elaborates on Group Work and clarifies its stages, its role in education and classroom settings, and specific advantages in learning environments.

Chapter three elaborates on the Methodology, encompassing participants, instruments, materials, and data collection and procedures of analysis. This section explains the process of selecting participants, including gender, age, and institute, and details how participants were assigned to three experimental groups and one control group. The chapter also delves into the participants' homogeneity using a standard pre-test and identifies target words through word knowledge pre-test. Additionally, it discusses the duration of instructional sessions, indicating that experimental groups received instructions related to the assigned techniques. This chapter also clarifies that three post-tests—vocabulary production, comprehension, and delayed post-test—were administered to collect data. Detailed explanations about each post-test, including the type of test, instructions, and duration are also given in this section. Chapter three concludes with a summary of the data analysis methods, utilizing three separate one-way ANOVA procedures, to investigate the efficacy of the chosen strategies on vocabulary learning and retention among primary students.

Chapter four, Results and Discussion, indicates how to explore the efficiency of the selected vocabulary learning techniques—the keyword mnemonic strategy, concept mapping strategy, and mind mapping strategy—on second language vocabulary comprehension, production, and retention among primary students. The chapter comprises three parts that address three research questions. Data analysis involves three separate one-way ANOVA procedures, demonstrating tables with descriptive statistics, ANOVA outcomes, post-hoc multiple comparisons of means, and relevant figures for each of the mentioned research questions. Chapter four concludes by discussing and comparing the outcomes of this study with other relevant studies conducted on the effectiveness of these techniques.

Chapter Five, Conclusion, focuses on the main findings derived from data analysis, presents pedagogical implications, addresses the limitations and delimitations of the current study, and proposes suggestions for future research. The obtained insights collectively deepen the understanding of the effectiveness of these techniques for vocabulary instruction.

Chapter Two

Review of Literature

2.1 Introduction

The current chapter is structured into six main sections. The initial part includes the definitions and importance of vocabulary learning, vocabulary learning strategies, and mnemonic techniques and their characteristics and types. The second part focuses on the keyword mnemonic method. This section includes definitions, stages, characteristics, its role and application in the classroom, advantages, various international and Iranian studies, and comparisons with other methods. The third part pertains to the concept mapping technique. This section encompasses definitions, types of concept maps, its role and application in education, advantages, and studies on concept mapping's impacts on vocabulary learning. The fourth part deals with the mind mapping technique. This section includes features of mind maps, applications and advantages, its function in the classroom setting and vocabulary learning, and several studies on the efficiency of mind mapping for vocabulary learning. The fifth part compares the concept mapping and mind mapping techniques which involves some studies comparing these two mapping techniques. The last part discusses group work, encompassing definitions, stages, its usage in classrooms and advantages.

2.2 Vocabulary Learning: Definitions and Significance

Proficiency in a second language is commonly described as the skill to distinguish words and correctly pair them with their corresponding words in the first language. This proficiency extends to effectively using second language words in communication, particularly across the four language skills (Oxford & Crookall, 1990). It is broadly recognized that vocabulary constitutes a crucial aspect of language and is considered one of its most indispensable parts (Kimkong, 2011). The definition of vocabulary encompasses not only word knowledge but also an understanding of the meanings of words (Linda & Shah, 2020).

Vocabulary is considered the focal point of language learning and communication (Siriwan, 2007) and holds a central position in the acquisition of the English language (He, 2010). Moreover, vocabulary holds a crucial function in determining the effectiveness of language learning, assessing whether learners grasp the language well, and comprehending implied messages (Kimkong, 2011). It has been underscored that knowledge of a robust vocabulary is fundamentally essential for developing the four main language skills. Without adequate knowledge of vocabulary, individuals may find it challenging to express themselves efficiently in both speaking and writing skills. Furthermore, the importance of possessing extensive vocabulary knowledge for successful communication highlights the need for

students and teachers to prioritize vocabulary learning and training. Thus, widespread vocabulary knowledge is not only essential but also highly advantageous (Kimkong, 2011).

Moreover, vocabulary is crucial to linguistic communication (Ostovar-Namaghi & Rajaee, 2013). Words convey an extensive variety of meanings and play a pivotal role in meaningful communication in a language (Lou, 2014). Additionally, having a definite range of vocabularies is the first principle to communicate fluently and easily (Bai, 2018). Thus, it is necessary to consider how to build vocabularies and employ various strategies to learn novel vocabulary (Ali & Anwar, 2021).

2.2.1 Vocabulary Learning Strategies (VLS)

Language learning strategies encompass a specific category dedicated to vocabulary learning strategies. Vocabulary learning strategies can be utilized in a diverse array of language learning tasks, including isolated activities such as vocabulary, pronunciation, grammar, as well as integrative tasks like speaking and reading comprehension (Huh, 2009). These vocabulary strategies are regarded as a crucial component of learning techniques in second language learning (Ostovar-Namaghi & Malekpur, 2015). The provision of helpful and appropriate vocabulary learning strategies aids students in comprehending and learning new words, as well as understanding novel vocabulary by integrating it with their existing knowledge (Stowe, 2015). It is crucial to emphasize the importance of examining vocabulary strategies for learning a substantial vocabulary and numerous words (Bai, 2018).

A number of suggested Vocabulary Learning Strategies (VLS) include “learner training, using mnemonics, word cards, guessing from context, coping strategies for production, using dictionaries, spelling rules, keeping records, and motivation” (Thornbury, 2002, p.144). Additionally, “incidental learning is facilitated through exposure to language input, in the form of extensive reading” (Thornbury, 2002, p.22). Hence, incidental learning and direct intentional learning can be considered as two various ways of vocabulary learning (Nemati, 2009).

In this regard, according to Oxford and Crookall (1990), techniques for vocabulary learning are categorized into four groups:

- *De-contextualizing Techniques*

These techniques include the use of word lists, the utilization of flashcards, and traditional dictionary usage.

- *Semi-Contextualizing Techniques*

Several semi-contextualizing techniques for L2 vocabulary learning include "word grouping, word or concept association, visual imagery, aural imagery, keyword, physical response, physical sensation, and semantic mapping" (p. 14).

- *Fully Contextualizing Techniques*

Techniques in this group encompass reading texts, listening practices, speaking sections, and writing practices.

- *Adaptable Technique*

Structured reviewing exemplifies this technique. This kind of technique can be utilized to strengthen the afore-mentioned techniques and creates a structured schedule for reviewing novel words.

Furthermore, according to Oxford (1990) as cited in Kocaman and Cumaoğlu (2014), the following scale suggested by Oxford is composed of two classifications:

A. "*Direct strategies* consist of memory, cognitive and compensation strategies:

- Memory strategies for storing and retrieving information,
- Cognitive strategies for understanding and producing the language,
- Compensation strategies for overcoming limitations in language learning" (p. 295)

B. "*Indirect Strategies* consist of meta-cognitive, affective and social strategies:

- Meta-cognitive strategies for planning and monitoring learning,
- Affective strategies for controlling emotions and motivation,
- Social strategies for cooperating with others in language learning" (p. 295)

Moreover, students frequently employ various methods for vocabulary learning, such as utilizing "flashcards, notebook, referring to bilingual and monolingual dictionaries to decipher the meaning, or giving some synonyms and antonyms" (Nemati, 2009, p.014; Ghalebi et al., 2020). Vocabulary learning encompasses activities like reading, utilizing monolingual dictionaries, interacting with diverse English language media, integrating new English vocabulary items into everyday conversations, employing determination, and applying meta-cognitive strategies, all of which are recognized as effective VLS (Asgari & Ghazali Bin, 2011). Additionally, students have developed helpful tools like vocabulary cards that

encapsulate essential information and main parts about new words (Sheridan & Markslag, 2017).

It is important to note that several factors influence the choice of vocabulary learning techniques. These factors encompass individual disparities such as gender diversity, various motivation levels, diverse learning backgrounds, self-efficacy, and learning styles (Nosidlak, 2013). Vocabulary learning strategies are affected by two main categories of elements: individual attributes of students and social environmental conditions (Bai, 2018). Individual attributes include "age, learning motivation, character and personality differences of students and the differences of genders". On the other hand, social environmental conditions emphasis that the social context holds a crucial function in shaping the utilization of VLS. Language, perceived as a social event in human communication, is closely tied to societal norms and interactions (Bai, 2018, p.851).

2.2.2 Mnemonic Techniques

Mnemonics, frequently utilized for vocabulary learning, can be defined as strategies (Rosdiana, 2009). These techniques enhance students' memorization skills, thereby expanding vocabulary and improving vocabulary mastery (Putra Hadiwijaya, 2020). Furthermore, mnemonic techniques can be applied in teaching vocabulary, simplifying the memorization procedure and making it easier and more enjoyable for students to remember vocabulary items (Risa S, 2020).

In addition, mnemonic strategies aid in recalling information by facilitating the procedure of remembering and making information more impactful and tangible (Bakken & Simpson, 2011). Worth noting is that the key feature in expanding mnemonic strategies is finding ways to integrate new information with existing knowledge in the long-term memory (Bakken & Simpson, 2011). Furthermore, many individuals find it challenging to memorize new, difficult, or boring content. In this regard, mnemonic strategies can be considered systematic processes for enhancing memory (Bakken & Simpson, 2011). The main aim of a mnemonic method is to improve learners' memory (Rosdiana, 2009; Susana, 2017). A mnemonic technique serves as a strategy to increase memory and is not exclusively intended to increase students' comprehension (Putra Hadiwijaya, 2020).

2.2.2.1 Characteristics and Types of Mnemonic Strategies

Successful mnemonics possess characteristics such as elaboration, vividness, interaction, and bizarreness (Hauptmann, 2004). Additionally, mnemonic techniques adhere to five main

principles: “Meaningfulness, Organization, Association, Visualization, Attention, and Interest” (Marthila, 2019, pp.50-51). It is noteworthy that among the various mnemonic tools, five widely recognized types include: 1) Rhyme, 2) Acronym and Acrostic, 3) Peg word technique, 4) Loci technique, and 5) Keyword technique (Rosdiana, 2009; McCabe, 2010; Bakken & Simpson, 2011; Putnam, 2015; Putra Hadiwijaya, 2020). Other mnemonic devices encompass the Phonetic system, Songs, stories, and the Link method (Putnam, 2015).

Mnemonics can be classified into five main groups with sub-groups. Linguistic mnemonics include the peg word technique and the key word technique. Spatial mnemonics are composed of techniques like the loci technique, spatial grouping, and the finger technique. Visual mnemonics involve utilizing pictures and visualization or imagery. Additionally, the verbal method encompasses strategies such as grouping or semantic organization and story-telling or the narrative chain. Moreover, physical responses methods include the physical response method and the physical sensation method (Amiryousefi & Ketabi, 2011).

Among the above-mentioned types of mnemonic strategies, the keyword strategy can be considered among the most efficient techniques for enlarging students’ vocabulary through speech and eventually with reading and writing (Susana, 2017). The next section will thoroughly discuss this technique.

2.3 The Keyword Method: Definitions and Stages

In 1975, Atkinson introduced an expanded method known as the keyword mnemonic method. This method has attracted considerable attention in studies, especially when compared to other mnemonic techniques (Abdei-Majeed, 2000). The keyword mnemonic technique is among the extensively explored memory learning strategies (Hauptmann, 2004). “Mnemonic refers to systematic procedures designed to improve one’s memory” (Köksal & Çekiç, 2014, p.131). The keyword technique is fundamentally a mnemonic strategy (Köksal & Çekiç, 2014).

The keyword method involves a two-stage process for recalling subjects. For instance, when learning new words within a non-native language, the first step is for the student to establish a solid association between the new word in a foreign language and an English vocabulary. The chosen keyword possesses some acoustic similarity to the English word. Subsequently, the student establishes a meaningful association by connecting the keyword with the definition of the word in the foreign language (Pressley et al., 1982).

In essence, the keyword strategy facilitates the acquisition of foreign words in English definitions. In this method, a keyword, which is a concrete or real English word with acoustic resemblance to a foreign vocabulary, is employed to establish a connection. This keyword is subsequently associated with the corresponding English equivalent or translation of the foreign term. Creating an interactive mental image helps establish a connection between the keyword and English equivalent of the foreign term (Crutcher, 1990).

Furthermore, the keyword strategy encompasses two distinct phases for acquiring new words. The initial phase is termed the acoustic or audio phase, during which the learner searches for a keyword—English word somewhat resembling part or all of the foreign term. The subsequent phase is the visual image phase, where the learner seeks to establish a visual link between the keyword and the foreign language word (Hogben & Lawson, 1994).

> For instance, "The keyword method is a mnemonic technique in which the keyword (e.g., English "paint"), an L1 word that bears a phonological and/or orthographic resemblance to the novel FL word (e.g., Dutch "paard"), plays a central role. This method divides word learning into two stages. In the first stage, one learns to associate the keyword with the novel word (e.g., "paint-paard"). Next, the learner must create a mental image in which both the keyword and the L1 translation (e.g., "horse") of the FL word interact (e.g., "a horse carrying a paint pot on its back")" (Hell & Mahn, 1997, p.509).

In another perspective, the keyword strategy emerges as among the most prominent and extensively examined teaching methodologies for foreign language vocabulary. The keyword strategy comprises two integral phases, namely the auditory link and the imagery link. This method proves to be a comprehensive approach **(**Rodríguez & Sadoski, 2000). The initial phase termed the acoustic link, involves the student identifying a keyword—a concrete word in the native language that resembles the word in the foreign language. Following this, the next phase in the method is the imagery link **(**Rodríguez & Sadoski, 2000).

The keyword mnemonic method procedure is further characterized by finding a first language keyword that shares acoustic or orthographic similarities with the second language word. This process involves linking the first language keyword with the second language word, followed by associating the first language keyword with the first language translation of the second language word (Sagarra & Alba, 2006).

> For instance, "a native English speaker could learn that the Spanish word *pato* means duck, using the English word *pot* as the keyword and creating an interactive image of a duck sitting in a pot. The underlying assumption of the keyword method is that an encounter with the FL word (here *pato*) will evoke the keyword (here *pot*), which in turn invokes the keyword-based image (here a duck sitting in a pot), involving the native-language translation (here *duck*)" **(**Rodríguez & Sadoski, 2000, p.386).

