



TITLE:
**FACILITATING READING COMPREHENSION AND ENHANCING
METACOGNITIVE STRATEGY USING MIND MAPPING AMONG
THE TERTIARY ESL LEARNERS**

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Table of Contents

Abstract

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Chapter 1. Introduction	5
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1.1. Research background.....	5
1.2. Research Aim and Objective	6
1.3. Research Questions	7
1.4. Research Rational	7
1.5. Definition of Terms	7
1.6. Organization of research	10
1.7. Summary	10

Chapter 2. Literature Review	11
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2.1. Introduction	11
2.1.1. Reading	11
2.1.2. Rationale for Reading	13
2.1.3. The Reading Text	13
2.2. Reading Model	14
2.2.1. Bottom-Up Reading Model	14
2.2.2. Top-down Reading Model	16
2.2.3. Interactive Reading Model	17
2.2.4. Reading and Schema Theory	18
1. Content Reading	18
2. Formal Reading	18
2.3. Reading Comprehension	19
2.4. Theoretical Framework	20
2.4.1. Prior Knowledge in Reading	21
2.4.2. Metacognitive Strategy for Reading Comprehension	21
2.5. Mind Map/Mind Mapping	22
2.5.1. Mind Mapping as a Metacognitive strategy for Reading	23
2.5.2. Procedures/ Technique of Mind Map	24
2.5.3. Explanation of Mind Map (Fig. 2.6)	26
2.6. Reading Comprehension among ESL learners	27
2.6.1. Reading Comprehension and language learning strategy.....	27
2.6.2. Reading Difficulties among ESL learners.....	29
2.6.3. Previous Studies.....	29
2.7. Conceptual Framework.....	33
2.7.1. Explanation of Conceptual Framework.....	33
2.8. Summary.....	33

Chapter 3. Research Methodology	35
3.1. Introduction.....	35
3.2. Research Design.....	35
3.3. Population and Sampling.....	36
3.4. Instrumentation.....	37
3.4.1. Questionnaires/Observation.....	37
3.4.2. Pre-test and Post-test.....	38
3.4.3. Semi-structured Interview.....	38
3.5. Data Collection Procedures.....	38
3.5.1. Data collection dependable.....	39
3.6. Data Analysis.....	39
3.6.1. Explanation of the table.....	40
3.7. Summary.....	41
Chapter 4. Results and Findings	42
4.1. Introduction.....	42
4.2. Demographic of the students.....	42
4.3. Paradigmatic considerations.....	42
4.4. Reflections on the interview process.....	43
4.5. Stages of Data Analysis.....	44
4.6. Data Analysis.....	45
4.6.1. Data Analysis chart.....	46
4.7. Validity and Reliability.....	46
4.8. Summary.....	47
Chapter. 5. Discussions/Suggestion. Limitation and Practical implication	48
5.1. Introduction.....	48
5.2. Discussions.....	48
5.3. Suggestion.....	48
5.4. Limitation.....	49
5.5. Practical Implication.....	50
5.6. Summary.....	50
Chapter. 6. Conclusion	52
6.1. Introduction.....	52
6.2. Summary.....	52
References	53
Appendix	60

FACILITATING READING COMPREHENSION AND ENHANCING METACOGNITIVE STRATEGY USING MIND MAPPING AMONG THE TERTIARY ESL LEARNERS

Abstract:

The first purpose of this study is to identify, categorize and analyze the ESL reading strategies used by students in higher education institutions. The second purpose is to explore the interaction of strategies, use, and reader factors, viz. field of studies, linguistic proficiency, reading achievement, motivation, beliefs, and reading comprehension evaluation ability. It is a known fact; Language plays an essential part in reading. To read and comprehend the text of a book, learners need to understand the language. For example, if a learner's English knowledge is lacking, his/her reading will not be smooth and may be unsuccessful. Therefore, students will have a problem as they cannot use the language to communicate or convey their thoughts. In countries where English is a second language, teaching reading in the English language has been given much emphasis in local and international schools and universities. In view of the above, this study focuses on using a mind map as a tool for reading comprehension, highlighting the involvement of metacognitive strategy in reading, and comprehending.

Keywords: Mind Map (MM). Metacognitive Strategy (MS), English as a second language (ESL), Reading Comprehension (RC).

CHAPTER 1

INTRODUCTION

1.1 Research Background

Reading is useful for language acquisition. Provided that students practically understand what, they read, the more students read, the better they get it. Reading moreover has a positive effect on students, vocabulary, grammar, or punctuation. Reading can show how we build sentences, segments, and the whole substance (Harmer, 2010). Besides, reading has been argued as an essential skill for accomplishment in all education settings (Brown, 2004). Accordingly, it is vital to have good reading comprehension abilities and become a capable ESL reader. Presently English is viewed as a global language in the learning foundations as well as inside society. Most employers look for representatives who can convey capability in English. Sadly, the norm of English among the present graduates is frustrating.

One may contend that emphasis should be placed on the skill needed to do a particular job instead of focusing on reading or conversing in English well. However, the ability to read and speak in English is compulsory in specific fields. The reading cycle is multidimensional; subsequently, unskilled readers are bound to have issues in getting a handle on the substance and creating the meaning of the content they read. The demonstration of reading can be disengaged from appreciation. ESL students need to use different reading strategies to improve their comprehension (Grebe & Stoller, 2002). Students can accomplish their academic success without comprehending what they read. Hence, the way to teach comprehension should be well understood by teachers. Teaching reading comprehension is an activity involving these steps: selecting a text explaining the strategy, modeling the strategy, guided support, practicing independently, and reflecting (NSW). Department of Education and Training, Teaching Comprehension Strategies, 2010, p.7). According to Yahya and Nora Dinah (2012), reading skill is not only limited to text comprehension skill and solely answering comprehension questions, but the reading skill should also involve students' skills in evaluating knowledge, solving problems, and associating data with a particular occasion, at the same time commenting and making assessments and conclusion based on the information obtained from the reading materials.

