



## Memory Strategies Used by Mathematics Students at Dayanu Ikhsanuddin University

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### ARTICLE INFO

*Keywords:* Language Learning Strategies, Mathematics Students, Memory Strategies

*Received :* 6 March

*Revised :* 21 March

*Accepted:* 23 April

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### ABSTRACT

Mathematics students used memory strategies. The objective of the research was to find out the use of memory strategies by mathematics students. This research used descriptive qualitative method. The sample of this research was 10 mathematics students in the academic year 2022-2023. The findings showed the learners had different approaches to applying associating and elaborating strategy. It depended on their learning goals and preferred learning styles. Learning from social media and movies was used to increase vocabularies, and learning from music was used to pronounce English correctly. The learners used a mental picture by remembering the situation on social media such as Facebook, Instagram, movies, songs, or situations when playing a game

## INTRODUCTION

Every student has a different language learning strategy for learning English, including students from the mathematics department. Oxford (1990) states that learners should take into account how their chosen learning strategies may facilitate learning that is simpler, quicker, more pleasurable, more self-directed, more efficient, and more adaptable to different contexts. She then separated LLSs (language learning strategies) into direct and indirect strategies, two classes. Direct strategies head memory strategies, cognitive strategies, and compensation strategies, while indirect strategies encompass metacognitive strategies, affective strategies, and social strategies.

Focusing on memory strategies, it is used to store and retrieve new information. For four reasons, it is possible to use memory techniques in language learning to verbally label pictures or produce visual representations of words or phrases: (1) The mind can store more visual information than it can verbal information, (2) Visual images are the most effective way to transfer information to long-term memory, (3) Visual images may be the most effective way to aid recall of verbal material, and (4) A large percentage of learners prefer visual learning (Oxford, 1990). Furthermore, as the background of the researcher as an English lecturer in the department of mathematics, the researcher wants to focus on the memory strategies used by students from the mathematics department. This is influenced by the findings of Amiruddin's 2015 study, which found that students who have studied natural sciences frequently employ memory strategies. From this belief, the researcher then conducted a study to see how mathematics students used memory strategies in learning English at Dayanu Ikhsanuddin University.

### **Objective of Research**

The objective of this research was to find out the use of memory strategies by mathematics students

### **Scope of the Research**

This research focused on the use of memory strategies used by mathematics students at Dayanu Iksanuddin University Academic Year 2022/2023. The context used was Out of Class.

## THEORETICAL REVIEW

### **a. Definition of Language Learning Strategies**

In the middle of the 1970s, the topic of language learning strategies first came up. Rubin and Stern created the first teaching strategies for reading literature in a second language in 1975. Learning strategies are described as "...any sets of processes, stages, plans, routines employed by the learner to facilitate the acquisition, storage, retrieval, and use of information" (Rubin, 1987). According to Oxford (1990), learning strategies are the actions students do to improve their own learning. She makes it clear that these strategies can help people internalize, store, retrieve, or use new languages.

Wenden (1987) examines these learning strategies from a variety of angles. The first relates to conduct, such as understanding and controlling the meaning of a second or foreign language. The second is cognitive, such as learners' tactical understanding of language learning. The final viewpoint is affective, which

includes student motivation and attitude. This point of view is somewhat in line with Ellis' (1997) definition of learning strategies, which are the particular techniques or strategies adopted by students in an effort to learn a second language.

These strategies can be behavioral (like saying new words aloud to help you remember them), mental (like interpreting a word's meaning from its linguistic or situational context), or affective (like using a cue to help you remember a word) (i.e. asking for repetition, a paraphrase, or an example). Consequently, strategies are tools for the independent action required to improve communication skills (Oxford, 1990). Ellis (1997) argues that when English language learners are faced with a challenge that tries to increase their communicative capacity, they must deal not only with how to think or act in a plain and enjoyable manner but also how to control their affective side.