Furthermore, the process of learning new words in a second language involves connecting them with keywords in the first language, using simple visual devices to construct sentences (Koksal, 2013). The keyword method includes two primary associations: audio and mental associations, establishing sound and image linkages between a new word in the second language and its counterpart in the L1 word (Taheri & Davoudi, 2016). As a mnemonic method, it integrates spoken information with visual imagery (Purnamasari, 2015). Various definitions mentioned above indicate that the keyword mnemonic method establishes links between L1 keywords and foreign vocabulary words through the use of visual image associations (Syuhada, 2019).

2.3.1 Characteristics of the Keyword Method

Bakheet Al-Zahrani (2011) asserts that an effective keyword method possesses the following characteristics:

1- Phonetic similarity

The keyword, according to the definition of the keyword method, sounds or phonetically resembles the foreign vocabulary.

2- Uniqueness

Establishing a unique linkage between the keyword and the foreign vocabulary helps prevent interference from other associations.

3- Exaggeration

Successful implementation of the keyword mnemonic method relies on visualization. Creating more effective visualizations involves introducing a level of bizarreness, wherein exaggeration in the image helps convey this sense of uniqueness between the keyword and the foreign vocabulary.

4- Sensory nature

Incorporating smells, sounds, tastes, and movements into the process of creating a visual image enhances the sensory nature of the method.

5- Interactivity

The main factor of the image lies in the linkage between the two items.

6- Simplicity

It is advisable that the association between the two items be kept simple.

7- Creativity

Engaging the learner through creativity fosters a stronger connection, deepens the processing of information, and ultimately leads to better retention.

8- Involvement

Memory is inherently connected with conscious experience, and increased involvement in the experience enhances the student's ability to remember it. Keywords produced by students themselves promote greater involvement compared to instances where the teacher creates the keywords.

9- Simplified Keywords

Students should be able to recognize keywords in the foreign language that can be inserted into phrases, film/book titles, and names.

10- Using Substitute Concrete Vocabulary

It is important to note that imagining concrete words, such as apple, car, and pen, is easy and straightforward. On the contrary, imagining abstract words like happiness, peace, and justice can be challenging. Utilizing visualization processes to aid in remembering abstract words is similar to concrete words, but an additional step involves using substitute concrete vocabulary to represent the abstract word.

In addition to the afore-mentioned characteristics, Hauptmann (2004) identifies two additional important features of the keyword method: the incorporation of sexual, vulgar and naughty elements, as well as the utilization of a single keyword for various target words.

There is ample evidence suggesting that the utilization of the keyword method significantly facilitates students' recall of vocabulary definitions (Pressley et al., 1982). This evidence is

derived from two main sources. The first source includes positive outcomes obtained using various materials, encompassing abstract and concrete vocabulary words in multitude languages, such as Spanish, Russian, French, German, and English. The second source comprises favorable results obtained from a diverse range of students, with different ages and abilities, including 3-year-olds to adults, learners with varying proficiency levels, and both native and non-native English speakers (Pressley et al., 1982).

It is noteworthy that the keyword method has proven to be a successful approach across various age groups and languages in vocabulary learning (Taguchi, 2006). However, the effectiveness of the keyword method may vary based on the age of individuals. Specifically, this method tends to be more effective with children, yielding higher and superior results compared to adults (Pressley et al., 1982). Additionally, the successful application of the keyword method is largely dependent on the proficiency level of second language learners (Ahmadi Safa & Hamzavi, 2013).

2.3.2 The Keyword Method in the Classroom

It has been reported that applying the keyword method in group settings can also be beneficial. The keyword method has been successfully implemented with both classes and small groups, including primary school children and junior high school students (Pressley et al., 1982). Additionally, the keyword method proves to be a valuable and effective technique for vocabulary learning in foreign languages, particularly for inexperienced students learning target vocabulary items. However, when applied to experienced high school students studying a foreign language, the impacts of the keyword method are less noticeable (Hogben & Lawson, 1994).

Research on the use of the keyword method in primary and middle school classrooms reveals that presenting an image for a novel second language word, along with an image for the keyword simultaneously, enhances retention and recall of vocabulary words. It is noteworthy that these images may not necessarily indicate the meaningful interaction between the keyword and the second language word meanings (Dolean, 2104).

Nevertheless, the effective application of the keyword method within the classroom setting demands careful consideration. While the keyword method has proven successful for primary school children, especially when involving the creation and utilization of interactive images, it presents a challenge for teachers attempting to generate such interactive pictures. The task of establishing an imagery association or visual link can be intricate, requiring deeper cognitive

processing for the production of a meaningful visual link. This, in turn, leads to improved retention and recall of new vocabulary words (Dolean, 2014).

Furthermore, the act of creating visual linkages can have effects that extend beyond the mere recall of new vocabulary items. Both teachers and students can engage in producing creative linkages, utilizing these associations through various means, including audio and mental links, both within and outside the classroom. For instance, through the use of these linkages, teachers can create an atmosphere where students find enjoyment in the learning process while also getting the benefits of mnemonic linkages (Taheri & Davoudi, 2016). Lastly, it is crucial to highlight that students must learn and apply the procedures of the keyword method to comprehend words well and produce more meaningful expressions. This proficiency is essential for engaging in memorable conversations without struggling to remember words (Khalafi & Oroji, 2016).

2.3.3 Advantages of the Keyword Method

One valuable and effective mnemonic method is the keyword method (Susana, 2017). This technique offers several important advantages, particularly in the realm of receptive learning (Ellis & Beaton, 1993). Notably, the keyword method stands out for its ability to significantly enhance learning speed and immediate recall of L2 vocabulary words when compared to alternative strategies for second language vocabulary learning (Wang et al., 1992).

According to Atkinson and Raugh (1975), as cited in Piribabadi and Rahmany (2014), the keyword method ranks among the most effectual vocabulary learning strategies, contributing to both immediate and delayed retention of new vocabulary in the target language. Furthermore, Susana (2017) asserts that the keyword mnemonic method plays a pivotal role in expanding learners' vocabulary knowledge through speech, reading, and writing. As a strategy to foster students' interest in learning vocabulary, this mnemonic method proves instrumental in enhancing students' mastery of vocabulary.

Furthermore, Köksal and Çekiç (2014) state that a successful application of the keyword mnemonic method aids EFL teachers and students in leaning second language vocabulary. Overall, the keyword method contributes to making the process of leaning second language vocabulary more effective, long-term, and enjoyable, particularly for young students and teenagers.

An advantage of the keyword method lies in its ability to enhance learning and understanding across a diverse range of learners with varying abilities and materials

(Dunlosky et al., 2013). Utilizing imagery links and interactive images proves effective for individuals of different ages, from second graders or college students, and with various abilities. Notably, even students with learning disabilities can successfully benefit from this method (Dunlosky et al., 2013).

Additional advantages of the keyword method extend to diverse types of materials, including L2 vocabulary from different languages (such as French, German, Italian, Latin, Russian, Spanish, and Tagalog); the vocabulary definitions of English words that are ambiguous and challenging to understand, along with scientific terminology; linkages related to capital cities of states (e.g., the capital of Nebraska is Lincoln); medical expressions; words related to individuals, including names, achievements, and professions; and finally, the features of minerals (Dunlosky et al., 2013).

Another notable benefit is that, similar to most memory methods, the keyword method has proven to be effective and successful (Margolis, 2009). It has demonstrated the capacity to enhance memory across various types of material for many students, making it a comparatively well-known mnemonic aid (Dunlosky et al., 2013). Additionally, this mnemonic tool serves as a valuable means to create an important visual image, thereby supporting memory for the meaning of a novel word (Susana, 2017).

2.3.4. Studies on the Keyword Method

The keyword mnemonic method has been extensively investigated, particularly in the realm of language learning (Purnamasari, 2015). It stands out as one of the most widely researched methods in vocabulary learning (Sagarra & Alba, 2006; Dolean, 2014) and second language vocabulary teaching (Toghyani Khorasgani & Khanehgir, 2017).

Numerous studies have explored the keyword method from various angles. These studies aim to assess its efficacy and utility compared to other methods, its usage across different languages and contexts, and its effectiveness with students exhibiting individual differences and abilities, such as age and language proficiency level (Sagarra & Alba, 2006). The following selected samples of research on the keyword mnemonic method underscore its educational value in vocabulary learning and retention. They also highlight its efficacy across diverse languages, contexts, and student demographics, including individuals with varying abilities, ages, and language proficiency levels.

2.3.4.1 International Studies on the Keyword Method

A multitude of studies have explored the application of the keyword method using English keywords for learning second language vocabulary in ESL contexts. According to Pressley et al. (1982), the keyword method has demonstrated constructive effects across various languages.

In a study by Elhelou (1994), the effect of the keyword mnemonic method on English vocabulary learning and recall was examined among 2nd grade Arab primary children. The study involved 30 children divided into two classes. One class utilized the keyword method instructions to learn new vocabulary, while the other class relied solely on word definitions. Results indicated a significantly higher recall rate for children who received instruction using the keyword method compared to their peers.

In another study, Avila and Sadoski (1996) investigated novel applications of the keyword method using Spanish keywords to learn English vocabulary words. The study included 63 5th-grade students with low levels of language proficiency. The students were taught English words either through the keyword method or through conventional methods focusing on direct translation and memorization. Results from cued-recall and sentence-completion tasks, both immediately and after a delay, demonstrated superior recall and comprehension outcomes for the keyword method group. Furthermore, the study suggested that the keyword method is easily applicable in ESL classrooms.

A study conducted in Taiwan in 2010 by Chen and Hsiao aimed to assess the impacts of instructing the keyword method on ESP (English for Specific Purposes) vocabulary learning. The study followed a quasi-experimental design, utilizing open-ended questionnaires for data collection. The study included 40 students who were randomly assigned to either the keyword method group or the traditional method group. Students in the keyword method group learned ESP vocabulary items utilizing specialized procedures of this method, while the other group learned the same words through definitions and synonyms. The results indicated that the keyword method group demonstrated better word recall compared to the other group.

In a study at Selcuk University conducted by Koksal (2013), the effect of the keyword mnemonic method on students' vocabulary knowledge, retention, and perceptions in French lessons was examined. The study involved two experimental and control groups, and the treatment spanned six weeks. Data collection included vocabulary achievement tests, retention tests, and students' reflective dairies to gather qualitative data on perceptions.

Quantitative data were analyzed using the Mann Whitney U test, while qualitative data were analyzed through content analysis. The results revealed that the keyword method improved students' vocabulary knowledge, increased retention of French vocabulary words, and positively influenced students' motivation and interests in French lessons.

In a study conducted in Turkey in 2014 by Köksal and Çekiç, the effectiveness of the keyword method was examined in second language vocabulary learning among 8th grade students in an EFL (English as a Foreign Language) setting. The study involved 45 Turkish first language students, all at the intermediate proficiency level, who were divided into two groups: the experimental group using the keyword method and the control group using first language translation. Pre- and post-tests were administered in a multiple-choice format. Analysis of the outcomes revealed significant differences between the two groups, suggesting that the keyword method was more effective than the translation technique.

2.3.4.2 Studies on the Keyword Method Compared with Other Methods

The efficacy of the keyword mnemonic method has been extensively investigated in comparison with other vocabulary learning methods. Rodríguez and Sadoski (2000) examined four different methods–rote, context, keyword, and context/keyword–to assess their impacts on vocabulary retention among 9th-grade students in EFL classrooms in Venezuela. The study, which included 160 participants randomly divided into four learning groups, evaluated immediate and delayed vocabulary retention using cued recall. The outcomes revealed that the context/keyword mnemonic method produced significantly better outcomes in delayed recall in comparison with the other methods tested, underscoring the efficacy of this instructional approach.

In a study by Sagarra and Alba (2006), the impacts of rote memorization, semantic mapping, and the keyword mnemonic method on vocabulary learning among elementary learners of Spanish were examined. With a participant pool of 778 elementary learners, the study aimed to compare the effectiveness of these methods in facilitating second language vocabulary learning. The outcomes showed that the keyword mnemonic method resulted in superior retention outcomes compared to the other techniques. Additionally, the study suggested that semantic mapping was less effective than rote memorization in vocabulary learning among elementary L2 learners.

In 2008, Lin and Cheng conducted a study comparing the efficacy of the keyword method, phonics, and keyword-phonics approaches in vocabulary learning among 5th-grade primary

students in Taiwanese EFL classrooms. The study involved 105 primary students who were divided into three groups and instructed in the respective techniques for learning English words. Immediate and delayed recall tests, including receptive and productive recall assessments for word meaning and spelling, were administered. The results indicated that both the keyword method and the keyword-phonics method were more effective than the phonics method in facilitating word meaning retention, as demonstrated by superior performance on both immediate and delayed receptive recall tests. However, the phonics method outperformed the keyword method in spelling retention, as evidenced by better performance on productive recall tests. The conclusion drawn was that while the keyword method simplifies primary students' learning of word meanings, the phonics method increases spelling skills. Additionally, the keyword-phonics method was found to be beneficial for improving both word meaning and spelling among primary students.

In another study by Soleimani et al. (2012), the effectiveness of the keyword method and context method in vocabulary retention among EFL learners in Iran was investigated. The quasi experimental study involved 40 Iranian learners at an English institute, all at the elementary level of language proficiency. Participants were assigned to two experimental groups, with one group utilizing the keyword method and the other using the context method for vocabulary learning. The obtained outcomes revealed better vocabulary retention, both immediately and in delayed recall, among learners who employed the keyword method compared to those who used the context method. Additionally, learners in the keyword method group exhibited lower forgetting rates over time.

In a subsequent study, Tavakoli and Gerami (2013) examined the effectiveness of two mnemonic methods: the keyword method and the pictorial method. These non-verbal methods were employed to teach vocabulary to EFL (English as a Foreign Language) students and to assess their impact on vocabulary learning and recall. To achieve the results, the study involved sixty female learners from an English school in Iran, all of whom were at a primary level of proficiency. The learners were assigned to three groups: two experimental groups and one control group. The experimental groups received instruction using either the keyword method or the pictorial method, while the control group received instruction through conventional methods. Quizzes were administered to evaluate the learners' retention of vocabulary words, and a delayed-post-test, consisting of multiple-choice format tests, was used to measure their overall vocabulary attainment. The obtained outcomes of both the

immediate and delayed post-tests indicated that the keyword method was more effective in aiding word retention compared to the pictorial method.