In the last few years, reading skill has attracted many applied linguists and psycholinguistics, each of which has approached the process from different perspectives. Though many definitions of the reading process could be considered, most theorists in the area agree that reading is a complex skill requiring thinking, understanding, and critical approaches to construct meaning from all sorts of written texts. This chapter establishes a working definition of the reading process and explores the main issues in developing reading comprehension skills. Also, it surveys some basic approaches and principles of teaching reading skills to tertiary learners. Reading is one of the most important skills which every student should possess. It also involves formulating mental images, understanding the image, visual presentation, and awareness of the symbols, their presentation, and written words. Zeki (1993), Moore and Lo (2008), and Lipson and Winton (2009) discussed that graphical images, the symbols which are created inside the brain pointed out that the brain creates a visual world, and the process of seeing and understanding happens at the same time.

1.2. Research Aim and Objectives:

Aim:

Keeping in view the above, mind mapping is considered a metacognitive strategy, that can accelerate learner's interest in reading and learning: therefore, helping students understand texts easily through drawing a diagram that illustrates the main concepts, the main, and the sub-ideas. A mind map is also distinguished, for its ability to quickly arrange ideas, fast learning, and information recall by brainstorming one's creativity and prior knowledge (Buzan & Buzan, 1996).

Objectives

The specific objectives of this study are:

1. To investigate the extent to which reading comprehension skills are improved by using mind mapping as a tool to facilitate metacognitive strategy.
2. To find out students' perceptions of mind maps and metacognitive strategies in facilitating reading comprehension.
3. To find out whether the mind map technique is an effective tool to enhance students' ability in reading comprehension.
4. To find out the difficulties faced in using MM to comprehend English reading texts.

1.3. Research Questions:

The research questions that this study aims to answer are as follows:

1. To what extent are reading comprehension skills improved by using a mind map as a tool to facilitate metacognitive strategy?
2. What are students' perceptions of mind maps and metacognitive strategies in facilitating reading comprehension?
3. Does the mind mapping technique help to students' ability in reading comprehension?
4. What are the difficulties in using MM, to comprehend English reading texts?

1.4. Research Rationale:

To read and comprehend the text of a book, learners need to understand the language. For example, if a learner's English knowledge is lacking, his/her reading will not be smooth and may be unsuccessful. Therefore, students will have a problem as they cannot use the language to communicate or convey their thoughts. The student struggle to comprehend the written text as they experience reading comprehension issues (Phantharakphong & Pothitha, 2014).

1.5. Definition of Terms:

1. English as a Second Language (ESL): This is the use or study of English by speakers of different native languages.

2. Reading: It is looking at the print, deciding what they mean and how they relate to each other. Reading will be different for different readers on different texts at different times and with different purposes (Alderson, 2000).

3. Reading-Comprehension: The purpose of reading is comprehension, getting meaning from written text. A major goal of reading comprehension instruction, therefore, is to help students develop the knowledge, skills, and experiences they must have, if they are to become competent and enthusiastic readers (www.readingrockets.org). Referring to statements by Cain and Oakhill (2007) comprehension involves collaboration of a wide range of cognitive skills and processes; there are many circumstances where difficulties arise that may lead to failure of comprehension.

4. Reading Skills: Reading skills are characterized as, programmed activities that bring about the interpreting and grasping of writings with speed, productivity, and familiarity, as a rules without the reader's consciousness of the segments or controls included. Afflerbach et al. (2008, p. 15). They are tactics that are mastered and unintentionally used by the reader to comprehend reading.

5. Reading Strategies: Reading strategies is the broad term used to describe the planned and explicit actions that help readers translate print to meaning. Strategies that improve decoding and reading comprehension skills benefit every student, but are essential for beginning readers struggling readers, and English Language Learners (www.readinghorizons.com).

6. Fluency: The term fluency is defined as 'freedom from word identification problems that might hinder comprehension' (Harris & Hodges, 1995, p. 85). Fluency bridges the gap between word recognition skills and comprehension. In other words, fluent readers do not spend excessive time and resources decoding words and can therefore concentrate on comprehension.

7. Vocabulary: Nash and Scowling (2006), describe vocabulary as the knowledge of words and their meanings. To sum up, vocabulary is an essential element of reading, and it will greatly influence the students' reading comprehension ability. Clearly, vocabulary mastery and comprehension are closely connected skills.

8. Prior Knowledge: Like vocabulary mastery, prior or background knowledge plays a crucial role in reading comprehension. Anderson and Pearson (1984) propose three ways in which prior knowledge may affect comprehension. First, it enables students to make inferences about what they are reading. Second, it draws students' attention to important information in a knowledge domain. And lastly, it can provide a plan for recall. Indeed, prior knowledge affects comprehension in all these ways.

9. Metacognition: Metacognition is simply, thinking about one's thinking. More precisely, it refers to the processes used to plan, monitor, and assess one's understanding and performance. Metacognition includes a critical awareness of, (a. one's thinking and learning and b. one as a thinker and learner (cft.vanderbilt.edu).

10. Metacognitive Strategies: According to the Inclusive Schools Network (2014), Metacognitive strategies refer to methods used to help students understand the way they learn; in other words, it means the process desired for students to think about their thinking. Teachers who use metacognitive strategies can positively impact students who learn.

11. Mind Mapping: Mind mapping presents, in a visual way, the core elements and techniques on how to draw mind maps. It looks a little too messy initially but, once we break the ingrained habit of linear notetaking, we won't look back (litemind.com).

12. Mind Map: A mind map is a diagram used to visually organize information. A mind map is hierarchical and shows relationships among pieces of the whole. Mind maps can be drawn by hand, as during a lecture, meeting, or planning session, for example, or as higher quality time when more time is available (en.wikipedia.org.).

1.6. Organization of Research:

Chapter Titles	Description
Chapter 1: Introduction	This chapter enhances the research background, aim, objectives, and rationale point.
Chapter 2: Literature Review.	This chapter covers the explanation and highlighting of the previous studies done by experts in English Language comprehension, metacognitive strategy, and mind mapping.
Chapter 3: Research Methodology	This chapter involves the key research methods and tactics along with their reasonings that will be used in this research study for the purpose of data acquisition.
Chapter 4: Finding and Discussion:	This chapter presents the main findings of research and a discussion of them considering the literature review.
Chapter 5: Conclusions and Recommendations	This final chapter symbolizes the key conclusions of the research and some recommendations for future research work.