#### **b. Taxonomies of Language Learning Strategies**

The following will be described the taxonomies from Oxford (1990), O'malley and Chamot (1990), and Ellis (1997), three experts in second language acquisition who have classified language learning strategies. O'Malley and Chamot's Classification of Language Learning Strategies

O'Malley and Chamot (1990) classify language learning strategies into three major categories: cognitive, metacognitive, and social/affective strategies. cognitive strategies include engaging with the content to be learnt, manipulating the material mentally or physically, or using a particular method when completing a learning activity (Chamot et.al 1988 in Chamot & O'malley, 1990). Subparts of these strategies include contextualization, substitution, note-taking, translation, rehearsal, and translation..

Chamot & O'malley (1990) say that Metacognitive strategies include planning for learning, paying attention to the learning process, and assessing how well one has learnt. The methods by which metacognitive techniques operate are described in the paragraphs that follow.

1. Planning involves establishing a plan for the parts, sequence, key ideas, or language functions to be used in handling a task, previewing the organizing concept or principle of an anticipated learning activity (advance organization), and suggesting approaches for managing a task (organizational planning)
2. Choosing ahead of time to focus on a learning task in general and to disregard other distractions; sustaining focus while carrying out the work
3. Selective attention is the deliberate choice to focus on particular linguistic cues or contextual information that will help you complete a task, as well as the deliberate attention to those cues as the activity is being completed.
4. Understanding the conditions that enable one to complete language activities successfully and making sure they are present are examples of self-management. Another example is regulating one's language performance to make the most of what is already known.

5. Self-monitoring involves assessing, confirming, or improving one's linguistic task performance or comprehension.
6. Identification of problems entails pinpointing the specific issue that has to be fixed in a task or a characteristic of the activity that prevents it from being completed successfully.
7. Self-evaluation involves comparing the results of one's own language performance to an internal standard for completeness and accuracy, as well as assessing one's language skills, use of strategies, and suitability for the work at hand.

Social/affective methods, in contrast to cognitive and metacognitive strategies, entail connecting with others in order to support learning or employing affective regulation in order to support a learning activity. Asking clarifying questions, cooperating with peers to solve a problem, pool information, check a learning task, model a language activity, or get feedback, using mental strategies that increase confidence in one's ability to finish the learning activity and self-talk might help lessen anxiety-reinforcing are all examples of activities that fall under the category of social/affective strategies. (Chamot et al. 1988 in Chamot & O'malley, 1990).

a) Oxford's classification of language learning strategies

The taxonomy of Oxford in 1990, which is considered as the broad and specific than other taxonomies were applied in this research. Oxford (1990) divided Direct strategies and indirect strategies are the two main categories of language acquisition techniques. There are six categories that divide these two classes: Memory, cognitive, and compensatory methods trail direct strategies. while indirect strategies head metacognitive, affective and social strategies. These strategies are mutually supported, related and complemented each other.