In another study, Piribabadi and Rahmany (2014) examined the efficacy of two vocabulary learning methods—the keyword method and the word-list method—on the acquisition of ESP (English for Specific Purposes) words among students with varying proficiency levels (upper-intermediate and lower-intermediate). The study involved 120 students who were divided into two groups, with each group receiving one of the selected methods. Following the instructional sessions, a post-test consisting of a multiple-choice test was administered to assess the students' proficiency in ESP vocabulary. The results of the study varied based on the participants' proficiency levels. Among upper-intermediate students, those who were taught using the keyword method demonstrated superior performance compared to those instructed with the word-list method. Similarly, lower-intermediate students who received instruction via the keyword method outperformed their peers who were taught using the word-list method. Overall, the outcomes indicated the effectiveness and preference of the keyword mnemonic method over the word-list method for ESP vocabulary learning across different proficiency levels.

In a study conducted by Zarei and Keysan (2016) within an Iranian context, the effectiveness of several techniques, including three mnemonic methods (the keyword method, the peg word method, and the loci method) and three mapping techniques (argument mapping, concept mapping, and mind mapping), was examined for vocabulary learning in a second language. To achieve the results, a total of 151 female students participated in the study, divided into six classes, each assigned one of the chosen techniques. During each session, students in each class learned new target words according to the instructions of their assigned technique. Following the instructional sessions, multiple choice format and fill-in-the-blank post-tests were administered to assess vocabulary comprehension and production, respectively. Data analysis revealed significant differences among the six chosen techniques in both vocabulary comprehension and production. However, the mean differences between the keyword method group and the concept mapping group, as well as between the keyword method group and the mind mapping group, were not statistically significant. This suggests that the participants in these three techniques functioned similarly in vocabulary comprehension. Similarly, the keyword method group and the mind mapping group demonstrated comparable performance in vocabulary production. In contrast, the participants

in the keyword method group outperformed their counterparts in the concept mapping group in vocabulary production.

2.3.4.3 Iranian Studies on the Keyword Method

Numerous studies have explored the efficacy of the keyword mnemonic method as a vocabulary learning strategy in Iranian EFL contexts. In a study conducted by Ahmadi Safa and Hamzavi in 2013, the effectiveness of the keyword method was investigated for vocabulary learning and long-lasting retention among elementary students in an Iranian EFL classroom. To attain this purpose, fifty elementary students at the 5th-grade level participated in the study and were divided into experimental and control groups. The experimental group utilized the instructions of the keyword mnemonic method to learn vocabulary words, while the control group employed traditional memorization techniques. Post-tests were administered, and data analysis revealed that students in the experimental group who used the keyword method functioned significantly better than their peers who relied on memorization strategies, both in terms of vocabulary learning and long-term retention of the new target words. These results underscored the effectiveness of creating mental linkages and images in vocabulary learning and long-term retention among elementary students in EFL settings.

In 2016, Davoudi and Yousefi investigated the efficacy of the keyword method on vocabulary retention among 4th-grade female students in an Iranian context. The study, employing a quasi-experimental design, involved 38 high school EFL students who were randomly assigned to either the experimental group, which utilized the keyword method, or the control group, which employed the traditional method. The outcomes of the t-test revealed the superiority of the keyword method group, demonstrating better vocabulary retention compared to the traditional method group. Additionally, statistically significant differences between the two groups were observed in the delayed recall post-test. In conclusion, the utilization of the keyword method has the potential to alleviate students' challenges in second language vocabulary learning and retention.

In 2016, Taheri and Davoudi conducted a study in the Iranian EFL context to investigate the efficacy of the keyword mnemonic method on vocabulary learning and long-term retention among primary learners. The study comprised 50 primary students from the Iranian EFL context, who were divided into experimental and control groups. In the experimental group, the keyword method was employed for vocabulary learning, whereas the control group used the traditional memorization technique. The obtained results from t-tests revealed that

the students who received instruction using the keyword method outperformed those who used memorization techniques in both vocabulary learning and long-term retention. As a result, this study emphasized the effectiveness of mnemonic techniques, such as the keyword method, in creating mental links and images to facilitate vocabulary learning and long-term retention among EFL students at the primary level.

In 2016, Khalafi and Oroji conducted a study to investigate the effectiveness of the keyword mnemonic method on vocabulary learning and retention among Iranian students. The study involved 40 female students at an intermediate level of language proficiency, all studying at an English institute in an Iranian EFL setting. To start the treatment, the participants were divided into experimental and control groups, with the experimental group receiving instruction in the keyword method, which included English words paired with their Persian equivalents. The control group did not receive this instruction. Post-tests and delayed post-tests were administered, and the results were analyzed using t-tests. The findings indicated that the keyword method significantly impacted vocabulary learning and long-term retention. Additionally, the method created an engaging and encouraging classroom environment for students.

Fasih et al. (2018) conducted a study to investigate the effectiveness of the keyword method-based instruction in increasing vocabulary learning and comprehension of content words in Iranian EFL classrooms. The study involved 256 male high school students, with 230 students categorized at the upper intermediate level of language proficiency following the administration of the Cambridge placement test. The study utilized a quasi-experimental design, with participants assigned to either experimental (keyword method) or control groups. Following instructional sessions, a post-test was administered to collect data. The outcomes demonstrated that the utilization of the keyword method instruction significantly enhanced vocabulary leaning and comprehension of content words among the participants.

2.4 Concept Mapping Technique: Definitions

Non-native English language learners require techniques that can facilitate learning, enhance memory retention, and enable them to apply the language in novel contexts (Kalhor & Mehran, 2016). Concurrently, educators strive to identify appropriate instructional methods that foster students' creativity and academic success. Among the myriad factors influencing successful language teaching and learning, strategies related to instruction and learning stand out as pivotal in learning (Kalhor & Mehran, 2016).

One such effective teaching and learning strategy is the concept mapping technique, recognized as both a cognitive and meta-cognitive strategy (Khoshsima et al., 2015). The concept mapping technique, initially introduced by Novak and Gowin (Wang, 2019), has become a focal point in education as a teaching and learning strategy (Kalhor & Mehran, 2016). It serves as a powerful learning tool for visually representing the structure of students' knowledge (Kassab, 2016). Concept mapping is recognized as an exclusive and straightforward teaching strategy for presenting knowledge. Its utilization significantly simplifies the creation and production of knowledge and information in educational contexts (Ghorai & Guha, 2018).

Students have the ability to create a concept map based on a passage, which typically comprises a list of crucial ideas or concepts along with related words. These items can be arranged hierarchically, with the top of the map containing more comprehensive, abstract, and general concepts, while the bottom part consists of concrete and detailed concepts. Linking lines or arrows are used to associate these concepts, facilitating the organization and visualization of relationships (Elhelou, 1997).

A concept map, in essence, serves as a graphical tool designed to organize and illustrate associations between concepts. These associations are visually represented by linking lines, which link two concepts together. Linking words or phrases placed on these lines serve to identify and describe the relationships between the connected concepts. Typically, concept maps are arranged hierarchically, with concepts organized from the most comprehensive and broad at the top to the most particular and detailed at the bottom (Novak & Cañas, 2007).

A concept map is alternatively described as a graphical representation of information, comprising interconnected concepts. These connections can take various forms, including labeled, unlabeled, directional or non-directional linkages. When constructing a concept map,

the use of arrows or lines with different meanings often shows causal or hierarchical associations among the concepts (Azarnoosh & Naeini, 2008).

From another perspective, concept maps consist of concepts organized within circles or boxes, with connecting lines representing the relationships between them. These lines, known as linking lines, are accompanied by linking words that illustrate the nature of the connections (Katagall et al., 2015). To provide a comprehensive understanding, the process of creating a concept map typically involves three stages: organization, layout, and linking (Kassab, 2016).

In the first stage, known as organization, the process begins with a list of concepts pertinent to a theme. The student then proceeds to group these concepts into categories and sub-categories based on their interconnections. In the second stage, known as layout, the focus shifts to sorting out the links or associations among groups. This involves establishing a steady hierarchy wherein the most crucial concepts are positioned centrally or at the top of the map. In the third stage, known as linking, arrows are used to indicate connections between linked concepts. Additionally, students employ words or short phrases to describe the nature of these connections, providing clarity and coherence to the concept map (Kassab, 2016).

In a further definition, "concept maps are node-and-link diagrams that represent the key-terms and relations among terms within a set of materials" (Karpicke, 2018, p.2). Students can employ various methods to construct concept maps, all of which include similar components. This involves "identifying key terms or ideas, placing those key terms in nodes, drawing lines that link related terms, and writing a description of the nature of the relation along the link" (Karpicke, 2018, p.2).

2.4.1 Types of Concept Maps

Building upon the definitions of the concept mapping technique outlined above, Moradi (2020) categorizes conceptual maps, or network designs, into various forms. The diversity in drawing methods and the demonstration of diagrams or graphs, alongside a wide range of scientific approaches, underscores the necessity of creating different kinds of concept maps.

Moradi (2020) describes different shapes of concept mapping, including the following:

A) *Linear Concept Map:* This type of concept map comprises nodes and connecting lines arranged sequentially. The process of creating this map starts with the first node or the simplest concept, followed by more difficult concepts in subsequent stages.

B) *Spider-like Concept Map:* Another prominent shape of conceptual maps or network designs is the Spider-like Concept Map. The first step in drawing this type of map involves placing the core concept at the centre of the framework or node, followed by connecting related concepts with arrows or links and surrounding nodes.

C) *Circular Concept Map:* This type of diagram is particularly useful for indicating mathematical and physical concepts that require calculation and confirmation by formulas. One of the most essential characteristics of circular concept maps is their inclusive and concurrent representation of mathematical concepts and equations.

D) *Networking Concept Map:* The networking concept map is a complex diagram designed to convey a wide range of concepts related to networks. It consists of nodes, with each node connected to other nodes in the network through links. According to Moradi (2020), one of the different ways to draw the networking design is the redial model. In this model, the core title is placed at the centre of the framework, with major branches situated around it and the subsidiary branches connecting to them.

2.4.2 Concept Maps in Education

Since their inception, concept maps have served as effective tools for both transmitting knowledge and facilitating communication (Duffill, 2013). Widely employed in classrooms and learning environments, concept maps enable students to effectively organize and convey their knowledge through mapping techniques such as concept mapping, which facilitates the graphical representation of information (Parikh, 2015). Instruction grounded in the use of concept maps helps students move away from rote memorization practices (Sharif Ullah, 2020).

The efficacy of concept maps in education is evident due to their applicability at any phase of the teaching process. For example, concept maps are utilized at the beginning of a lesson when introducing a new concept to students and at the end of the lesson for review and revision purposes (Aziz et al., 2017). Therefore, teachers can employ concept mapping as a teaching strategy to facilitate students' studies and enhance their learning process (Ullah et al., 2021).

Concept mapping is often referred to as a learning device, and the accurate construction of a concept map transforms it into a powerful technique for students to enhance cognitive performance at higher levels (Aziz et al., 2017). During the construction of concept maps by students themselves, they articulate ideas in their own words, thereby facilitating the

identification of inaccurate and false concepts. The purpose is to enable teachers to identify areas that students find incomprehensible or unclear, providing an objective means to evaluate those aspects that are not fully grasped by students (Aziz et al., 2017). It is noteworthy that the creation of concept maps is carried out in various ways in educational contexts. For example, students can construct concept maps independently during their studies, or both teachers and students can collaborate to create concept maps as a classroom practice (Karpicke, 2018). Students often perceive the creation of concept maps as an enjoyable and engaging teaching tool in the classroom (Aziz et al., 2017).

Moreover, the concept map designed by the student is systematically assessed by the teacher to evaluate the student's understanding of the topic (Duffill, 2013). In education, particularly in specialized or professional fields, concept mapping is considered an ideal evaluation tool applied for the teaching and assessment process, enabling teachers to assess students' development and learning (Aziz et al., 2017). The focus on utilizing concept mapping in specialized fields of education is on learning and its application as a knowledge tool. In these fields, concept mapping serves both as a learning aid and an assessment tool. The extensive use of concept maps in evaluation enables teachers to self-evaluate their teaching methods (Aziz et al., 2017). Additionally, concept mapping serves as a tool to assess learning outcomes at the classroom, curriculum, and educational levels (Sharif Ullah, 2020).

2.4.3 Advantages of the Concept Mapping Technique

The concept mapping technique encompasses a variety of advantages across different areas. Concept maps serve as useful tools for clarifying knowledge structures (Slotte & Lonka, 1999). Moreover, concept mapping is considered a successful learning strategy for students with varying learning preferences (Azarnoosh & Naeini, 2008). Additionally, utilizing concept mapping encourages idea generation and fosters creativity among individuals (Katagall et al., 2015).

The effectiveness of concept maps has been demonstrated across various age groups and diverse individual abilities. Concept mapping simplifies learning for students with lower academic proficiency (Elhelou, 1997). Concept mapping is valuable for its ability to differentiate the learning process for each individual, thereby enhancing learning quality while requiring minimal additional effort and cost for the educational system (Elhelou, 1997). Additionally, studies have shown that concept mapping positively impacts the quality of students' learning across various settings and educational levels, from elementary school to

university (Kinchin et al., 2019). Concept maps find utility among a diverse range of individuals, including kindergarten children, university students, and experts in various disciplines (Aziz et al., 2017). Furthermore, the application of concept mapping extends across educational settings, including schools, universities, and professional education levels (Sharif Ullah, 2020).

Concept maps offer numerous benefits, such as enhancing memory and recall, as well as facilitating reciprocal comprehension (Freeman & Jessup, 2004). They are recognized as impressive and successful tools for assessing an individual's understanding in a specific area of knowledge (Cañas et al., 2004). Concept maps enable students to grasp the connections between represented concepts, thus aiding in their comprehension of these concepts and their broader context (Davies, 2010). Additionally, the use of concept maps helps students comprehend complex ideas more easily (Abate et al., 2020).

In addition to the afore-mentioned advantages, it is noteworthy that concept mapping is widely applied across various fields of study to arrange and present knowledge, while also enhancing meaningful learning (Katagall et al., 2015). Concept mapping is recognized as one of the foremost teaching-learning devices aimed at improving meaningful learning outcomes (Aziz et al., 2017). The utilization of concept maps facilitates meaningful learning by organizing concepts, promoting active engagement in learning, enhancing conceptual understanding, fostering student self-reflection, and facilitating meaningful conversation among students (Wang, 2019).