1.7: Summary:

As important as reading is to everyday living, another essential goal of the assignment is enjoyment. Facilitators must attempt to show students that tasks can be attractive to them for reasons other than strictly utilitarian ones. Furthermore, the study will explain how the mind-mapping technique enhances reading comprehension skills, supports various language learning activities, and is a recommended way to deliver meaningful learning for students (Budd, 2004).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter outlines some relevant literature reviews to find out the use of metacognitive strategy in tertiary classes, using mind map (MM) as a tool to enhance reading comprehension (RC). In learning reading comprehension, the students can get meaning and understanding from the written language and strengthen their English. Wallace (2000, p.3) states that any potential reader has the most significant asset in the case of reading in a first or some other language, which is an awareness of how we use language. Reading is all about language and understanding. We know about language; first, we use it to communicate; second, it only makes sense in the context that is part of a larger text or in a situation. Further, this chapter's primary focus is on reading, its explanation, and its definition, which concludes with related studies that have been conducted on metacognitive strategies. This study will also acknowledge (Brown, 1987; Baker, 1991) that metacognition is divided into; metacognitive knowledge and metacognitive control processes. This refers to at learners know about cognition and how learners use that knowledge to regulate cognition.

2.1.1 Reading:

Reading helps people not only get access to more language input but gain more knowledge concerning the world as well. It is a prominent method for learning new information and has the capacity of opening new ways of perceiving the world and transforming the world (Grebe & Stoller, 2010, p.11). For ESL learners, reading is an essential method for independently obtaining information from other countries. Even though most people learn to speak before they learn to read or write, most people have more needs and chances to read than to speak in learning a second and foreign language (Goodman, 1986; Hsu, 2010, p.11).

Even though one may have reading troubles in their native language, the issues deteriorate when reading is applied to a subsequent language, as students may be falling behind in various understanding segments, including exactness, perception, and speed.

Readers' awareness, monitoring, and regulating of these methodologies while reading is called metacognitive. As stated by Flavell (1976) metacognition is a learner's knowledge and control over his or her own reasoning cycle and learning exercises, for example, reading. Also, the idea of metacognition incorporates pondering the reasoning cycle, mindfulness, comprehension, memory methods and learning attributes. In 2008 Collins and Smith highlighted metacognitive strategies that helped students to focus their attention in an understanding of the content and to make connections between past knowledge and new information. The point of metacognitive procedures is to show students how to set goals and how to be compelling and autonomous, which was emphasized by Baker (2002).

Grebe (1991, p. 379) argues that many researchers attempt to understand and explain the fluent reading process by analyzing the process into a set of component skills in reading. It is proposed that in any event, there are six general segment aptitudes and information territories:

- 1) Automatic recognition skills
- 2) Vocabulary and structural knowledge
- 3) Formal discourse structure knowledge
- 4) Content/word background knowledge
- 5) Synthesis and evaluation skills/strategies
- 6) Metacognitive knowledge and skills monitoring. In addition, according to Tarigan (1994, p.9-10), there are seven other purposes of reading:

- 1) Reading for details or facts,
- 2) Reading for main ideas,
- 3) Reading for sequence or organization,
- 4) Reading for inference,
- 5) Reading for classifying,
- 6) Reading for evaluating, and
- 7) Reading for comparing or for contrasting.

Despite the lists above, the researcher tends to agree that the purpose of reading is categorized into two broad categories, intensive and extensive reading. The terms were introduced by Munby (1979) cited in Hadley (2001, p. 205). Intensive reading requires

readers to understand both linguistic and semantic aspects and pay attention to the text. While extensive reading, speed, and skill in getting the general picture play an essential role in the reading process. The purpose of extensive reading is to get the general idea of the text, usually for pleasure, whether it is to enjoy a story, to get the main idea, to know the author's intent, or to react personally to the text. As we know, reading is the most essential and required skill for almost every human being in this time and era, and the most wanted skill needed for all university learners. When a learner can read, understand, and comprehend English texts effectively, he/she has established himself/herself as an effective reader.

When a learner has poor reading skills, he/she must make a great effort to grasp and acquire new knowledge throughout his/her academic years. It is common to observe that ESL tertiary learners fail to learn the basics of reading, especially when reading literary texts.

2.1.2 Rationale for Reading

When we read articles, a sign, a warning, or ads, our motives and aims are different in one way or another from when we read a piece of poem, a short story, or a portion of prose. Harmer (2001, p. 200) points out that 'one type of reading and listening, in other words, takes place because we have some practical or instrumental purpose in mind. Another kind of reading and listening takes place mainly for pleasure. Harmer (2001) considers two main reasons for reading, a) instrumental and b) pleasurable. Instrumental reasons imply a task with a precise aim in the mind of the reader. We generally read a notice to get the time of the bus's departure to know how to carry out a procedure; we read a sign to know to get to a place. We may also read a ticket machine to understand operating it or setting it on and off. This kind of reading happens when we have a practical or instrumental purpose in mind.

2.1.3 The Reading Text:

Mei-Yun (1993) considers reading as an interactive process of communication. The reading text thus stands as a medium between the writer and the reader. By decoding the text, the reader can get the meaning of the words and the message communicated by the writer. According to Halliday and Hasan (1976, p.12), a text is a semantic unit, a unit

not of a form but meaning. An article/text may be spoken or written, prose or verse, dialogue, or monologue. It may be anything from a single proverb to a whole play, from a momentary cry for help to an all-day discussion on a committee. At the most, basic level reading is recognizing words, from simple recognition of the individual letters and how these letters form a particular word to what each term means not just on a personal level but as part of a text. In English, as in many other languages, different combinations of the same letter can form different words with entirely different meanings. So, the letters d, r, a, and w, can make into the 'draw' and 'ward' (which has several implications for behaving in specific ways, performing in a play or film). Recognition of the actual word is not enough on its own to constitute reading. Understanding what we are reading is vital and is undoubtedly the main point of teaching reading in a class at any level.