1. Direct Strategies

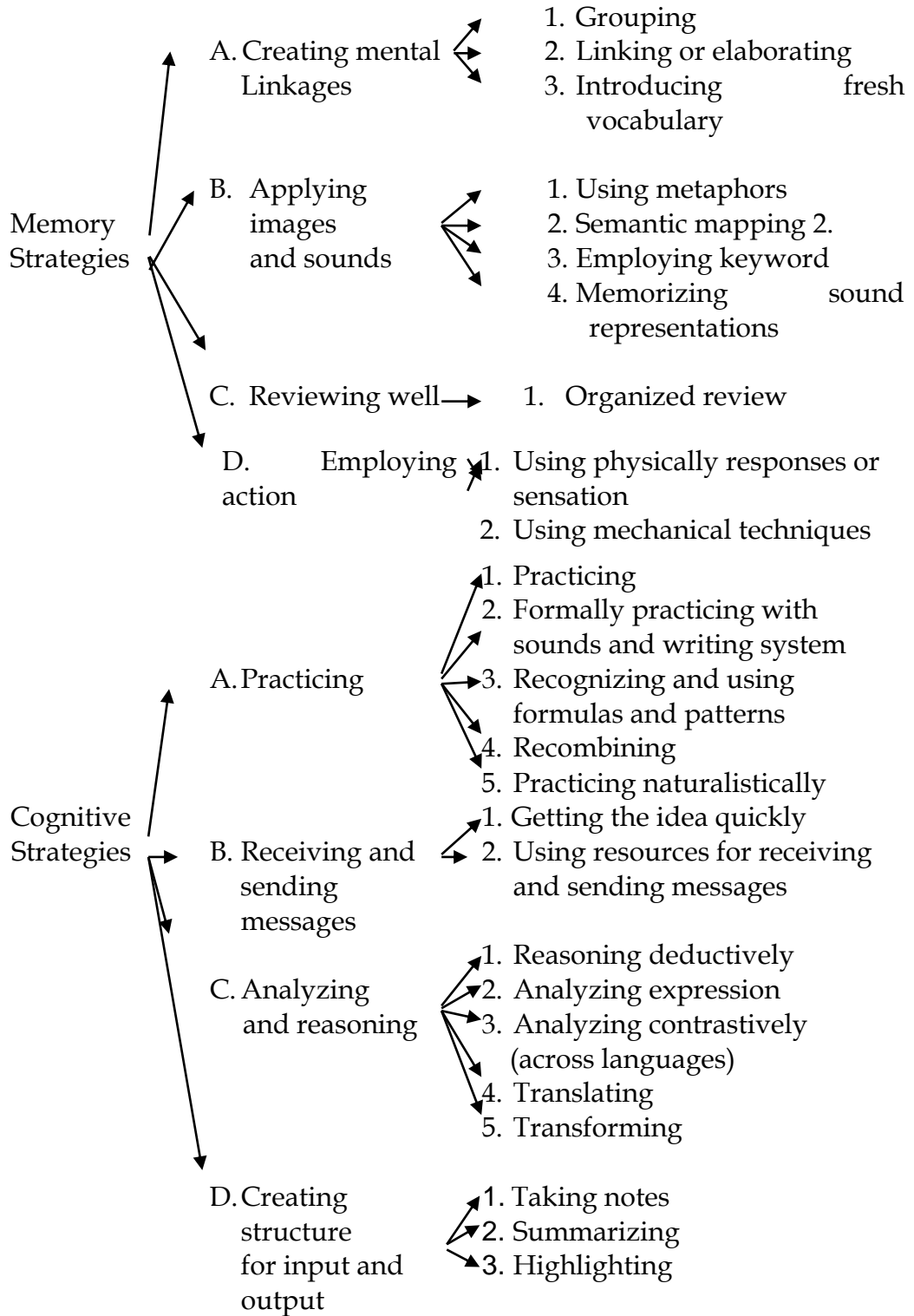
Direct techniques are those that directly use the target language when learning a language (Oxford 1990). The three direct strategy characteristics (memory, cognitive, and compensatory) all require language processing in the mind, though they each do so differently and for different things.

Memory techniques specifically aid students in storing and recalling new information. They demonstrate a number of meaning-related principles, including the principles of order, association, and review (Oxford, 1990). She emphasizes that these strategies are useful for learning vocabulary because "vocabulary is by far the most significant and unmanageable component in the learning of any language," despite the fact that some research indicates that language learners hardly ever employ these techniques (Oxford, 1990).

In language learning, memory strategies are possible to give verbal labels to picture or to create visual images of words or phrases for four reasons: (1) the mind's storage capacity for visual information exceeds its capacity for verbal material, (2) the most efficiently packaged chunks of information are transferred to long-term memory through visual images, (3) visual images may be the most patent device to aid recall of verbal material, (4) a large proportion of learners have a preference for visual learning (Oxford, 1990).

A unifying purpose that unites cognitive methods is the manipulating or changing of the target language by the learner (Oxford, 1990). Learners can apply these skills in a variety of ways, including understanding and producing new language. This makes using these tactics when learning a language extremely important. Thus, according to her, cognitive strategies are typically found to be the most popular strategies with language learners (1990).