From another viewpoint, the concept mapping technique has been extensively utilized across various educational disciplines and domains. It has been employed in science subject classrooms to enhance student learning (Kinchin, 2001), as an educational tool for nursing students (Akinsanya & Williams, 2004), and in the discipline of accounting (Irvine et al., 2006). Concept mapping has also been applied in critical thinking contexts (Wilgis & Mc Connell, 2008; Green, 2010; Aziz et al., 2017), as well as in medical, science, education, and management courses (Katagall et al., 2015). Additionally, it has been found utility in science education, online learning, general science and English teaching courses, and philosophy of education (Aziz et al., 2017), serving purposes such as creative brainstorming, note-taking, outlining, and learning enhancement (Karpicke, 2018).

Moreover, concept mapping has been integrated into problem-based learning approaches (Jain et al., 2020; Sharif Ullah, 2020), mathematical concepts and courses (Moradi, 2020),

and as an evaluation tool for assessing student performance and learning (Aziz et al., 2017; Jain, et. al., 2020, Moradi, 2020). It has also been utilized in active learning, project-based learning, and distance learning contexts (Sharif Ullah, 2020), and in assessing self-efficacy of nursing students (Elmeghawri & Sleem, 2021).

2.4.4 Studies of Concept Mapping on Vocabulary Learning

In all instructional settings, the two primary focuses revolve around learning and effective learning methods. The majority of teachers seek out approaches and techniques to facilitate the learning process for students (Azarnoosh & Naeini, 2008).

In education, the key role of vocabulary in second language learning has been well-documented in numerous studies (Liu, 2016). A common challenge faced by students is the difficulty in remembering certain vocabulary words. To address this issue, it is more beneficial to introduce useful and effective strategies for vocabulary learning rather than teaching students with a large volume of vocabulary items (Liu, 2016). To illustrate further, the use of concept mapping techniques in the realm of vocabulary learning provides a structured approach to arranging information during the word definition process. When creating a concept map, students place the main vocabulary word in the centre and utilize additional links or concepts to associate with the main word (Liu, 2016). Numerous studies have investigated the effectiveness of concept mapping techniques across various educational disciplines and domains. The following examples have been selected to indicate the efficacy of concept mapping techniques in vocabulary learning.

A study conducted by Palmer et al. (2014) investigated the efficacy of instruction-based concept mapping on the vocabulary learning skills of 7th graders with mild disabilities. The instructional techniques examined in the study included concept mapping and a dictionary approach. The outcomes of the study revealed noticeable improvements in vocabulary learning among students who utilized the concept mapping technique compared to those who used the dictionary approach.

In another study, Khoshsima et al. (2015) examined the effects of the concept mapping technique on vocabulary learning and retention among Iranian EFL students. The study employed a quasi-experimental design, with a total of 40 Iranian students at the pre-intermediate proficiency level serving as subjects. These students were divided into two classes: experimental and control. Prior to the instructional treatment sessions, all students completed a vocabulary pre-test. Following the treatment sessions, a post-test consisting of

the same vocabulary was administered to all participants. Additionally, a delayed post-test was conducted to assess the long-term efficacy of concept mapping in vocabulary retention. The outcomes indicated that concept mapping was effective in both vocabulary learning and retention among EFL students.

Deemae (2016) also conducted a study to investigate the efficacy of concept mapping on reading comprehension, vocabulary development, and English reading attitude. The study involved 30 6th graders and employed a quasi-experimental design. The findings revealed significant improvements in reading comprehension, vocabulary development, and knowledge among the students, as well as considerable progress in their attitudes toward reading.

Besides the studies mentioned above, Naderifar (2018) performed a comparative study on Iranian EFL students to examine the impacts of concept mapping and notebook keeping techniques on self-regulation in vocabulary learning. The study involved 90 female students, who completed vocabulary self-regulation pre-test and post-test to collect data. The participants were assigned to three groups: one group received instruction-based concept mapping, another group utilized vocabulary notebook keeping techniques, and the third group served as the control. Data analysis was conducted using a one-way ANOVA procedure. The obtained outcomes indicated that students who received instruction in concept map and notebook keeping techniques showed significant improvements in self-regulation in vocabulary learning. However, the differences between the concept map and notebook keeping techniques were not statistically significant in terms of their impacts on self-regulation in vocabulary learning. The final outcomes of the study suggest that EFL teachers consider using these techniques as effective vocabulary learning strategies and tools to enhance self-regulation in vocabulary leaning.

In a study conducted by Kaveh and Rassaei (2019) with Iranian EFL students, the impact of using concept mapping on vocabulary learning and students' awareness of vocabulary learning strategies was examined. The study involved 40 students who were divided into experimental (receiving instruction in vocabulary learning through concept mapping instructions) and control groups (no special treatment). Both groups were assessed using a vocabulary test and a questionnaire related to vocabulary strategy use. The findings of the study revealed noticeable developments in second language vocabulary learning among students who utilized the concept mapping technique. Additionally, the obtained results demonstrated the effectiveness of concept mapping in increasing students' awareness of vocabulary learning strategies.

In a further study undertaken by Rezvani and Sadrosadat (2020) on Iranian EFL students, the effectiveness of using concept mapping was examined in leaning lexical collocation with respect to gender. The participants of the study involved 90 students in the intermediate level of language proficiency who were studying a general English course. They were assigned to two groups: experimental and control. The experimental group received concept mapping instructions, but the control group received the traditional approach. Gender differences were also considered within the experimental group using the concept mapping technique. All participants completed pre- and post-tests. The obtained results revealed the usefulness and success of utilizing instruction-based concept mapping to promote the learning of lexical collocation. Nonetheless, there were not statistically significant differences concerning gender in the experimental group.

2.5 Mind Mapping Technique: Definitions

A mind map is a graphical tool composed of a core keyword or image, with branches containing peripheral ideas flowing from the core (Casco, 2009). In another definition, Tony Buzan (1970) describes mind maps as "a visual technique where information and knowledge are converted into a hierarchical, formatted, and illustrated diagram, with structural key terms associated with a subject" (Vilela et al., 2013, p.199). Mind maps are also recognized as a new tool in teaching and learning, governed by specific rules. Furthermore, applying mind maps involves associating known and unknown information, previous and novel information, as well as individual and general information (Borovková, 2014).

The technique of mind mapping encompasses six key elements: "a) central image, b) key word, c) basic ordering ideas, d) branches, e) colour, and f) picture" (Aswadi, 2013, p.28). It is important to note that when designing a mind map, a central idea is placed at the core of the diagram, from which various subtopics stem. It is evident that there are associations between the central idea and these subtopics (Borovková, 2014). Additionally, employing thicker and thinner branches, as well as varying font sizes, helps to clearly denote the hierarchical structure (Borovková, 2014).

Hierarchies and groups sort out and arrange information within a mind map. A central image serves as the focal point for these hierarchies and connections. This process occurs naturally yet in a structured and coherent way. Branches emanating from the central image represent main subjects or groups linked with the core theme, with each branch labeled by a keyword or image (Samhudi, 2016). Additionally, the use of colors in mind maps enhances

their visual appeal and makes them more engaging (Borovková, 2014). In this regard, the most effective way to design a mind map involves utilizing colors, along with many pictures or symbols; similar to an art form (Samhudi, 2016).

In a broader sense, "mind mapping is a storage system, data recall, and tremendous access to the gigantic library in a great human brain" (Yahrif, 2021, p.29). Additionally, mind mapping can be described as a creative, useful, and accurate method for storing thoughts and opinions, as well as recording pathways to enhance memory and facilitate the generation of facts and ideas, allowing the brain to function naturally from the outset (Yahrif, 2021).

2.5.1 Features of Mind Maps

According to Sbenaty (2005), mind maps possess four important features:

1. A central image represents the targeted topic.
2. The key ideas of the topic flow out from the central image on branches.
3. Branches incorporate a keyword or image on the related line to convey details.
4. The branches form an associated nodal construction.

Considering the fundamental principles of generating mind maps, mind maps also encompass some crucial features such as clear structure, creativity, personalization, and motivation. These features reflect that mind maps can be regarded as both a helpful concept in teaching practice and an effective learning tool (Borovková, 2014).

A) Clear Structure

Mind maps function as an influential and important learning tool, supporting clear structure (Borovková, 2014).

B) Personalization

According to Thornbury (2002) as cited in Borovková (2014), the "judgments that learners make about a word are most effective if they are personalized" (p.19). Mind maps personalize notes and the learning process (Borovková, 2014).

C) Creativity

Creativity can be considered as another essential feature of mind maps (Borovková, 2014). The mind mapping technique enhances creativity and makes the learning process more flexible and enjoyable (Jiang, 2020).

D) Motivation

Mind maps are motivational learning tools that serve as an alternative to tedious automatic exercises (Borovková, 2014).

2.5.2 Applications and Advantages of Mind Mapping Technique

The mind mapping technique finds well-recognized applications in various domains, including note taking, teaching, studying, writing, personal development, meeting and project management, brainstorming, creating activity lists, enhancing memory, presentations, and developing visual aids (Mento et al., 1999). Moreover, its practical nature facilitates the association of ideas and pertinent information, making it widely utilized in instructional as well as business and industry settings (Alahmadi, 2020).

The mind mapping technique also offers numerous advantages. Utilizing mind maps to enhance accurate recall from written material proves to be an effective strategy (Farrand et al., 2002). Since the focus of the mind mapping strategy lies in visual imagery, the significance of visual representations has been established in the process of information retention in memory (Abi-El-Mona & Adb-El-Khalick, 2008). Additionally, foreign language teachers employ mind maps in classrooms to improve students' oral fluency, boost their self-efficacy, and consequently, enhance student autonomy (Casco, 2009).

Taking notes from course materials, which are simple and attractive to use, is just one of the many benefits of this well-known thinking tool. Mind maps provide the ability to memorize information better, offer fast and helpful correction, aid in maintaining and recalling information, facilitate brainstorming sessions, and assist in preparing daily plans (Tee et al., 2014). Furthermore, the great advantages of mind mapping extend to problem solving, note-taking and brainstorming, memorizing novel vocabularies and arranging activities, organizing presentations, and enhancing students' reading skills (Buran & Filyukov, 2015).

Moreover, the advantages of mind mapping lie in progressing students, increasing vocabulary knowledge, developing ideas, and enhancing students' self-assurance in the learning process (Samhudi, 2016). Additional benefits of the mind mapping technique include aiding in recall, increasing creativity, solving problems, focusing on a topic, and organizing thoughts (Erdem, 2017). Mind maps are also utilized as a useful technique in the learning and teaching process, serving as a form of note-taking (Erdem, 2017). Furthermore, they enhance students' memory, boost creativity, and improve presentation skills (Solusia, 2020).

2.5.3 Mind Maps in Classrooms and Vocabulary Learning

The effects of using mind maps in classrooms are helpful and efficient because they are principally considered to be visual learning tools and can also activate other kinds of intelligence and senses simultaneously (Borovková, 2014). By utilizing graphical and pictorial designs, mind maps clarify the learning-teaching process, leading to enhanced memory retention and increased student motivation (Liu et al., 2014). Furthermore, mind maps are regarded as both a useful and effective technique for note-taking and as a wonderful tool in the classroom for all, particularly for children (Tee et al., 2014). Additionally, students can work in groups or independently to create mind maps, looking for related words associated with a core word (Samhudi, 2016). This technique is reported to be easy, enjoyable, and stimulating creativity, while also fostering student autonomy, making it suitable for both small and large classes (Kadagidze, 2016). Since students often have different emotions and feelings, they produce various mind maps on any given subject, and a fun learning environment in class during the learning process also encourages the creation of mind maps (Yahrif, 2021).

A mind map is a versatile tool that can also be applied in foreign language teaching, particularly in the process of vocabulary learning. Students can utilize mind maps to brainstorm and learn new vocabulary items. At the outset, students are prompted to brainstorm vocabulary related to a specific subject. Subsequently, students are encouraged to create their own mind maps instead of using the conventional method of creating glossaries (Casco, 2009). It is worth noting that employing mind maps is a useful approach to facilitate vocabulary learning, offering an alternative method to memorize new vocabulary items instead of relying solely on rote memorization (Binti Abdul Aziz & Bt Yamat, 2016). Additionally, memorizing new vocabulary items is often perceived as a challenging task by English language learners. In this context, the use of mind maps has demonstrated more successful outcomes in enhancing vocabulary learning and knowledge organization (Jiang, 2020).

> Moreover, as Štěpankova (2021, p.8) asserts, “Mind maps can be a useful aid in the classroom because they can support teaching the language system and teaching language skills. As for the language system, it is generally known that mind mapping is suitable for vocabulary learning and teaching”.

2.5.4 Studies of Mind Mapping on Vocabulary Learning

Several studies have already investigated the effectiveness of the mind mapping technique across various domains and educational disciplines. The notion of mind maps is not totally unknown for the majority of individuals (Borovková, 2014). For instance, Heidari and Karimi (2015) conducted a study in an Iranian context to examine the impact of mind mapping on vocabulary learning and retention. In this study, 40 male students from a first-grade high school participated. They were randomly assigned to either the experimental or control group. At the outset, all participants took a pre-test, consisting of vocabulary tests designed by the researcher. Subsequently, the experimental group received vocabulary instruction based on the mind mapping technique, incorporating elements such as colours, symbols, keywords, and images. In contrast, the control group received traditional instruction methods, including translation and the use of synonyms and antonyms. Following the instructional sessions, both groups took a post-test. Data analysis revealed that students in the experimental group, who utilized mind mapping for vocabulary learning, performed better than those in the control group on the delayed post-test.

In another study, Binti Abdul Aziz and Bt Yamat (2016) examined the use of mind map to improve students' vocabulary retention. The study, which employed a quasi-experimental design, involved 38 subjects. Both experimental and control groups underwent pre-test and post-test, with the treatment spanning four weeks. The results showed the efficacy of mind mapping in enhancing students' vocabulary retention.

Additionally, in a separate study conducted in 2016, Samhudi explored the application of the mind mapping process in teaching vocabulary items and assessing the development of students' vocabulary mastery. The study used both tests and questionnaires to collect the necessary data. The findings indicated that mind mapping significantly enhanced students' vocabulary mastery. Furthermore, the outcomes from the questionnaires revealed that the majority of students held that this technique facilitated progress, increased vocabulary learning, fostered idea development, and enhanced self-assurance in the learning process.