2.2. Reading Model

Models of the reading process are models of an ideal reader reading a text. They can tell us and give us insights into how such a reader does during the process. Knowing how good readers do when reading actually can help teachers develop a clearer conception of the needs and requirements in class. In the last twenty years, the terms top-down, bottom-up, and interactive have been suggested to describe the different models of the reading process. The study will solely depend on the following models; first, bottom-up processing, which focused on the printed form of a text. Second, the cognitive view, or top-down processing, can enhance the role of background knowledge in addition to what appeared on the printed page. The third is the metacognitive perspective, based on the control and moderation the reader can have or manipulate in comprehending a text. Thus, highlights the involvement of the reader's thinking about what he/she is doing while reading. In other words 'thinking about thinking.' Similarly, there is an 'interactive reading model and schema theory in reading comprehension (Rumelhart, 1985).

2.2.1 Bottom-Up Reading Model:

In general bottom-up reading, can be categorized as a stimulus-driven process. The traditional bottom-up approach to reading is influenced by behaviorist psychology of the 1960s, which claimed learning is based upon 'habit formation, brought about by the repeated association of a stimulus with a response' and language learning was characterized as a response system that humans acquire through automatic conditioning

processes, where ‘ some patterns of language re- reinforced (rewarded) and others are not,’ and ‘only those patterns reinforced by the community of language users will persist’ (Omaggio, 1993, p. 45-46).

In this model, the reader is expected to reconstruct the writer’s message serially: from letters to sounds to words then to meaning. This means that the reader decodes separate linguistic units, phonemes, graphemes, and words, building textual meaning. Alderson (2000, p. 16) points out that: “Bottom-up approaches are serial models, where the reader begins with the printed word, recognizes graphic stimuli, decodes them to sound recognizes words and decodes meanings. Here, the reader or listener focuses on individual words and phrases, and understanding is by relating these detailed elements to build up a whole as Bobrow and Norman (1975), suggested in the figure below:

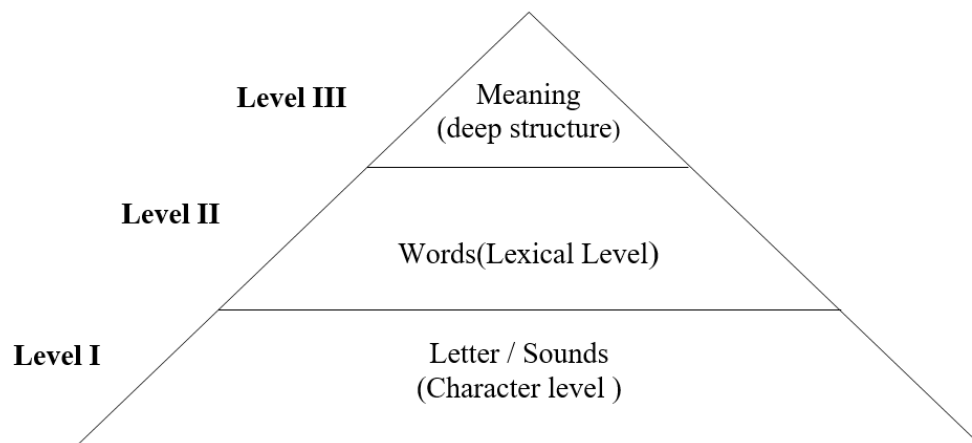


Figure 2.1: Bottom-up model;

In respect to this view, the reader needs to begin reading the letter names, associating the letter names with their sounds then blending these sounds into words. Figure 2.1 demonstrates that graphic information enters through the visual system and is transformed at the character level from a letter character to a sound that is from a graphic representation to a phonemic representation then, the phonemic representation is converted at the linguistic levels. Level III Level II Level I: Meaning (deep structure), II. Words (Lexical Level) III. Letter. Sounds (Character level), and word units pass on to the third level. (Deep structure level) at which meaning is assumed and assimilated, into words.

2.2.2. Top-Down Reading Model

The top-down model means applying prior knowledge to work on the meaning of a text. Harmer (2001, p. 201) states that: ‘In top-down processing, the reader or listener gets a general view of the reading or listening passage by, in some way, absorbing the overall picture; this is greatly helped if the reader or listener’s schemata allow them to have appropriate expectations of what they are going to come across.’ Harmer emphasizes the importance of the prior knowledge or schemata that accounts for the acquisition of knowledge and the interpretation of a text through the activation of information stored in the reader's brain. Thus, the more those schemata are relevant to the reading text, the more likely understanding and reading are successful. In the figure below, Beverly (1988, p. 4) depicts fluent readers actively engaged in predicting or guessing meaning. It is suggested here that the flow of information proceeds from the top so that the process of word identification is dependent upon meaning first. The higher-level processes stored in experience and the reader's knowledge of the language pattern (syntax) interact with and control the flow of information, (Stanovich, 1980). Overall, theorists like Goodman and Stanovich point out two opposing models in the reading process. One theory envisions reading as a bottom-up, and the contrasting theory views reading as a top-down process. (Rumelhart, 1977) however, claims that neither the bottom-up nor the top-down model of the reading process account for what occurs during the reading process, and he proposes an interactive model.

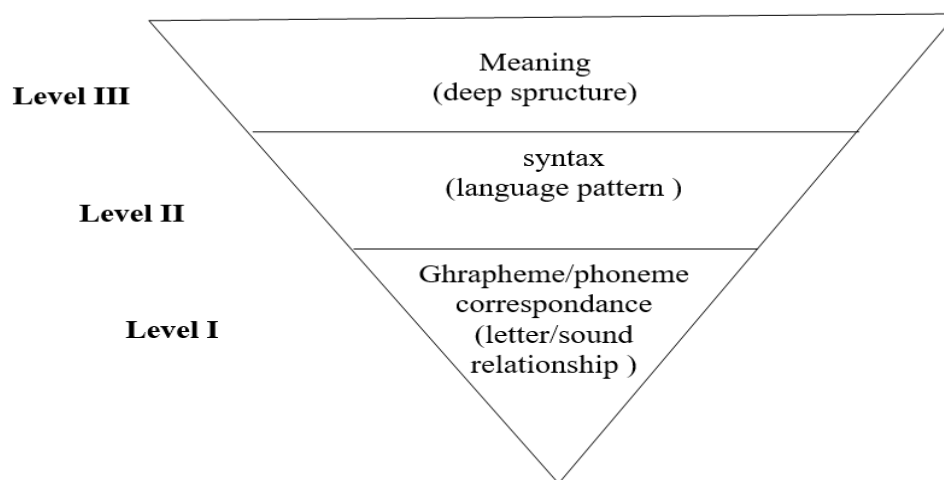


Figure: 2.2 Top-Down Model

2.2.3 Interactive Reading Model

The interactive model proposes that the reader construct meaning by using all significant sources (grapheme, phonemic, morphemic, punctuation, semantics) without adherence to anybody's set request. The reader, all the while, utilizes all processing levels even though one meaning can be essential at a given time (Dechant, 1991). Many theorists in the field claim that the process of reading is an interaction between top-down and bottom-up processes. In an interactive model, a final hypothesis about the text is synthesized resulting from continuous and simultaneous interaction between multiple knowledge sources of the model as shown in the figure suggested by (Alderson, 2000. p. 59).