Compensation strategies make the learners possible to use the new language for either comprehension or production even though they have boundaries in knowledge. These strategies occur not only in the process of comprehending the new language but also in producing it (Oxford, 1990). She adds that scholars frequently presume that these strategies simply apply to speaking ability, e.g. using mime or gestures nevertheless they may also be used in informal writing as well as in speaking, e.g. adjusting or approximating the message, coining words, using circumlocution or synonyms, or selecting the topic (1990). Diagram below demonstrates direct strategies and their subcategories.



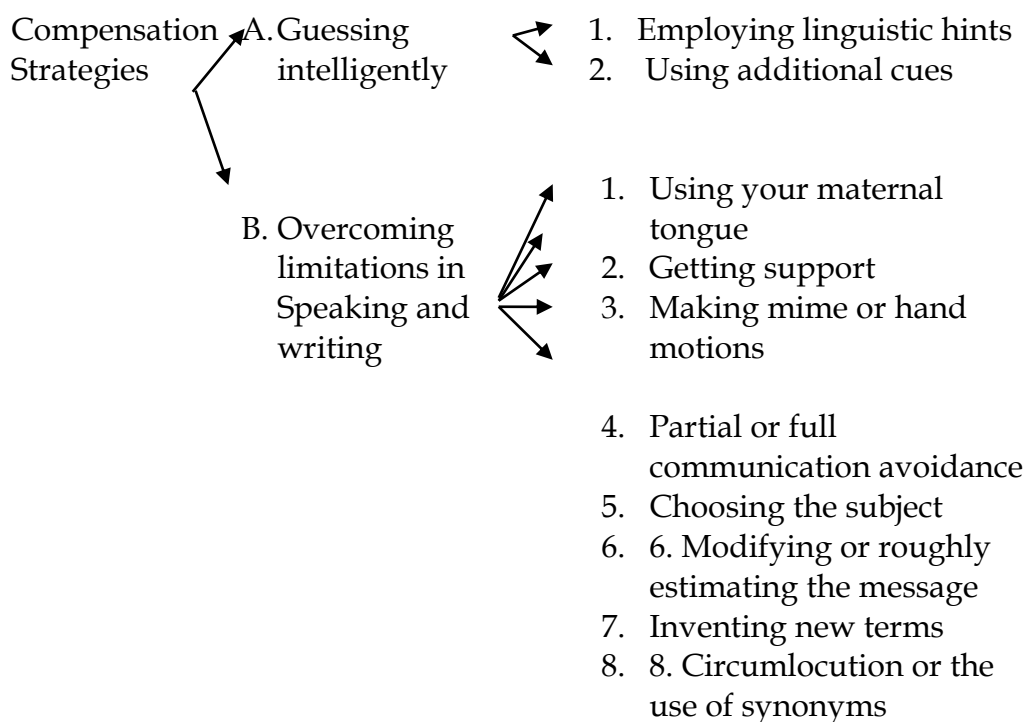


Figure 1. Direct Strategies (Oxford, 1990: 38)