In 2020, Alahmadi also assessed the effectiveness of the mind mapping technique in second language vocabulary learning among Saudi female students. The study included 50 participants from an English language centre, all at the intermediate level of language proficiency. Subsequently, the participants were divided into two groups: experimental and control. The experimental group received vocabulary instruction utilizing the mind mapping

strategy, while the control group received instruction through traditional methods such as memorization. Pre- and post-tests were administered to both groups to assess the efficacy of the mind mapping technique. The obtained outcomes indicated significant developments in vocabulary learning among the experimental group. Additionally, the study found that the use of mind mapping simplified vocabulary learning by enhancing knowledge of vocabulary and understanding of word meanings. Furthermore, the utilization of the mind mapping strategy increased student motivation in the vocabulary learning process.

Moreover, in another study performed by Fikriah et al. (2021), the researchers investigated the utilization of mind mapping strategy in teaching English vocabulary to 7th-grade students. The study employed a qualitative approach, with data collection including observation of the English learning process, interviews with both teachers and participants, and documentation such as pictures and recordings. Miles Huberman's framework was utilized for data analysis, which involved data reduction, presentation, and verification. Findings of the study demonstrated that the use of colourful mind mapping made the vocabulary learning process more enjoyable for students. Additionally, incorporating mind mapping into English studies facilitated students' understanding of the material and helped them memorize new vocabulary words. Furthermore, when mind mapping was used, students actively participated in class activities.

2.6 Comparison of Concept Mapping and Mind Mapping Techniques

The presentation of various kinds of graphic instruments has become increasingly common. Examples of these graphic tools include concept mappings and mind mappings (Ahlberg, 2013). Two main learning strategies, mind mapping and concept mapping, are frequently referenced in the learning process and are utilized to enhance students' learning success (Redhana et al., 2021). It is noteworthy that collaboration among students in drawing a map aids in the mapping strategy process. This collaboration encourages students to consider their viewpoints as necessary components in map creation. The individuality and uniqueness inherent in maps provide students with greater motivation and enthusiasm (Tarkashvand, 2015).

On one hand, the techniques of concept mapping proposed by Novak and mind mapping by Buzan share several similar characteristics. For example, both maps integrate texts and images (Eppler, 2006). "Concept maps and mind maps are great personal learning tools that result in individual solutions" (Eppler, 2006, p.205). Additionally, both mind mapping and

concept mapping techniques can be utilized to visualize complex concepts (Aydin, 2013). "The visual, non-linear nature of both mapping techniques makes them useful tools for educators who want to help students think through complex ideas and processes in accessible ways" (Beavers, 2014, p.1). Furthermore, there are several reasons for using concept mapping and mind mapping strategies, such as evaluating students' academic success (Salah Abbas et al., 2018).

On the other hand, while mapping strategies share similar primary aims, they differ in their usage (Davies, 2010). "Mind maps result in attractive, colorful, and memorable results, whereas concept maps tend to be less memorable because most of them look very much alike – a collection of boxes and arrows (with occasional icons)" (Eppler, 2006, p.205). In the mind mapping strategy, students can visualize and discover relationships between represented concepts. In contrast, the concept mapping strategy enables students to comprehend the concepts and their corresponding domain, as well as the associations between concepts (Davies, 2010).

In addition, other important differences exist between these two mapping strategies. According to Novak and Can˜as (2006) as cited in Davies (2010), in contrast to concept mapping, mind mapping is regarded as less structured and more pictorial strategy. Concept mapping is considered a relational tool because its main purpose is to create online associations between ideas. However, its purpose is not to produce unstructured connective components. The concept map is organized hierarchically with a tree structure.

These two mapping strategies also differ in their degree of accuracy and formality. Concept maps are typically more formal and structured compared to mind maps. While mind maps are more pictorial and focus on graphs and images to aid in recall of relations, concept maps are hierarchically structured. Concept maps utilize this structure along with connective phrases to help grasp of connections more effectively (Davies, 2010).

Moreover, the mind mapping technique encounters limitations in dealing with more complicated associations. For instance, mind maps are likely effective for brainstorming important themes for students to recall in exams. However, it is less likely to be considered a beneficial technique for comprehending how one concept is necessary to understand another concept (Davies, 2010). It should be noted that more complicated subjects require relational analysis rather than just a connectional device. In this regard, the development of concept

mapping helps to address the barriers and limitations of the mind mapping tool (Davies, 2010).

2.6.1 Studies Comparing Concept Mapping with Mind Mapping

The following studies have been selected to highlight a comparison between mind mapping and concept mapping techniques. Tarkashvand (2015) conducted a study to compare and examine the effectiveness of concept mapping and mind mapping techniques on the vocabulary achievement of Iranian EFL female students. The purpose of the study was to determine how these strategies contribute to students' vocabulary achievement. The participants included 62 students who were assigned to two classes. Each experimental class received one of the afore-mentioned strategies. Subsequently, a post-test created by the teacher was administered to both experimental groups to collect data. Findings of the obtained data revealed that the participants in the mind mapping class significantly outperformed the other class, which received the concept mapping strategy, in terms of increasing students' vocabulary achievement.

In a subsequent study performed in 2015, Tarkashvand also examined the effects of concept mapping and mind mapping on the vocabulary achievement of Iranian EFL male students. The study included 62 male students who were at an intermediate level of language proficiency and were assigned to two experimental groups: one using concept mapping and the other using mind mapping techniques. Both classes were administered a post-test, and the data was analyzed using a t-test. The results revealed that students utilizing mind mapping strategy exhibited greater improvement in vocabulary achievement compared to those using concept mapping strategy, regardless of gender.

In a study conducted by Salah Abbas et al. (2018), the effectiveness of concept mapping and mind mapping techniques was examined in enhancing students' understanding. A total of 140 Egyptian students participated in the study, which comprised three groups: a control group and two experimental groups, namely concept mapping and mind mapping. In the first experimental group, students utilized the concept mapping technique and were provided with three Arabic texts unrelated to their background. The second experimental group utilized the mind mapping technique with the same texts. The results, based on collective assessment scores, showed significantly higher scores achieved by students using the mind mapping technique. Furthermore, participants using the concept mapping technique spent the shortest time answering tests and fulfilling assessments. Additionally, according to the feedback from

students in both experimental groups, the process of learning knowledge was found to be enjoyable and interactive through both mind mapping and concept mapping techniques.

In a 2021 study by Redhana et al. the efficacy of mind mapping and concept mapping learning strategies was compared to determine the extent of differences in student learning success and to assess students' preferences regarding these strategies. The study utilized a quasi-experimental design and incorporated both a test and a questionnaire. Covariance analysis and descriptive statistics were employed to analyze the data collected on students' learning success and their responses, respectively. The outcomes indicated significant differences in the learning success between the mind mapping and the concept mapping groups, with the mind mapping group demonstrating superior outcomes compared to those using concept mapping. Additionally, the results revealed more positive responses from students utilizing the mind mapping strategy compared to the concept mapping group.

2.7 Group Work: Definitions and Stages

Group work, as a broad concept, encompasses a range of techniques. It involves assigning collaborative activities to two or more students, fostering both collaboration and the use of self-initiated language (Brown, 2001). Group learning comprises two prominent approaches that have attracted attention: cooperative learning and collaborative learning. These approaches serve as motivators for student learning and highlight different facets of knowledge acquisition and learning within a group in an instructional context (Hammar Chiriac, 2014). Additionally, group work can be characterized as students learning collectively. They typically organize into small groups consisting of four or five members to engage in language-related tasks (Kasim, 2015).

Another perspective defines group work as a collaborative effort involving multiple individuals working together to accomplish an activity or a task. The primary goal of group work is to encourage students to collaborate effectively in order to achieve shared objectives (Situmorang, 2021). Group work is also recognized as a necessary component in modern technology-driven teaching and learning approaches. It serves as a powerful tool for teachers, offering them an influential technique to engage students in the learning process and facilitates opportunities for cooperative learning (Situmorang, 2021).

Group work typically involves four key steps (Burke, 2011). Firstly, the teacher decides to incorporate group work into the classroom and ensures it is included in the syllabus. Secondly, the teacher instructs students on how to effectively engage in group work, fostering

active participation and collaboration. The third step involves monitoring the progress of group members throughout the activity. Finally, students undertake the crucial step of evaluating the group's performance (Burke, 2011). Additionally, Ellis and Holmes (2017) as cited in Situmorang (2021) describe five phases in the execution of group work. These phases include: "1) Preparing for group work, 2) Designing the group activity, 3) Introducing the group activity, 4) Monitoring the group task, as well as 5) Ending the group task" (p.283).

2.7.1 Group Work in Classrooms

When a large group of students convenes in one classroom, they are typically subdivided into smaller groups for a designated period (Ward, 1987).

> "Each small group is recognized and treated as a separate and distinct social entity by the teacher and the students in the classroom. To be considered instructional, the activities carried out by students in a small group must include learning of educational material" (Ward, 1987, p.1).

In educational contexts, group work commonly involves a limited number of students collaborating to complete tasks (Apple, 2006). Group sizes can vary, ranging from small teams comprising 4-6 members to larger assemblies with 15 or more participants (Neville, 2009). Hence, an essential aspect of group success lies in the selection of its members (Burke, 2011).

Furthermore, group work serves as a learning technique across all levels of instructional systems (Hammar Chiriac, 2014; Situmorang, 2021). It facilitates knowledge acquisition and stimulates learning, ultimately enhancing academic performance (Hammar Chiriac, 2014). Employing group work in classroom activities also serves to motivate students' learning and fosters a sense of enjoyment in the learning process (Taqi & Al-Nouh, 2014). Importantly, the effectiveness of group work is also contingent upon students' attitudes, with the method of group work influencing students' attitudes towards learning (Taqi & Al-Nouh, 2014). Using group work positively impacts students' attitudes during the learning process (Situmorang, 2021).

Moreover, it is important to highlight that English teachers continually seek effective techniques to assess students' proficiency in the target language, and group work represents a modern approach to language teaching, offering a progressive alternative to traditional methods (Kasim, 2015). Group work has been found to be superior to traditional language teaching approaches in terms of learning achievement. Implementing group work also

provides students with more opportunities to actively use the language in the classroom (Kasim, 2015). Consequently, organizing EFL students into groups or employing group work strategies aids in expanding their English language usage. Through the utilization of group work techniques, students can collaborate and engage in activities within small groups comprising four or five members with varying abilities. Incorporating group work into the classroom allows for the implementation of a variety of tasks or activities, including "game, role play, project, information gap, jigsaw, think pair and share, debate, enquiry technique, prioritizing, and fishbowl technique" (Kasim, 2015, p.97).

2.7.2 Advantages of Group Work

Numerous advantages of group learning and collaboration are strongly supported by scientific studies (Hammar Chiriac, 2014). These include fostering interactive language production, promoting an emotional environment favorable for learning, boosting student accountability and self-sufficiency, and moving towards individualized education (Brown, 2001). Another significant strength of group learning is its ability to enhance learning and comprehension (Barkley et al., (2005) as cited in (Kasim, 2015). Additionally, using group work improves learning outcomes and comprehension levels, effectively teaches communicative skills, facilitates richer discussions, fosters the acquisition of new social skills, and enhances student motivation (Taqi & Al-Nouh, 2014).

Utilizing group work to teach EFL also offers numerous benefits for students, including "increasing and improving their skills in thinking, communicating, interacting, negotiating, and problem-solving" (DyahPhitaloka, 2015, p.11). Furthermore, students perceive several advantages of group work, such as encouraging them to speak more, helping them gain confidence and fluency in speaking, simplifying the learning process through interaction, and providing opportunities for sharing ideas and addressing problems (DyahPhitaloka, 2015). Group work also aids EFL students in improving their language abilities. The benefits of group work can be categorized into two primary areas: cognitive facets and emotional facets. Cognitive facets aid students in the learning process, and emotional facets, which increase students' motivation (Alfares, 2017). In addition to these benefits, the practice of group work expands the willingness of members to take accountability, enhances their self-assurance in sharing ideas, helps them fulfill their tasks, and fosters their ability to respect others. Moreover, group work has a positive influence on students' learning habits and attitudes, both individually and within a group setting (Situmorang, 2021).

Chapter Three

Methodology

3.1 Introduction

The present quasi-experimental study aims to examine the effects of the chosen techniques, namely the keyword method, concept mapping, and mind mapping, on L2 vocabulary comprehension, production, and retention among elementary female students within a group learning framework. This chapter outlines the methodology employed, detailing the participants, materials, instruments, and procedures applied for data collection and analysis.

3.2 Participants

Initially, 120 female Iranian EFL students (6th graders primary) were selected for participation in this study from two branches of a well-known language institute located in Paveh County, Kermanshah. Paveh County was specifically chosen from the 14 counties in Kermanshah due to its representation of the larger population. The selection process utilized simple cluster sampling to effectively choose and characterize the participants. To minimize any differences and to ensure homogeneity among the participants for research purposes, socio-economic factors such as grade, gender, age, institute, and place of residence were taken into account. Convenience sampling was then employed to select two branches of the language institute in Paveh County for the study.

The participants, aged 11 to 12, were all at the elementary level of language proficiency and exclusively female, in accordance with the single-sex policy of language institutes in Iran. This study specifically selected participants from two branches of a renowned language institute in Paveh County, Kermanshah city, considering the common practice of multiple branches in such institutes. The participants were initially organized into four pre-existing main groups, each comprising 30 students. The study, employing a quasi-experimental design, included both experimental and control groups: three experimental groups and one control group. Notably, the participants were not randomly assigned; instead, they were selected from pre-existing groups within the two institutes. Each main group further divided into smaller groups, with the students themselves selecting their smaller groups. Additionally, in the experimental groups, the participants were randomly assigned one of the selected techniques, while the control group received no special treatment.

3.3 Materials and Instruments

In this study, the following materials and instruments were utilized to collect data: a pre-test, a word knowledge pre-test, two post-tests, and a delayed post-test.

3.3.1 Pre-test

Before commencing the experiment and instructional treatment sessions, the groups underwent a pre-test comprising 35 items in a multiple-choice format. The purpose of this pre-test was twofold: to homogenize the participants and to assess their language proficiency level. To achieve this, a standard language proficiency test, namely the English Placement Test published by Pearson Longman ELT, was employed to ensure the comparability of the chosen study groups. The mean and standard deviation of the scores were calculated (Mean= 27.5, SD= 5.18). To achieve homogeneity among the participants, those whose scores strayed more than one standard deviation above or below the mean were excluded from subsequent analyses. The results indicated that the remaining 112 students were all at the elementary level of language proficiency (See Appendix A). Additionally, the reliability of the pre-test was calculated using the KR-21 formula, yielding a coefficient of 85%.