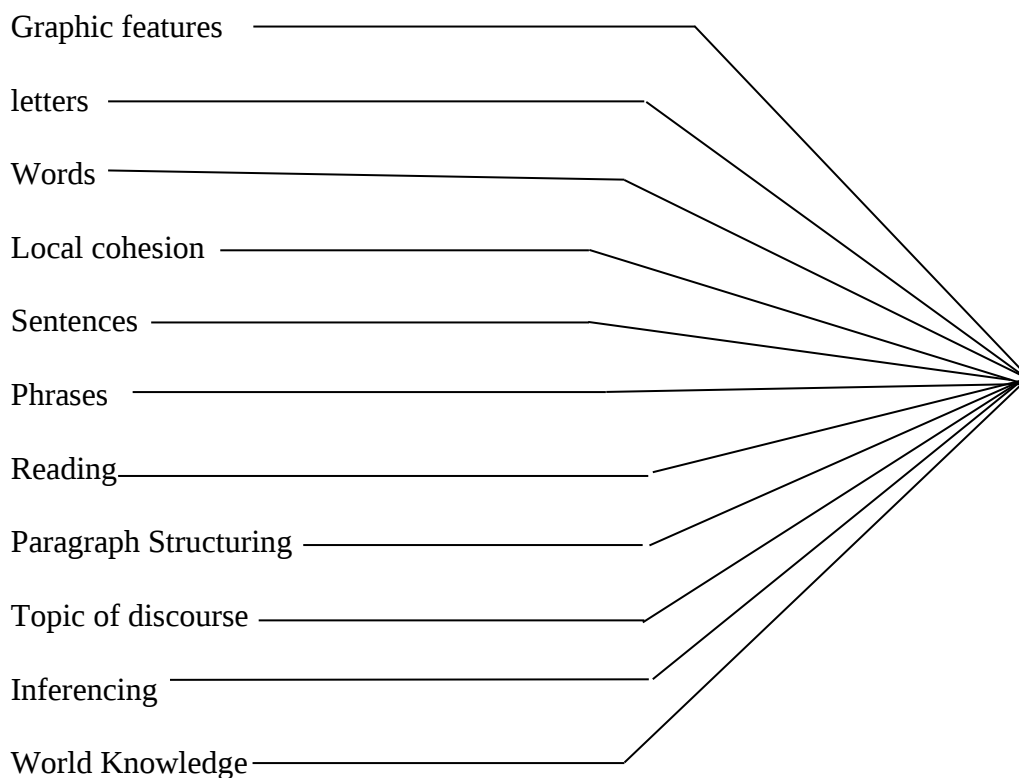


Figure 2.3: A simplified interactive model

On the left of the diagram appear all the various processing levels for reading skills and on the right the reading process. Reading is neither a bottom-up nor a top-down process, but a synthesis of the two. A reading text then must be analyzed at various levels starting from the smallest units to the text. Moreover, the reading involves pre-existing knowledge about the text to the reading comprehension process.

2.2.4. Reading and Schema Theory:

Schema theory describes reliance upon the student's schemata or prior knowledge concerning the content read. Each reader conveys diverse schemata (background information), and these are likewise frequently social. 'Schema theory depends on the conviction that every act of comprehension perception includes one's knowledge of the world also' (Anderson et al., 1983, p. 73). Subsequently, readers build up an interpretation of the information read in the book (Widdowson, 1988, p. 56).

Similarly, it was stated by Bartlett (1997), schemata are divided into two main types, content schemata (background knowledge of the world) and formal schemata (background knowledge of verbal structure) along the process of reading, the stages can be divided into three i.e., before reading, while reading, and after reading.

1) Content Schemata

It refers to the message of the content, one's experience with the substance will make it more profitable and productive. Anderson (1994) clarifies that schema helps in understanding the missing information in the content. Dayzie (2004) showed that content schema construction has an immediate relationship with understanding comprehension.

2) Formal Schemata

It refers to how text differs from one another; for example, a reading text could be a frictional work, a letter to the editor, or a scientific essay. Each genre will have a different structural organization; knowledge of these genre structures can aid reading comprehension. It gives the reader a basis for predicting what a text will be like Smith (1994). Similarly, Carrell (1983) stated that Content schemata, however, are divided into two types. Background knowledge, i.e., any sort of knowledge about the text whether relevant or irrelevant to the content of the reading text. Students who do not share the same schemata knowledge with the writer of the text would find it difficult or impossible to comprehend what the text means and the message behind the printed page. Thus, the better a reader makes correct predictions, the less he will check the text. Their correct predictions are certainly a very essential and important factor in reading comprehension.

The role that background information plays in incomprehension has been formalized in schema theory. Cook (1989, p. 69) points out that: 'Keywords or phrases stimulate the mind in the text or context, which helps activate schema'

2.3. Reading Comprehension:

The process of reading comprehension depends on mental perception rather than sensory perception. Although it begins with the sensory perception of the written word, it requires concentration, attention, and analysis of all elements as an integrated unit, (Al-Tal, 1992). Further classification regarding reading comprehension was introduced by (Burns'et, al. 2002), according to reading comprehension includes a few levels that follows a hierarchy, where they classified reading comprehension into three levels, which are.

1. Reading lines: It is the simplest level of comprehension achieved by the reader, where he/she understands the information and ideas of the text. This level is achieved when the reader understands what the author means in general even if the reader does not understand what the author wants in specific.
2. Reading between the lines: At this level, the reader shows that he/she understands what the author specifically wants. And even goes beyond that by extracting meanings and relationships between ideas in the text and even explaining the meanings related to the theme of the text.
3. Reading behind the lines: At this level, the reader uses the information included in the text and applies what he/she understands in similar situations to get new meanings and ideas.