## 2. Indirect Strategies

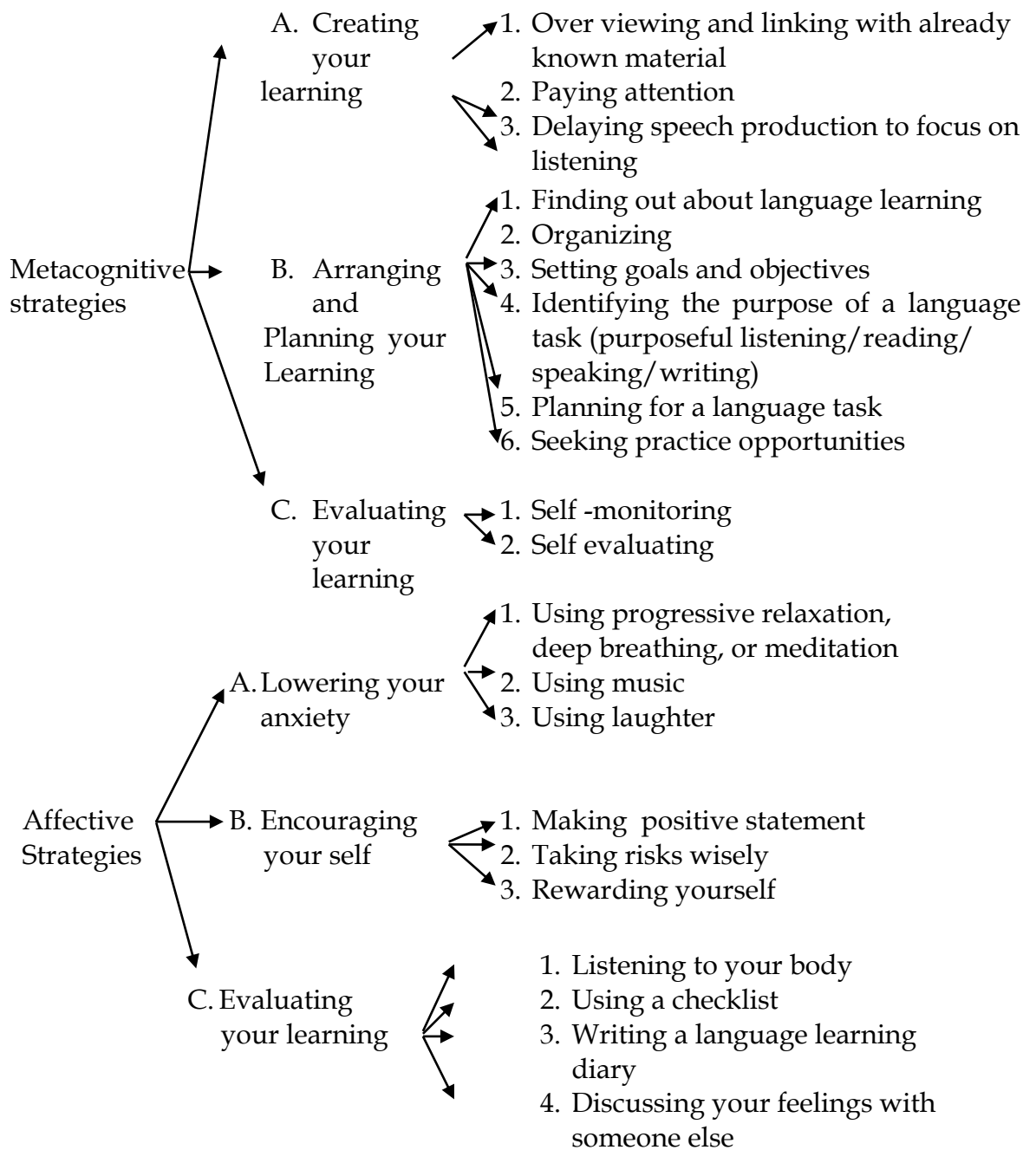
Metacognitive, emotive, and social strategies are three types of indirect strategies. Because they facilitate and oversee language acquisition without (in many cases) directly utilizing the target language, these categories are known as indirect techniques (Oxford, 1990). The advantages of indirect techniques include their nearly universal applicability and their value at all levels of language proficiency (listening, speaking, reading and writing). The following is a description of each category:

Metacognitive strategies allow the learners to control their own cognition that is, to coordinate the learning process by using functions such as centering, arranging, planning, and evaluating (Oxford, 1990). Therefore, how they are used is essential to language learning.

Affective strategies help the learners to regulate their emotions, motivations, and attitudes (Oxford, 1990). The affective aspects that language learners may regulate are either good or negative emotions. The great majority of language learners who have common hang-ups and challenges can benefit from using these strategies (Oxford, 1990).

Social strategies provide the unique purpose of assisting language learners in picking up the target language through social contact (Oxford, 1990). Students must therefore employ the appropriate social skills when interacting with others. These social tactics can be divided into three subcategories: inquiring, cooperating, and empathizing.

Diagram below shows indirect strategies and their subcategories.