3.3.2 Word Knowledge Pre-test

In selecting vocabulary items for the study, the decision was made to use the book taught in the institutes themselves. The 'Family and Friends 2' book, published by Oxford University Press, served as the source for choosing vocabulary items for the instructional sessions. This choice aimed to introduce topic-based word lists with accompanying pictures, followed by exercises. The aforementioned book was employed to choose 128 vocabulary items for presentation during the instructional treatment sessions. It is important to note that the selection of these vocabulary items was based on two criteria. Firstly, all vocabulary items needed to be suitable for the mentioned techniques and appropriate for elementary students. Secondly, the chosen vocabularies were required to facilitate the creation of pictures or images, being concrete even though a few words were abstract. Additionally, the Cambridge Dictionary was utilized to obtain samples of sentences containing these words.

After the necessary vocabulary items were chosen, the target words of the study were contextualized in 75 sentences to form the word knowledge pre-test. The target words were then bolded and underlined in each sentence, and the students were instructed to write the meaning of the words in Persian. Using the word knowledge pre-test, any vocabulary items

known to the students were omitted. For example, if a word was already known by three students, it would be excluded from the word list to be taught. Therefore, the purpose of the word knowledge pre-test was to identify unknown words for the instructional treatment sessions and ensure that the students did not have prior knowledge of them (See Appendix B). Similarly, the reliability of the word-knowledge pre-test was determined through the KR-21 formula, resulting in a coefficient of 79%.

3.3.3 Post-tests

After the treatment sessions, two post-tests containing the target words were administered in two different formats (See Appendix C):

3.3.3.1 Vocabulary Production Post-Test

The post-test format comprised four types of fill-in-the-gap questions. In the first part, students were presented with pictures of various items and were assigned the task of filling the gaps with appropriate words. The second part involved a puzzle featuring photos, requiring students to complete the puzzle by providing corresponding words. The third section consisted of sentences defining specific target words; students were prompted to deduce related words and fill in the gaps. Lastly, the fourth part presented a series of sentences, and students were required to fill in the blanks using a provided word list. It is noteworthy that, for all fill-in-the-gap questions, the initial letter of the words was provided to students to discourage the use of words similar to the target words. The objective of this post-test was to evaluate the impact of the selected techniques on vocabulary production. Following the same methodology, the reliability of the vocabulary production post-test was computed utilizing the KR-21 formula, demonstrating a coefficient of 84%.

3.3.3.2 Vocabulary Comprehension Post-Test

The post-test format consisted of two types of questions. The first part comprised 15 multiple-choice questions. In the second part, students faced several sentences containing the target words and were tasked with arranging these sentences in the correct order to construct a meaningful short passage. The objective of this post-test was to evaluate the impact of the selected techniques on vocabulary comprehension. Likewise, the reliability of the vocabulary comprehension post-test underwent assessment through the KR-21 formula, producing a coefficient of 82%.

3.3.3.3 Delayed Post-Test

A month after administering the two post-tests, vocabulary retention post-test, known as the delayed post-test, was given to the students to assess their vocabulary retention. The delayed post-test comprised 15 multiple-choice questions and 15 fill-in-the-blank questions. For the fill-in-the-blank questions, the initial letter of the word was provided to aid in the production of the target words and to prevent the students from using possible synonyms (See Appendix D). The objective of this delayed post-test was to investigate whether the special treatment of this study—utilizing the keyword method, concept mapping, and mind mapping techniques—had a significant effect on the vocabulary retention of Iranian primary female students (6^{th} graders) within a group learning framework. Notably, the reliability of the delayed post-test was determined utilizing the KR-21 formula, indicating a coefficient of 84%. It is important to note that the Family and Friends 2 (Testing and Evaluation) book published by Oxford University Press was employed to form vocabulary comprehension and production post-tests. Additionally, standardized elementary vocabulary tests (for multiple-choice questions) and KET tests (for fill-in-the-blank questions) were utilized in forming the delayed post-test in this study.

3.4 Data Collection Procedures

Initially, 120 female Iranian EFL students (6^{th} graders) from two branches of a well-known language institute located in Paveh County, Kermanshah city, participated in this study. The manager and supervisor of the institutes were briefed on the research project and its objectives, and they agreed to collaborate with the researcher throughout the research process. However, the institutes' manager requested a permission letter from the researcher to ensure the confidentiality of all information in the students' registration forms, including names and phone numbers. Additionally, a teacher training session was conducted to familiarize teachers with the afore-mentioned techniques. They were provided with a pamphlet containing explanations and samples of the selected techniques.

In collaboration with the two language institutes, a list of elementary classes along with students' names was provided for initial organization. Subsequently, the participants were divided into four pre-existing main groups, with each class consisting of 30 participants. The study included both experimental and control groups, comprising three experimental groups and one control group. However, it is important to note that the participants were not

randomly assigned to these groups; instead, they were selected from pre-existing groups within the two institutes.

After determining the groups, the first step was to administer a standard 35-minute pre-test (English Placement Test by Pearson Longman ELT), composed of 35 multiple-choice items, to homogenize the participants and determine their language proficiency level. In the next step, the mean and standard deviation of the scores were calculated. The results indicated that 112 participants were selected for instructional sessions, with 28 students in each group.

It is noteworthy that each main group was divided into 7 small groups, each consisting of 4 students. The small groups were self-selected by the students in each class. Once homogeneity was ensured, the word knowledge pre-test was conducted to confirm that the students had no prior knowledge of the target words. This test comprised 128 bolded and underlined vocabulary items contextualized in 75 sentences, selected from Family and Friends 2 by Oxford University Press. The sentences containing samples of these words were extracted from the Cambridge Dictionary. The allocated time for the word knowledge pre-test was 50 minutes. As a result of the word knowledge pre-test, 60 target words were selected for the instructional treatment sessions. Out of the total of 128 vocabulary items, the words that were familiar to the students were excluded from the instructional treatment sessions.

Afterward, the participants of each experimental group were randomly assigned one of the chosen techniques, including the keyword method, concept mapping and mind mapping; the participants in the control group did not receive any special treatment. In the initial instructional session, each main group of participants received a brief explanation of the selected techniques' procedures and stages, namely the keyword method, concept mapping, and mind mapping. Subsequently, they began working with the assigned technique. It is noteworthy that the students remained unaware of the experiment to prevent any influence on the outcomes; they were only made familiar with and taught vocabulary items according to the chosen technique.

The instructional treatment spanned 16 sessions over two and a half months, with two additional sessions allocated for administering two post-tests and one delayed post-test. Learning sessions occurred twice a week, each lasting 45 minutes. In every session, the teacher introduced 5 new words to the students based on the selected technique, with students in small groups collaborating to learn these new words. The teacher emphasized and encouraged collaboration among learners to create an effective learning environment.

Additionally, during each session, the students presented samples of the techniques using new words (See Appendix E).

Here's a brief overview of the selected techniques—keyword method, concept mapping, and mind mapping—chosen for their impact on second language (L2) vocabulary learning and retention among primary students within a group learning framework:

The keyword method: In the first session, students of the keyword method group (n=28) were divided into 7 small groups, each consisting of 4 students. Each session, the students received a new topic-based wordlist and learned these words based on the instructions of the keyword method. The teacher presented associated Persian keywords, provided helpful examples of the keyword method phases, and created memorable mental images of the Persian keyword corresponding to the Persian definition of the English word. It is important to note that the students in small groups worked together to create their own keywords and mental images.

Concept mapping: In the first session, students of the concept mapping group (n=28) were divided into 7 small groups, each consisting of 4 students. The students in the concept mapping group received the same topic-based wordlists each session. The objective was to organize and create cohesive relationships between all vocabulary items to memorize them effectively. Using the new words, the teacher provided useful examples for creating concept maps. When a new topic-based wordlist was presented to the participants, students in the small groups worked together and placed the novel word in a circle or box at the top of the map. Additionally, they utilized arrows to connect two words. Subsequently, these arrows were employed to create links or cohesive structures within a concept map.

Mind mapping: In the first session, students of the mind mapping group (n=28) were divided into 7 small groups, each consisting of 4 students. The mind mapping procedure was instructed to the students, and the small groups worked together to learn new topic-based wordlists each session. They wrote the core vocabulary in the center; subsequently, they drew thick branches containing key ideas or topics. These thick branches were then divided into thin branches with subtopics. To encourage students to learn new words using mind mapping technique, the teacher explained some of the benefits of this new innovative technique, such as note taking, brain storming, and studying before an exam.

At the conclusion of the experimental period, two post-tests were administered to assess the impact of the keyword method, concept mapping, and mind mapping strategies on the vocabulary comprehension and production of 6th-grade primary students within the group learning framework. The vocabulary comprehension post-test comprised two parts: the first part consisted of 15 multiple-choice questions, while the second part required students to arrange sentences containing target words in the correct order to form a meaningful short passage.

The vocabulary production post-test encompassed four types of fill-in-the-gap questions. In the first part, students filled in the gaps of words corresponding to pictures. The second part involved completing a puzzle based on provided photos. The third part included sentences defining target words, requiring students to fill in the gaps with the correct words. The final part required students to fill in blanks using a given wordlist, with the first letter of each word provided to prevent the use of similar words. The allocated time for the post- tests was 50 minutes.

One month after administering the two post-tests, a vocabulary retention post-test, known as the delayed post-test, was conducted. This test consisted of 15 multiple-choice questions and 15 fill-in-the-blank questions to evaluate students' vocabulary retention. It is important to note that the post-tests (vocabulary comprehension and production) were formulated using the Family and Friends 2 (Testing and Evaluation) book published by Oxford University Press. Additionally, standardized elementary vocabulary tests and KET tests were utilized to create the delayed post-test in this study.

3.5 Data Analysis

Three separate one-way ANOVA procedures were employed to analyze the obtained data and address the proposed research questions. This study encompassed three research questions. The first research question aimed to examine the effects of the keyword method, concept mapping, and mind mapping techniques on vocabulary comprehension. Similarly, the second research question investigated the impact of these techniques on vocabulary production. Finally, the third research question explored the impacts of the afore-mentioned techniques on vocabulary retention. It is worth noting that these chosen techniques were applied to primary students within a group learning framework.

Chapter Four

Results and Discussion

4.1 Introduction

The current study meticulously examines how effective three distinct vocabulary learning techniques are in comparison to one another, including the keyword method, concept mapping, and mind mapping with a focus on their impact on L2 vocabulary comprehension, production, and retention of primary students. This chapter delves into the three proposed research questions using the quantitative outcomes derived from the students' post-test performance in vocabulary comprehension, production, and retention. Additionally, the present chapter employs tables and figures in order to elucidate the obtained outcomes of statistical analyses.

4.2 Examination of the First Research Question

Utilizing a one-way ANOVA procedure, the initial research question scrutinized the impacts of the chosen vocabulary techniques on L2 vocabulary comprehension. Below, Table 4.1 encapsulates descriptive statistics related to vocabulary comprehension test, providing a comprehensive overview of key metrics.

Table 4.1

Descriptive Statistics for the ANOVA on the Vocabulary Comprehension

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Keyword Method	28	20.75	3.35	.63	19.45	22.04
Concept Mapping	28	22.92	2.59	.49	21.92	23.93
Mind Mapping	28	24.67	2.56	.48	23.68	25.67
Control	28	17.75	2.97	.56	16.59	18.90
Total	112	21.52	3.85	.36	20.80	22.24

Table 4.1 illustrates that the mind mapping group exhibits the highest mean ($\bar{x}$= 24.67), trailed closely by the concept mapping group ($\bar{x}$= 22.92). The participants of the keyword method ($\bar{x}$= 20.75) record the third mean. Notably, the control group has the lowest mean ($\bar{x}$= 17.75) on the vocabulary comprehension test.

The One-way ANOVA procedure was utilized to ascertain if there were statistically significant differences among the observed means of the chosen groups. Below, Table 4.2 indicates the outcomes of this ANOVA analysis, shedding light on statistical significance of differences observed among the means of the groups.

Table 4.2

The Outcomes of the ANOVA on the Vocabulary Comprehension

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	749.45	3	249.81	29.89	.000
Within Groups	902.46	108	8.35		
Total	1651.92	111			

Considering Table 4.2, the data such as the observed F value and the significance level (F= 29.89, P < 0.05) indicate that there are statistically significant differences among the selected groups, resulting in the rejection of the first null hypothesis. Consequently, the Post-Hoc Scheffe test was implemented in order to pinpoint precise differences between the means. Below, Table 4.3 presents the outcomes of the Post-Hoc Scheffe test, providing more details regarding the statistically significant differences observed among the groups.

Table 4.3

Post-Hoc Multiple Comparisons of Means for the Vocabulary Comprehension

(I)Group	(J)Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Keyword Method	Concept Mapping	-2.17	.77	.052	-4.37	.015
	Mind Mapping	-3.92*	.77	.000	-6.12	-1.73
	Control	3.00*	.77	.003	.80	5.19
Concept Mapping	Mind Mapping	-1.75	.77	.169	-3.94	.44
	Control	5.17*	.77	.000	2.98	7.37
Mind Mapping	Control	6.92*	.77	.000	4.73	9.12

*. The significant mean difference is at the 0.05 level.

In light of the outcomes presented in Table 4.3, there are statistically insignificant differences between the mind mapping group and the concept mapping group. The suggestion is that the performance of the participants in both groups was similar. Likewise, although the observed difference between the keyword method and the concept mapping group is not statistically significant, the participants in the concept mapping group exhibited slightly better performance than those in the keyword method group. In addition, the observed difference between the means of the mind mapping group and the keyword method is statistically

significant, implying that the group utilizing the mind mapping technique functioned better than their classmates in the keyword method group. Additionally, the results unveiled that the observed mean differences between the keyword method and the control group, the concept mapping and the control group, as well as the mind mapping and the control group are statistically meaningful. This implies that the groups exposed to vocabulary learning techniques, such as the keyword method, concept mapping, and mind mapping outperformed the control group.

Figure 4.1 provides a clear graphical illustration of the impacts of the three chosen techniques on vocabulary comprehension of primary students.