Further, it was stated that the reading act's outcome is comprehension with its various types of literal understanding of stated ideas and higher-order types, which include interpretive, critical, and creative awareness (Roe & Smith, 2012). This incorporates following written directions, spotting details and groupings, and understanding reason impact connections.

2.4. Theoretical Framework

The following theoretical framework shows the concept of the theories mentioned, which is the focus of this study, how mind-mapping is linked with metacognitive strategy and reading comprehension skills.

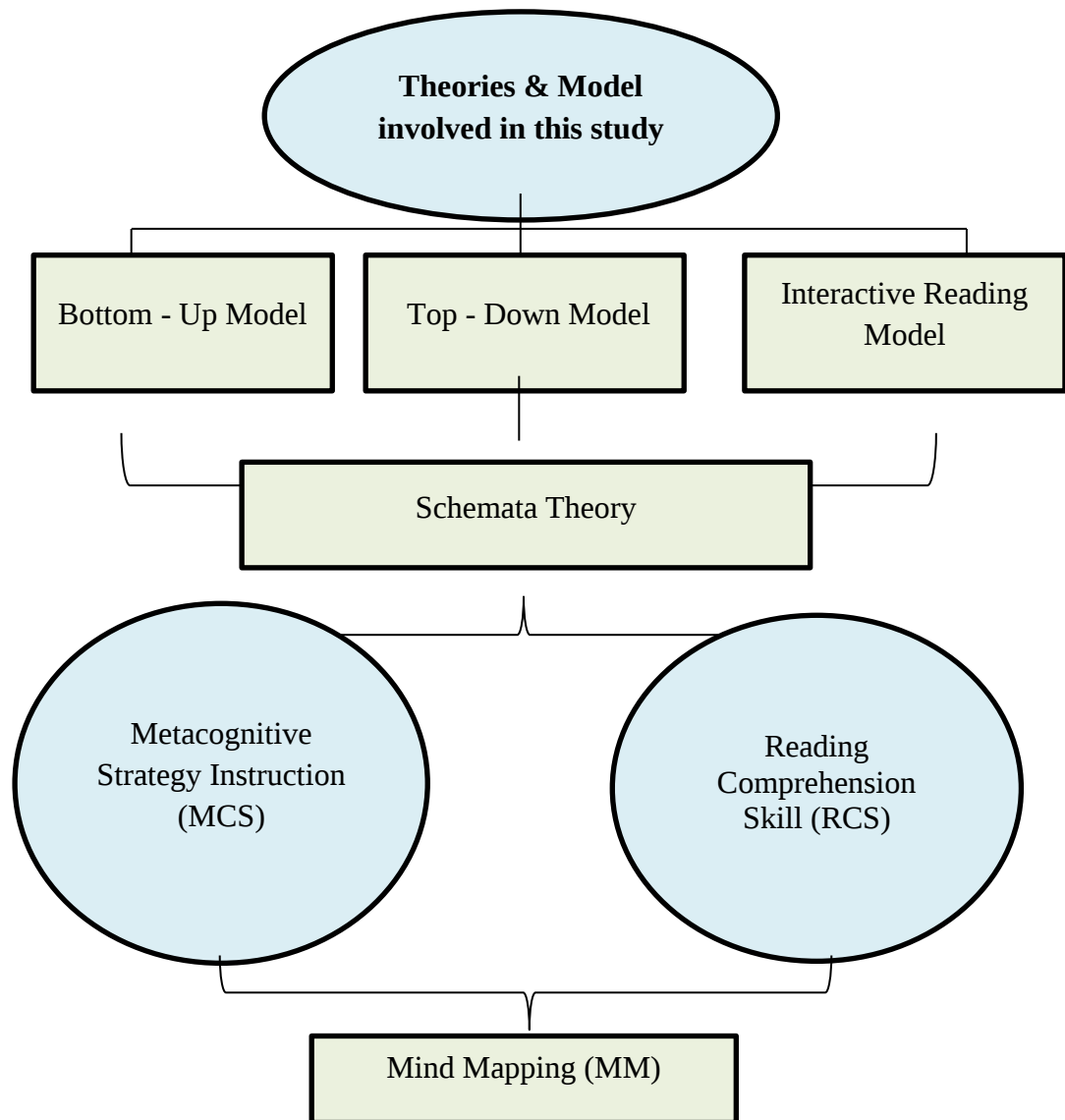


Figure 2.4: Theoretical frame-work

2.4.1. Prior Knowledge in Reading

Anderson et al. (1977, p. 369) stated the importance of prior knowledge in influencing the interpretation of a text summed up every act of comprehension involves one's knowledge of the world, they propose three ways in which prior knowledge may affect comprehension. First, it enables students to make inferences about what they are reading. Second, it draws students' attention to important information in a knowledge domain. In like manner Yahya (2010) expressed that, 'reading is a significant verbal aptitude, through proper pronunciation and correspondence, it encourages students to comprehend the composed content and to imagine the situation, through picturing, that should be cultivated by students so they can investigate information completely' .during the time spent reading a book, a reader needs to comprehend the substance, data, clarification or realities planned to be conveyed by the writer. Readers understanding results from the interaction between realistic paintings and the readers' language skills and information on the universes. In this intelligent cycle, the reader attempts to re-make the importance planned by: Badr El-Deen (2009) referred to Islamic Azad College; Vol.2, 81-90.)

2.4.2. Metacognitive Strategy for Reading Comprehension:

'Metacognitive or Metacognition' is one of the newest buzzwords in educational psychology. Generally, metacognition refers to thinking about one's thinking and controlling one's learning. Metacognition refers to higher-order review, which involves active control over cognitive processes engaged in learning. Activities such as planning an hour to approach a given learning task, monitoring comprehension, and evaluating progress toward completing a job are metacognitive. It is vital to say that metacognition plays a critical role in successful learning. There, are several steps in the metacognitive strategy which are used in teaching reading comprehension. Metacognitive strategies are desirable to all learners. According to Zhang and Sheep (2013), metacognitive strategies are divided into three categories, they are planning, monitoring, and evaluating. These steps are discussed below.