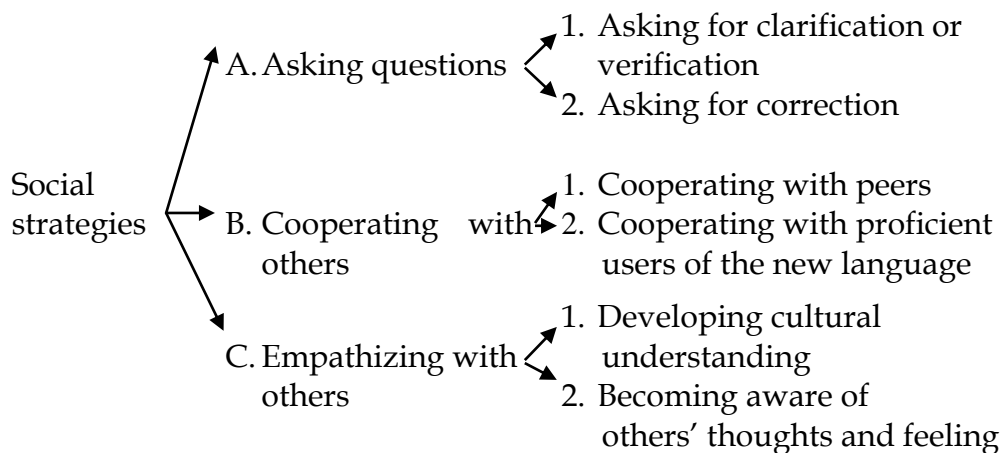


Figure 2. Indirect Strategies (Oxford, 1990: 136)

## METHOD

### Research Design

The design of this study was descriptive qualitative method. The study conducted at dayanu Ikhasanuddin University located in Baubau city, Southeast of Sulawesi province

### Population and Sample

#### 1. Population

A population is a group of individuals who has the same characteristic (Creswell, 2007). The population of this study was 20 mathematics students in the academic Year 2022/2023.

#### 2. Sample

The sample of this research was 10 mathematics students in the academic year 2022-2023.

### Instrument of the Research

Instrument of this research was semi-structured interview. Therefore, a semi-structured interview provides interviewers flexibility in both the wording of each question and the use of probes. The SILL (Strategy Inventory Language Learning) questionnaire, created by Oxford in 1990, served as the basis for the interview's content.

### Procedure of Data Collection

The researcher interviewed all the mathematics learners one by one. all the interviewing process took five days to finish.

### Technique of Analyzing the Data

The aim of doing interview was investigating the memory strategies used by students. There were three steps in analyzing this data namely, "data reduction, data display, and conclusion drawing/verification" (Miles & Huberman in Sugiyono, 2013).

1) Data Reduction

In the interview process, semi-structured interviews were chosen. It provided lots of details. In order to focus on the goals of this data collection, the writer reduced the amount of information in the data while still evaluating it.

2) Data Display

The most frequent form of display data for qualitative research data in the past has been narrative text (Miles & Huberman in Sugiyono, 2013). The researcher then provided the results of the interview data in narrative text after doing data reduction.

3) Conclusion Drawing/Verification

Drawing or verifying was the following step after showing the results of the interview data. The researcher drew or confirmed the usage of memory strategies by the math students throughout this phase.

## RESULTS

The following questions were the list of questions regarding Language Learning Strategies from Oxford (1990).

1. Do you think the relationships between what you already know and new things you learn in English? If yes, How do you apply that information into your learning?

HU : (iya. saya lihat di sosmed. Di sosmed sangat banyak membantu belajar Bahasa Inggris khususnya kosakatanya. Di sosmed biasanya saya banyak belajar Bahasa Inggris. Ketika membaca di sosmed inilah saya menghubungkan apa yang sudah diketahui dengan kata yang baru dipelajari. Kadang-kadang saya buat caption menggunakan bahasa Inggris di instagram).