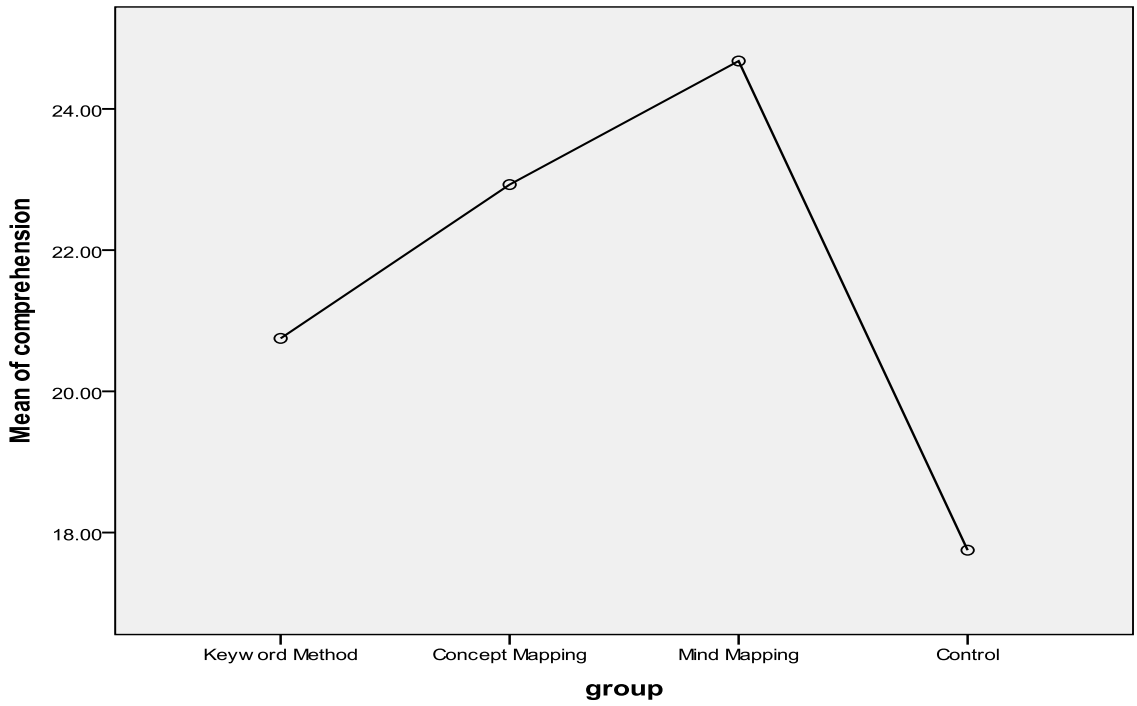

Figure 4.1: *Performance of the Students on Vocabulary Comprehension Test*

4.3 Examination of the Second Research Question

Using another one-way ANOVA procedure, the second proposed research question examined the impacts of the chosen strategies on L2 vocabulary production among primary students. Below, Table 4.4 presents descriptive statistics pertinent to vocabulary production test, offering a detailed overview of key metrics.

Table 4.4

Descriptive Statistics for ANOVA on the Vocabulary Production

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Keyword Method	28	22.32	4.00	.75	20.76	23.87
Concept Mapping	28	22.89	2.37	.44	21.97	23.81
Mind Mapping	28	26.53	1.93	.36	25.78	27.28
Control	28	19.82	3.00	.56	18.65	20.98
Total	112	22.89	3.76	.35	22.18	23.59

The results from Table 4.4 unveil that the mind mapping group displays the highest mean score ($\bar{x}$= 26.53), followed in close succession by the concept mapping group ($\bar{x}$= 22.89), and the keyword method group ($\bar{x}$= 22.32). It is also noteworthy that the participants in the control group exhibit the lowest mean ($\bar{x}$= 19.82) when compared to the other groups.

Another one-way ANOVA was utilized to determine whether the observed mean differences among the chosen groups were statistically meaningful. Below, Table 4.5 illustrates the outcomes of the ANOVA process.

Table 4.5

The Outcomes of the ANOVA on Vocabulary Production

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	644.85	3	214.95	24.91	.000
Within Groups	931.85	108	8.62		
Total	1576.71	111			

Referring to the information in Table 4.5, the data, such as the obtained F value and the significance level (F=24.91, P < .05), demonstrate that statistically significant differences exist among the groups' means, prompting the rejection of the second null hypothesis in this

study. Consequently, a Post-Hoc Sheffee analysis was utilized to identify the specific differences between the observed means. Below, Table 4.6 provides detailed information regarding the outcomes of the conducted post-hoc multiple comparisons.

Table 4.6

Post-Hoc Multiple Comparisons of Means for the Vocabulary Production

(I)Group	(J)Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Keyword Method	Concept Mapping	-.57	.78	.912	-2.80	1.65
	Mind Mapping	-4.21*	.78	.000	-6.44	-1.98
	Control	2.50*	.78	.021	.27	4.72
Concept Mapping	Mind Mapping	-3.64*	.78	.000	-5.87	-1.41
	Control	3.07*	.78	.002	.84	5.30
Mind Mapping	Control	6.71*	.78	.000	4.48	8.94

*. The significant mean difference is at the 0.05 level.

Derived from Table 4.6, the observed difference between the keyword method and the concept mapping group is not statistically significant, implying that both groups functioned similarly. Furthermore, statistically meaningful differences exist between the means of the mind mapping group and the keyword method group, the mind mapping and the concept mapping group, and the mind mapping group and the control group. The results reveal that the participants utilizing the mind mapping technique outperformed their counterparts in the keyword method group, the concept mapping group, and the control group on the vocabulary production test. This highlights that the mind mapping strategy proves to be more effective in enhancing the vocabulary production of primary students. Similarly, the observed mean differences between the keyword method and the control group, and the concept mapping and the control group demonstrate statistical significance, indicating that the control group performed poorly in comparison with the other groups.

The following Figure 4.2 depicts a clearer graphical illustration of the positioning of the groups on L2 vocabulary production of primary students.

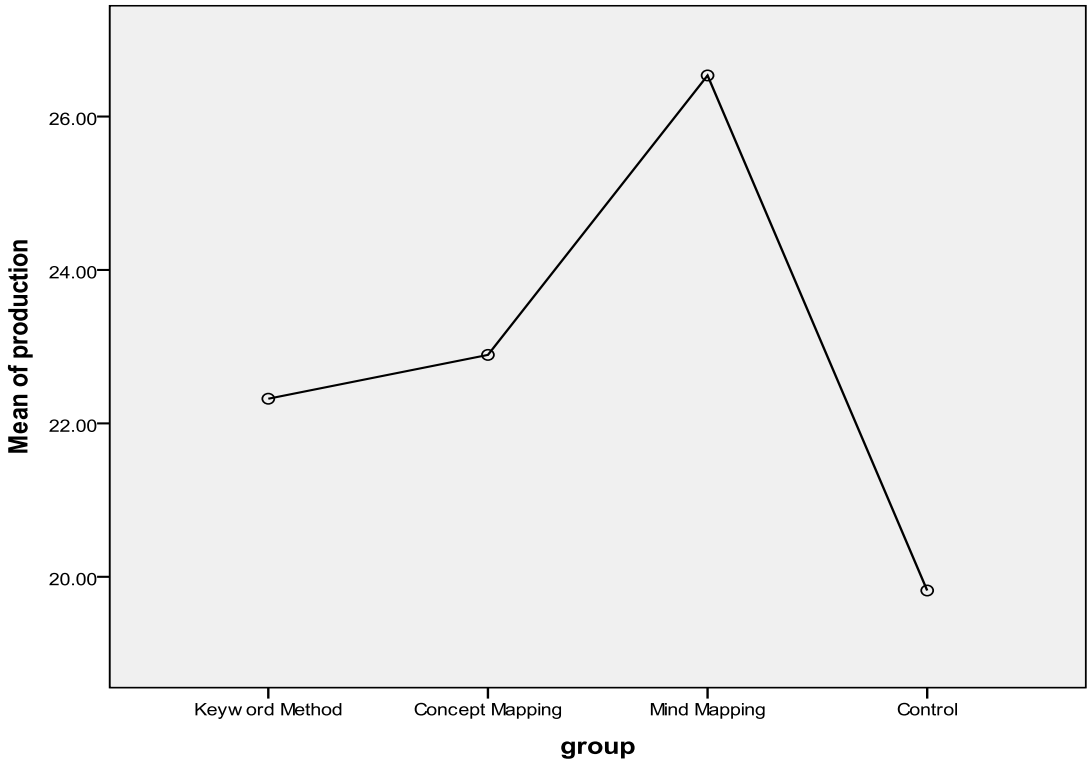

Figure 4.2: *Performance of the Students on Vocabulary Production Test*

4.4. Examination of the Third Research Question

In this study, the third research question sought to examine the impacts of the chosen strategies on L2 vocabulary retention. To achieve this, the third one-way ANOVA analysis was employed to acquire the necessary data. Below, Table 4.7 compiles the descriptive statistics for the vocabulary retention test.

Table 4.7

Descriptive Statistics for the ANOVA on the Vocabulary Retention

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound
Keyword Method	28	19.39	2.49	.47	18.42	20.36
Concept Mapping	28	21.78	1.47	.27	21.21	22.35
Mind Mapping	28	24.07	1.71	.32	23.40	24.73
Control	28	17.46	2.82	.53	16.37	18.55
Total	112	20.67	3.30	.31	20.05	21.29

Based on the results revealed in Table 4.7, the participants in the mind mapping group secure the highest mean score ($\bar{x}$= 24.07). Following this, the concept mapping group achieves the second highest mean score ($\bar{x}$= 21.78), while the keyword method group demonstrates the third mean score ($\bar{x}$= 19.39). Ultimately, the control group participants display the lowest mean score ($\bar{x}$= 17.46).

The last one-way ANOVA analysis was employed to determine if the attained mean differences among the selected groups were statistically meaningful. Below, Table 4.8 illustrates the outcomes of the ANOVA analysis, elucidating the observed statistically significant differences.

Table 4.8

The Outcomes of the ANOVA on Vocabulary Retention

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	692.21	3	230.73	47.71	.000
Within Groups	522.21	108	4.83		
Total	1214.42	111			

Table 4.8 indicates that the data, such as the observed F value and the significance level (F= 47.71, P < 0.05), underscore the statistically significant differences among the four groups. Consequently, the final null hypothesis is also rejected. Subsequently, the Post-Hoc Scheffe analysis was conducted to ascertain the accurate mean differences between the chosen groups. Below, Table 4.9 furnishes comprehensive information regarding the outcomes of the Post-Hoc Scheffe analysis on vocabulary retention.

Table 4.9

Post-Hoc Multiple Comparisons of Means for the Vocabulary Retention

(I)Group	(J)Group	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Keyword Method	Concept Mapping	-2.39*	.58	.001	-4.06	-.72
	Mind Mapping	-4.67*	.58	.000	-6.34	-3.00
	Control	1.92*	.58	.016	.25	3.59
Concept Mapping	Mind Mapping	-2.28*	.58	.003	-3.95	-.61
	Control	4.32*	.58	.000	2.65	5.99
Mind Mapping	Control	6.60*	.58	.000	4.93	8.27

*. The significant mean difference is at the 0.05 level.

Given the outcomes presented in Table 4.9, statistically significant differences emerge between the means of all groups. This implies that conducting a post-test on vocabulary retention reveals meaningful mean differences, indicating varied performances across all groups. A thorough examination of Table 4.9 underscores statistically significant mean differences between the mind mapping and the keyword method, the mind mapping and the concept mapping, as well as the mind mapping and the control group. This suggests that the participants utilizing the mind mapping outperformed all groups in vocabulary retention. Furthermore, statistical significant differences between the concept mapping and the keyword method emphasize the superior performance of the participants in the concept mapping group compared to their peers in the keyword method. Consequently, the keyword method proves less effective in enhancing the vocabulary retention of primary students when compared to the mind mapping and concept mapping techniques. Additionally, the control group exhibited poor performance on the vocabulary retention test.

Figure 4.3 illustrates a more lucid graphical representation of the four groups in L2 vocabulary retention.

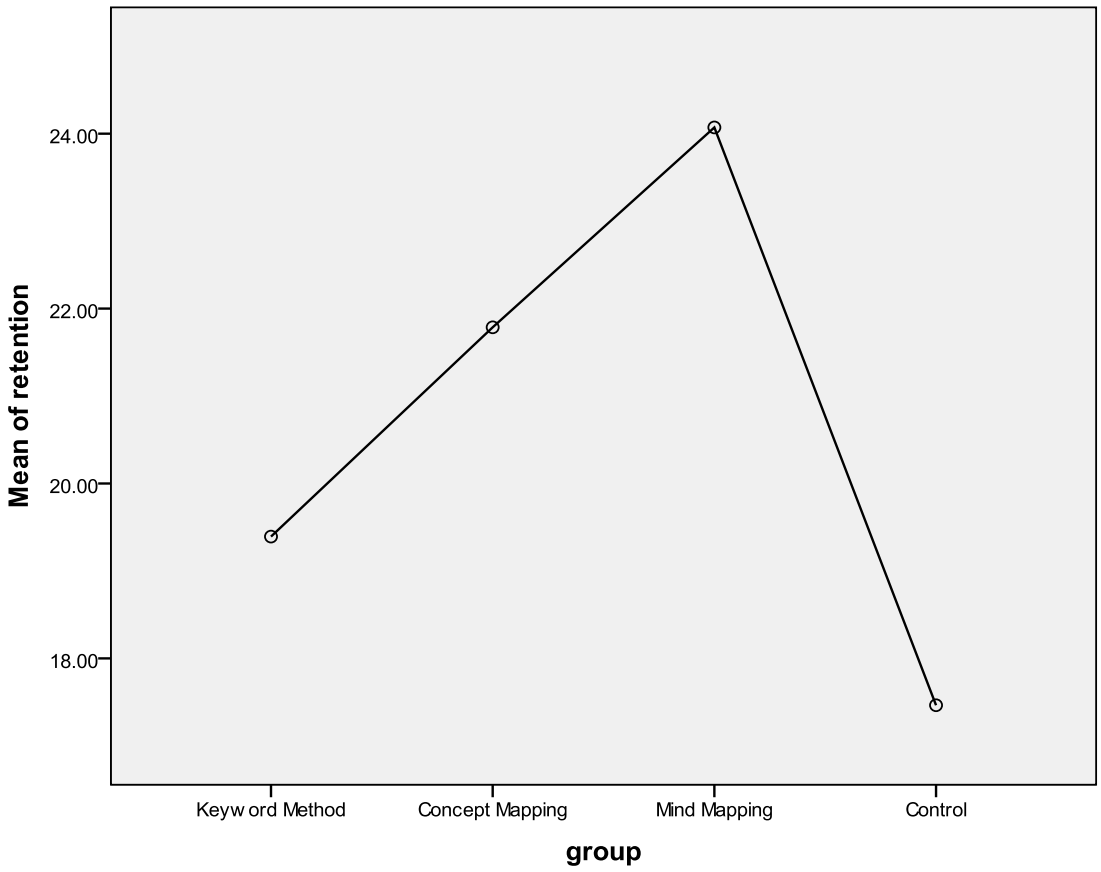

Figure 4.3: *Performance of the Students on Vocabulary Retention Test*

4.5 Discussion

The present study sought to examine the differences in the impacts of three chosen methods — the keyword method, concept mapping, and mind mapping — on the second language (L2) vocabulary comprehension, production, and retention of primary students within a group learning framework. The study's outcomes reveal statistically significant mean differences among the groups on all post-tests, including vocabulary comprehension, production, and retention.