1) Planning

Studying requires the ability to plan strategies for learning (Palinscar & Brown, 1984). Reading can be divided into three parts, viz: pre-reading, while reading, and post-reading. As a metacognitive strategy, planning takes place in the phase of pre-reading. While planning, learners would consider thinking about. Pictures, graphics, headings, and subheadings also play a remarkable role in helping readers make predictions about the content of the text and they are used as parts of the planning strategy.

2) Monitoring

Thiede et al. (2003) say that overall reading comprehension is influenced by how accurately one can monitor comprehension during reading. In this process, the students monitor how well they are learning the material, which is a step toward determining the current level or state of learning.

3) Evaluating

The next suggested metacognitive strategy is evaluating. Evaluating itself has many purposes, for example, collecting feedback, gathering data or information, and doing assessments. In addition, evaluating reading serves several purposes. Succinctly defined as making judgments, evaluating helps readers determine:

- i. the importance of information obtained from the written text.
- ii. the accuracy and credibility of what has been read.
- iii. the appropriateness or usefulness of the ideas.
- iv. the amount of personal enjoyment in reading a text.
- v. one's own progress as a reader (Fries-Gaither, 2012).

Moreover, Zimmermann and Pons (1986) say that strategies for evaluation are statements or behaviors that the students can use to measure the quality or progress of their work. In this study, MS will be utilized through MM.

2.5. Mind Map/ Mind Mapping:

A Mind Map/ Mapping is a technique using a diagram to represent words, ideas, tasks, or other information connected to arrange radially around a central keyword or idea. The Mind Mapping concept was popularized widely by Tony Buzan (Buzan & Buzan, 2004). They further argue that the human brain already contains maps of information, which has the ability to make patterns using data it already possesses and the ability to process the vast amount of information using radial instead of linear structures.

Recently, mind map/mind mapping has been widely used as a learning technique in various disciplines to generate, structure, visualize, and classify ideas. Mind mapping is a visual type of note-taking that offers a review of a point and its complex information, allowing students to understand, create new ideas, and build connections and new thoughts. Therefore, the learning will be more effective, meaningful, and well-organized. Students should be trained to be able to comprehend properly, while using a mind map, the suggested steps in using the Mind Mapping technique, particularly for helping readers' to understand relationships used by the authors /writers of expository texts, are simplified as follows:

- In the center of the page, write the title of the passage/article. In this study, expository text was used.
- On the first layer, write the keywords of subdivision/subheadings which show parallel ideas.
- On the next layer, write the keywords on each subheading.
- Draw lines to see the relationship among ideas. Keep in mind that there is no right or wrong version of a mind map, as each individual or student has their own way of thinking. As long as students/learners can summarize what they read. The sample of the mind map, for this study is based on the expository text on the recent COVID-19 pandemic.

(Appendix D).

2.5.1. Mind Mapping as a Metacognitive Strategy for Reading

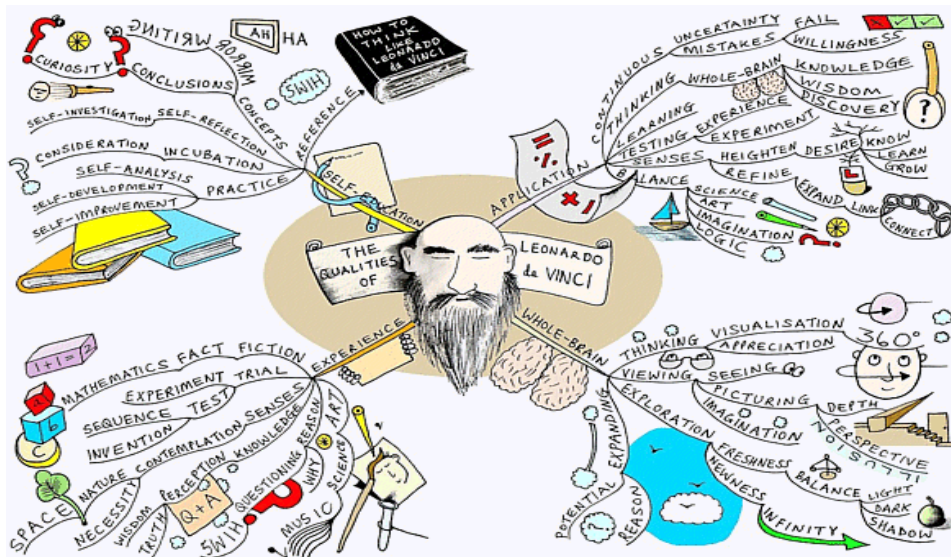
There are a number of strategies that can help students become more sophisticated learners, and thus better able to learn over the long run. These strategies include concept mapping/mind mapping, organizing, note-taking, identifying important information, and summarizing. (Pressley, et., 1992 & Weinstein, et., al 1988). The earliest records of human drawings were during the Ice Age. Between 60,000 to 10,000 BC, cave dwellers in France, Spain, Africa, and Scandinavia painted animals and scenes from their own experiences. Such pictorial imagery eventually led to the development of reading and writing. Language evolved from images to pictographs to symbolic codes, becoming increasingly abstract (Chi et al., 1988).

By mind-mapping, the students also train the brain's left side because it deals with color, drawing, and creativity. Tony Buzan, the originator of the method, illustrates mind mapping as a show, reviewed thinking procedure. By this, he implies that mind maps are made by starting in the middle and producing progressive degrees of detail. There Therefore part takes an evaluated or tree limb design, with thoughts stretching into their subtopics. MM permits greater innovativeness, and deep thinking while overseeing opinions, allowing, and providing the note-taker to relate words with graphic representations (Buzan, 2010, p., 12).

2.5.2. Procedures/Techniques of Mind Mapping

To elaborate further, the procedure of mind mapping making is straightforward. The students can remember a lot of information in this way. Further, as mentioned earlier there are several steps to make mind mapping: (Ibid, cited: Buzan, p. 15-16) In the most recent study, it was specified that there are only simple three steps of 'Mind Map'.