Yes, I use this strategy. I see many English words on social media. It helps me a lot in learning English vocabularies. When I read on social media, I always think about the relationships between the vocabularies that I already know and the new vocabularies I learn in English. Sometimes I make captions using English on Instagram

IS : (ya, tentu)

Yes, of course

SA : (ya, saya menggunakan strategi ini, saya suka musik barat. Saya belajar Bahasa Inggris dari lagu-lagu barat itu. Dari satu lagu ke lagu berikutnya. Saya suka baca itu liriknya supaya saya bisa menyanyi benar pengucapannya. Dengan begitu ketika saya menyanyikan lagu berikutnya yang kosakatanya mirip saya bisa melafalkannya dengan benar)

Yes, I use this strategy. It's because I love western music. I learn English through those songs. I learn English from one song to the next. I read the lyrics so I can sing with the correct pronunciation. By that way, when I sing the next song with similar vocabularies, I can pronounce it correctly.

AL : (ya, saya pakai strategi ini. Kalau saya suka film, film -film hollywood. Saya baca terjemahannya kalau lagi nonton. Tapi kadang-kadang saya tidak baca karena sudah sering nonton film barat jadi sudah tahu artinya)

Yes, I use this strategy. I like Hollywood movies. I read the subtitles when I am watching movies but sometimes I don't because I've often watched western movies so I already know what it means

SN : (ya, saya selalu pakai strategi ini)

Yes, I always use this strategy

SS : (Ya, saya menggunakannya)

Yes, I do

The interview for question no 1 showed that all the students used this strategy. HU, SA, and AL had different treatments for applying the strategy. HU applied this strategy by learning English vocabularies from social media. It seemed that she focused a lot on increasing her vocabularies. The result of the strategy was that sometimes she made captions in English on her Instagram. Unlike HU, SA used the strategy in a different way, namely learning through music. She liked western music. He read the lyrics of the songs he listened to so that he could pronounce them correctly. So that when he sang the next song with similar vocabulary, he could pronounce it correctly. SA focussed on correct English pronunciation through music. AL put this strategy when watching movies. He liked Hollywood movies. He read the Indonesian subtitle when watching the film, but sometimes he didn't because he already knew the meaning.

2. Do you use rhymes to remember new English words? Could you describe the process of using the rhymes?

HU : (ya, kadang-kadang, saya gunakan)

Yes, Sometimes I use this strategy

IS : (tidak)

No

SA : (dalam lagu barat rhymesnya. Ya, saya menggunakan strategi ini. Di musik Rap dan Hip- Hop lagu barat itu)

I use this strategy. I learn the rhymes from western songs in the rap and hip-hop genres.

AL : (saya tidak menggunakan strategi ini)

No, i do not use this strategy

SN : (tidak)

No

SS : Kadang kadang  
(sometimes)

The interview for question number 2 displayed the variety of students' statements in answering it. HU and SS answered that they sometimes used this strategy. Meanwhile, IS, AL, and SN did not use this strategy. SA reported that she used this strategy. According to her, rhymes were very much found in music of RAP and Hip-Hop genre.

3. In remembering new English word, do you use a mental picture of a situation or context in which that word might be used?

HU : (ya, saya gunakan, saya belajar bahasa inggris di media sosial instagram atau tiktok. Jadi untuk mengingat itu, yah kebanyakan ingat-ingat ke medsos itu)

Yes, I use the strategy. I learn English from social media such as instagram or tiktok. Thus, I remember my social media when remembering new English word.

IS : (ya, tapi kadang-kadang saja)

Yes, I use this strategy, but just sometimes.

SA : (iya, sering saya gunakan, kalau kata Bahasa Inggris baru itu, iya di lihat di tiktok, facebook atau instagram atau film , lagu.

Yes, I use this strategy. I remember my Facebook, TikTok, Instagram, film, or song.

AL : (iya, tapi jarang)

Yes, but seldom.

SN : (ya, saya juga mengingat paling yang di media sosial juga itu instagram dll.)

Yes, I remember from social media such as Instagram, etc.

SS : (ya, saya gunakan, kalau mengingat kata bahasa Inggris baru, karena saya gamer, saya mengingat yang di game saja

(Yes, I use the strategy. Because I am a gamer, I think about my game when remembering new English words)

From question number 3 above, the frequency of using this strategy was very diverse. IS and AL said that they rarely used this strategy. Whereas HU, SA, and SN said that in remembering new English words, they remembered those on social media such as Facebook, Instagram, movies, or songs. SS added that, as a gamer, he remembered the situation when he was playing a game.