The outcomes of the present study indicate that the mind mapping group exhibits the highest mean score in all conducted tests, including vocabulary comprehension, production, and retention. The participants in the concept mapping and the keyword method group record the second and third means, respectively, while the students of the control group have the lowest mean in the obtained data.

Upon analyzing the collected data, this study revealed various outcomes for each of the three research questions: In the present study, the keyword method group performed better than the control group in all three vocabulary tests. This implies that using the keyword mnemonic method is more effective than the traditional memorization technique to increase vocabulary learning and retention of primary students. In line with this finding, Elhelou's (1994) study revealed that 2nd-grade children, who experienced instructional sessions with the keyword method, demonstrated a significantly higher vocabulary retention rate when compared to their peers in the control group. Similarly, Avila and Sadoski (1996) found that when comparing the keyword method with the typical training of 5th graders with a low level of language proficiency, this mnemonic method yielded significant improvements in both recall and comprehension, both in immediate and delayed situations. This finding is also consistent with the research of Ahmadi Safa and Hamzavi (2013), who observed improved performance among 5th-grade primary students using the keyword method for both vocabulary learning and long-term retention of new words. Additionally, Ahmadi Safa and Hamzavi underscored the effectiveness of creating mental images for vocabulary learning and long-term retention in elementary students.

Moreover, the outcomes of the current study reveal statistically significant differences between the mind mapping group and the keyword method group in all three vocabulary tests, indicating that the participants using the mind mapping technique outperformed their classmates in the keyword method group. This demonstrates the effectiveness of the mind

mapping technique in improving vocabulary learning, including comprehension and production, as well as the retention of elementary students when compared to the keyword mnemonic method. This result is in contrast with the findings of the study by Zarei and Keysan (2016), who reported that the keyword method group and the mind mapping group performed similarly in both vocabulary comprehension and production tests.

In light of the outcomes of the current study, the negligible differences observed between the keyword method and the concept mapping group in both vocabulary comprehension and production suggest their similar performances. Nevertheless, the participants utilizing the concept mapping technique exhibited a slightly superior performance in the comprehension test. On the contrary, statistically significant differences emerged between the keyword method group and the concept mapping group in vocabulary retention. This implies that the concept mapping group exceeded their peers in the vocabulary retention test. It may be concluded that the concept mapping technique yields great results in enhancing vocabulary retention of primary students. These outcomes share both similarities and differences with the findings of the study conducted by Zarei and Keysan (2016). On the one hand, Zarei and Keysan reported similar performances between the keyword method and the concept mapping group in the vocabulary comprehension test. On the other hand, the participants using the keyword mnemonic method surpassed the concept mapping group in vocabulary production.

A detailed examination of the current study's results highlights significant differences in all three vocabulary tests between the mind mapping group and the control group. This emphasizes the effectiveness of employing the mind mapping technique in enhancing various aspects of vocabulary learning, including comprehension, production, and retention among elementary students, as compared to the traditional memorization technique. This finding aligns with the results of Heidari and Karimi (2015), where data analysis revealed that employing mind mapping increased students' vocabulary learning and retention. Furthermore, the experimental group outperformed the control class on the delayed post-test.

Similar to this finding, Alahmadi (2020) discovered that employing the mind mapping technique resulted in significant advancements in vocabulary learning. This technique not only streamlined vocabulary learning but also enhanced overall vocabulary knowledge. Moreover, the use of the mind mapping strategy contributed to improved student motivation in the vocabulary learning process. Consistent with this outcome, Fikriah et al. (2021) conducted a qualitative study to thoroughly examine the procedures of mind mapping. The analyzed data demonstrated that creating colorful mind maps for vocabulary learning

enhanced students' enjoyment, simplified their comprehension, facilitated memorization of new words, and encouraged active participation in the class.

The findings of the current study offer evidence that the participants utilizing the concept mapping technique outperformed the control group in all three vocabulary tests. This suggests that the use of an effective mapping technique, such as concept mapping, enhances elementary students' vocabulary comprehension, production, and retention. Findings from this study are in line with the research conducted by Khoshsima et al. (2015), who reported the effectiveness of the concept mapping technique on vocabulary learning and retention of EFL students. Similar to the results of this study, Deemae's (2016) research demonstrated noticeable advancements in vocabulary development and knowledge among 6th graders. Additionally, the current findings align with the study conducted by Kaveh and Rassaei (2019) on EFL students in Iran, which asserted that the use of concept mapping instructions significantly contributed to advancements in students' vocabulary learning and their awareness of vocabulary learning strategies.

Another significant finding to consider is the observed differences between the mind mapping group and concept mapping group across all three tests. While insignificant differences exist between these two mapping techniques in the vocabulary comprehension test, emphasizing the students' similar performances in comprehension, statistically significant differences emerge between mind mapping and concept mapping in both vocabulary production and retention. This implies that the students' superior performances in the mind mapping group underscore the effectiveness of this technique in increasing vocabulary learning and retention among primary students when compared to the concept mapping group. The similarity of this outcome is evident in the research conducted by Tarkashvand (2015), who compared the efficacy of two prominent mapping strategies, namely concept mapping and mind mapping, on the vocabulary achievement of both male and female Iranian EFL students. The results of the data analysis demonstrated the superior performance of the participants using the mind mapping technique over the concept mapping group, ultimately enhancing students' vocabulary achievement.

The current results also align with the findings obtained by Zarei and Keysan (2016), wherein both concept mapping and mind mapping demonstrated similar performances in the vocabulary comprehension test, suggesting the equal effectiveness of these techniques in enhancing vocabulary comprehension. However, the students utilizing the mind mapping technique were more successful than their counterparts using the concept mapping technique.

Moreover, the results of study conducted by Salah Abbas et al., (2018), similar to the findings presented here, revealed that the students who employed mind mapping achieved higher scores in the comprehension assessment. It was widely acknowledged that learning knowledge was more enjoyable using both mapping techniques.

Furthermore, the present findings resonate with the research conducted by Redhana, et al. (2021), where significant distinctions in the learning success were observed between the groups using mind mapping and concept mapping. The data indicated that the mind mapping group accomplished better outcomes compared to the students who employed the concept mapping technique. Additionally, the students using the mind mapping strategy provided more positive responses than those using concept mapping. Therefore, mind mapping and concept mapping are two key learning strategies employed in the educational process, frequently utilized to enhance students' learning success.

It is widely acknowledged that a beneficial approach in the implementation of mapping strategies involves students collaborating to create a map. This collaborative effort encourages students to view their perspectives as essential elements in the mapping process. The individuality and uniqueness inherent in these maps provide students with added motivation and enthusiasm (Tarkashvand, 2015).

Several factors could probably explain and elucidate these variations. One possible reason is the socio-cultural and educational environment in Iran. In the educational system of Iran, students have a tendency to prefer teacher-centered instruction over learner-centered approaches. This preference may stem from cultural values that adhere to conventional teaching methodologies. Another potential factor contributing to these differences could be the participants' proficiency level. Given that the participants in the current study were at a primary language proficiency level, their potential limited vocabulary and language skills may result in heavily reliance on the teacher for guidance and instruction.

Another plausible factor contributing to these findings could be related to gender differences. It is worth noting that the current study solely concentrated on female learners and did not account for gender differences. Moreover, the time factor may play a crucial role in accounting for these differences. Implementing mnemonic and mapping procedures typically demands a considerable time investment.

Chapter Five

Conclusion and Implications

5.1 Introduction

This chapter provides a concise overview of the key findings obtained from the data analysis and highlights the main insights discovered during the study. In addition to presenting the main findings and their pedagogical implications, this chapter also acknowledges the limitations and delimitations of the study, while proposing suggestions for future research. These insights collectively contribute to a deeper understanding of the effects of the keyword method, concept mapping, and mind mapping on vocabulary learning and retention among primary students within a group learning framework and its implications for vocabulary learning.

5.2 Conclusion

The current study aimed to examine the impacts of the keyword method, concept mapping, and mind mapping on vocabulary comprehension, production, and retention among primary students within a group learning framework. The purpose of the presented three research questions was to scrutinize whether there were statistically significant differences among the selected mnemonic and mapping techniques on L2 vocabulary comprehension, production, and retention of elementary students. The obtained outcomes revealed that the three research questions were rejected, suggesting that the mean differences were statistically significant on all three tests.

The findings of this study shed light on the effectiveness of the mind mapping technique in enhancing vocabulary comprehension, production, and retention among primary students. The mind mapping group accomplished the highest mean among the other groups and outperformed others on all three tests. However, the mind mapping group and concept mapping group performed similarly in the vocabulary comprehension test. The concept mapping group exhibited the second highest mean, followed by the keyword method group on three vocabulary tests. While there were insignificant differences between the concept mapping group and the keyword method group on vocabulary comprehension, the participants who utilized the concept mapping strategy demonstrated slightly better performance compared to the keyword method group. Additionally, insignificant differences between these two groups highlighted that both groups performed similarly on vocabulary production. In the same vein, significant differences between the concept mapping group and the keyword method group on vocabulary retention imply that the concept mapping group outperformed

their counterparts. The participants of the control group displayed the lowest mean and performance when compared to the other groups.

In conclusion, the current study has provided valuable insights into the effectiveness of mapping techniques in enhancing L2 vocabulary learning and retention among primary students compared to the mnemonic instructional and traditional memorization methods. Additionally, these results underscore the importance of incorporating mapping techniques as valuable visual instructional tools into both language learning pedagogy and language teaching methodology among primary students to enhance more effective vocabulary learning outcomes.

5.3 Pedagogical Implications

The findings of the current study offer valuable insights into effective pedagogical strategies aimed at enhancing vocabulary learning and retention among 6th-grade primary students. Educators can employ the keyword method, concept mapping, and mind mapping techniques within group learning frameworks to facilitate deeper understanding and long-term memory of vocabulary.

Firstly, teachers must prioritize enhancing intrinsic motivation and enthusiasm among primary students regarding vocabulary learning strategies. Additionally, they must create dynamic learning environments that foster self-directed and learner-centered instruction. Secondly, the integration of visual educational techniques, such as the keyword method, concept mapping, and mind mapping, can significantly enhance vocabulary comprehension, production, and retention among primary students.

Furthermore, teachers should emphasize the importance of collaborative group learning environments where students can actively engage in peer discussions, share insights, and collaboratively learn vocabulary. Teachers can promote a supportive learning environment that fosters effective vocabulary development by encouraging active participation and interaction.

Overall, the robust pedagogical implications underscore the importance of employing a diverse range of instructional strategies, particularly incorporating mapping and mnemonic techniques, to meet the specific needs and preferences of 6th-grade primary students. By cultivating an inclusive and collaborative learning environment, teachers can empower students to become proficient learners.

5.4 Limitations and Delimitations

The present study acknowledges the following limitations and delimitations:

Firstly, the low probability of generalizability of the study's findings to other contexts may be attributed to the specific demographic and educational context of 6th-grade primary students. The study's sample size is considered another limitation of the current study. The study involved only 112 female primary learners, which may limit its representativeness for the broader population of 6th-grade students.

The study exclusively focuses on 6th-grade primary students, which limits the relevance of its findings for students in different grades, age groups, and educational levels. Gender differences were not considered in this study, providing insights and outcomes specifically adapted to this demographic group. Additionally, the limited duration of the study, consisting of 16 intervention sessions, each lasting 45 minutes, may restrict the ability to observe long-term effects of the interventions on vocabulary learning and retention. Moreover, as the interventions were implemented under controlled conditions within the institute setting, their applicability may differ from real-world instructional practices.

Furthermore, the effectiveness of the keyword method, concept mapping, and mind mapping may vary based on factors such as learning styles, familiarity with the techniques, motivation, and cognitive abilities among students, which could not be entirely controlled for. Additionally, the study only examined three specific methods of vocabulary instruction (keyword method, concept mapping, and mind mapping), omitting alternative strategies from investigation.

Another factor influencing the results is that the study was conducted within a group learning framework and did not investigate methods that are specifically designed or adapted for individual students or one-on-one teaching approaches, which might yield different outcomes compared to group learning. Lastly, the study primarily relied on quantitative data. It overlooked qualitative insights into both teachers' and students' experiences and perceptions regarding the incorporation of mapping and mnemonic techniques aimed at enhancing vocabulary comprehension, production, and retention.

5.5 Suggestions for Further Research

While the current study focused on a group learning framework, future research could investigate how individual learning styles may affect the effectiveness of the keyword method, concept mapping, and mind mapping. Additionally, delving into the incorporation of meta-cognitive strategies in conjunction with these techniques could yield valuable insights.

It is worth noting that examining teachers' and students' motivation, perceptions, attitudes, and experiences within group learning settings may enhance vocabulary comprehension, production, and retention outcomes.

Given the various linguistic and cultural backgrounds of students, further research could scrutinize the effects of cultural and linguistic factors on the efficacy of these vocabulary learning strategies. Comparative analysis of outcomes across diverse cultural contexts and foreign languages could be beneficial for using these methods for various student populations.

With the increasing use of digital tools and technology in education, future research could delve into the incorporation of technology and online learning platforms to increase the effectiveness of the keyword method, concept mapping, and mind mapping within group learning frameworks.

Furthermore, future research could investigate the applicability of these techniques across different disciplines beyond vocabulary learning, such as science, ESP, medicine, mathematics, and social studies, may provide new approaches to increase interdisciplinary learning experiences for primary students.

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