4. To remember new english words or phrases, do you remember them by remembering their location on the page, on the board or on a street sign?

HU : Iya, di media sosial

Yes, In social media

IS : Iya saya gunakan, di instagram begi gtu bukan di tanda jalan atau halaman bacaan

Yes, I use the strategy. I remember it from Instagram, not from its location on the page, on the board or on a street sign

SA : (Di media sosial saja)

Only from social media

AL : Iya, di facebook bgtu, tiktok

Yes, I use the strategy. I remember it from facebook or tiktok

SN : Iya, di instagram, facebook dll.

Yes, I use the strategy. I remember it from instagram, facebook, etc

SS : Iya, di games games itu juga

Yes, I use the strategy. I remember it from my game.

The interview for question number 2 showed all the learners used this strategy. They remembered new English words or phrases from social media like facebook,instagram, tiktok, or game.

## DISCUSSION

The first memory strategy was creating mental linkages: associating and elaborating. The learners thought what they already knew and new things in English. They had different treatments for applying this strategy. It depended on their preferences and purposes in learning English. In increasing vocabularies, HU applied this strategy by learning English from social media. The result was sometimes she made captions in English on her Instagram. Unlike HU, SA focused more on pronouncing English correctly. Due to the fact that he loved western music, he learned the correct pronunciation by reading the lyrics. AL put this strategy when watching movies. He liked Hollywood movies. He read the Indonesian subtitle when watching the film, but sometimes he didn't because he already knew the meaning.

The second memory strategy was creating mental linkages: associating and elaborating. The use of rhymes to remember new English words. The interview showed that in learning English, this strategy was not always applied by the learners, but for SA, who loved western music, she said the rhymes were very much found in the music of the RAP and Hip-Hop genres. Thus, she used this strategy.

The third memory strategy involved using images and sounds to represent sounds in memory. In remembering new English word, the learners used a mental picture of a situation or context in which that word might be used. They remembered those on social media such as Facebook, Instagram, movies, songs, or situation when playing a game.

Last strategy was applying images and sounds;using imagery. In remembering new English words or phrases, the students remembered their learning from social media like facebook, instagram, tiktok, or even game.

## **CONCLUSIONS**

The conclusions of the research were:

1. Creating mental linkages by associating and elaborating, the learners thought about what they already knew and new things in English. The learners had different approaches to applying this strategy. It depended on their learning goals and preferred learning styles. Learning from social media and movies was used to increase vocabularies, and learning from music was used to pronounce English correctly.
2. Creating mental linkages by associating and elaborating strategy, the use of rhymes to remember new English words. Listening to RAP and Hip-Hop music was beneficial to the learner when implementing this strategy.
3. Applying images and sounds by representing sounds in memory. The learners used a mental picture by remembering the situation on social media such as Facebook, Instagram, movies, songs, or situations when playing a game.
4. Applying images and sounds; using imagery. To remember new English words or phrases, the students remembered their learning from social media like facebook,instagram, tiktok, or even game

## **ACKNOWLEDGMENT**

The researcher wants to say deepest gratitude to the Dean of Teacher Training and Education Faculty at Dayanu Ikhsanuddin University, who has given his permission to conduct this research.

## **REFERENCES**

- Creswell, J. (2007). *Qualitative Inquiry and Research Design: Choosing among approaches* (2nd ed.). USA: Sage Publications.
- Ellis, R. (1997). *Second Language Acquisition* (1st ed.). New York: Oxford University Press.
- O'Malley, J., & Chamot, A. (1990). *Learning Strategies in Second Language Acquisition*. Cambridge: Cambridge University Press.
- Oxford, R. (1990). *Language Learning Strategies*. New York, USA: Newbury House Publisher.
- Sugiyono. (2013). *Metode Penelitian Kombinasi (Mixed Methods)*. Bandung, Indonesia: ALFABETA.
- Wenden, A. (1987). *Learner Strategies in language Learning*. USA: Prentice/ Hall International.