1. Set a central topic.
2. Add branches of related ideas.
3. Add sub-branches for more relevant ideas. (Tanguay. M. Nov.26.2020)



<http://www.improvewithmetacognition.com/mind-mapping.metacognition> (2017)

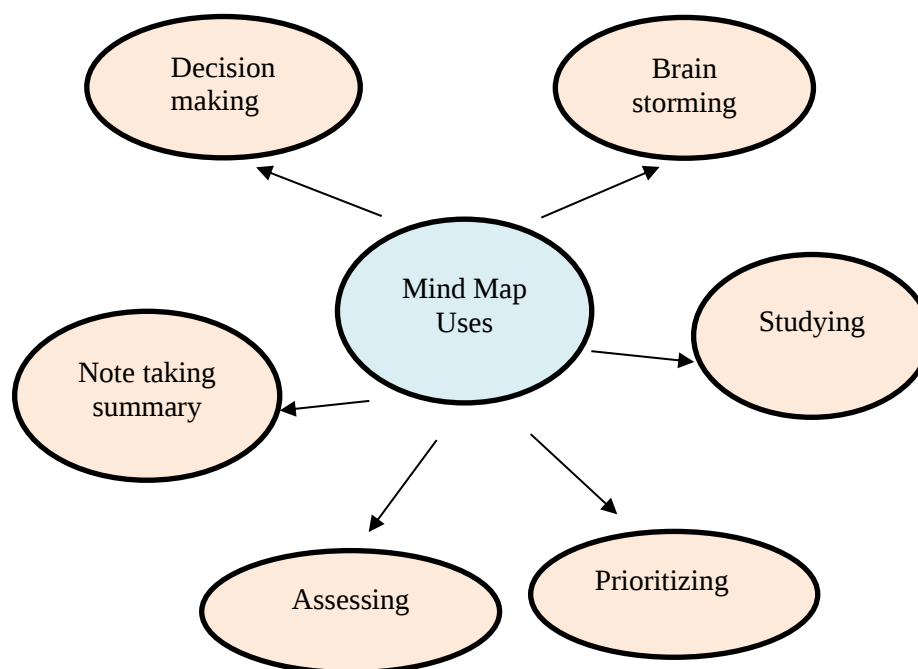


Fig. 2.6: Mind Map Uses.

2.5.3. Explanation of the above MM (Figure 2.6)

1. Notetaking

MM provides an alternative form of note-taking whether for students or facilitators. It can be done before or during the class by the students or facilitators. During the session by the student, or afterward as a way of checking whether the fundamental and powerful concepts were taught or understood.

2. Studying

Instead of re-reading notes taken, a method destined for failure, students can be reorganized their understanding into a mind map or two. MM not only offers the visual alternative here but provides retrieval practice, another metacognitive technique.

3. Assessing

Instead of giving the traditional quiz at the start of class or a five-minute paper at the end, it is preferred to ask students to produce a mind map of any read English comprehension concept covered in class. This alternative experiment will demonstrate to students a different approach and place another tool in their metacognitive strategy toolbox.

4. Prioritizing/Decision Making

It means to rank in order of importance. When items are placed in a mind map, something has to occupy center stage. Lesser items are confined to the areas. It also means to rank in order of importance, meaning to set something at the top of a ranking system. The practical reading strategy enables students to distinguish between the most and talk about how they have prioritized the information given in the text (which mean how student grade).

5. Brainstorming

Brainstorming usually, help learners to increase their word quantity, and to come up with as many words, and ideas as possible. Only when the brainstorming session is over are the ideas evaluated.

2.6. Reading Comprehension among ESL (English as a Second Language) Learners

Littlewood (2008) adds that English is learned as a second language to allow communication as it is known as the lingua franca and serves as the medium of interaction among people in multilingual countries and between those who do not speak each other's native language. It was further supported by Brown (2001) who states that the widespread of the English language serves as secure employment and education has made it often valued highly as a tool for upward social mobility. Top-down is a process where the reader draws their intelligence and experience to understand a text. Besides, the involvement of the generic structure of the text is also covered by the bottom-up process. Bottom-up is dealing with linguistic aspects such as words, phrases, grammatical, cues, and markers Brown (2001, p. 299).

Generally speaking, mind mapping combines two processes of reading comprehension: top-down and bottom-up processes. Hence, we can say that MM adopts the way the brain organizes our knowledge and experiences. Similarly, we can say that MM is a visualization of the brain's work. The diversity of cognition related to cognition can be labeled as meta-perception, meta-understanding, and meta-memory, with metacognition remaining as the superordinate term.

2.6.1. Reading Comprehension and Language Learning Strategy

Successful language learners are aware of the learning process and use learning strategies (including metacognitive ones) flexibly and efficiently. Training on using the metacognitive approach can target the following aspects: improving learning performance, learning new techniques to facilitate content assimilation, increasing self-confidence, and increasing effectiveness in terms of time spent and expected results (Jimenez et al., 2009). There are several approaches for making academic diagrams, including concept maps, mind maps, geography maps, semantic web, flowcharts, and graphs. A flexible format is integrating diagrams as an instructional approach (Ellis, 2010). In other words, metacognition is knowledge or awareness of an individual of his/her cognitive system or knowing about knowing. The root 'meta' means beyond, so the term refers to 'beyond thinking'. Specifically, this means that it encompasses the process of planning, tracking

(monitoring), and testing (assessing) our own understanding or performance (evaluating) (Flavell, 1979). There exist three types of metacognition, they are known about a person, knowledge about the task, and knowledge about the strategy. Similarly, it was further highlighted by Brown (2001) communicative competence consists of organizational competence (grammatical and discourse), pragmatic competence (functional and sociolinguistics), strategic competence, and psychomotor skills (pronunciation). Thus, to be proficient and competent in the English language, learners must use live language; the language is spoken by native speakers from a variety and rehearsed sources by using technology to record the conversation and formal language used in the radio, television, newspaper, magazines, and others (Ovando et al., 2006). Park (1994, p. 35) defines learning strategies as “ the mental activities people use when they study to help themselves acquire, organize, or remember incoming knowledge more efficiently.” In classification, O’Malley et al. (1985) categorized learning strategies under three main groups.

1. Metacognitive Strategies: (e.g. planning for learning, thinking about the learning process as it is taking place, monitoring of one’s production or comprehension, and evaluating learning after an activity is completed).
2. Cognitive Strategies: (e.g, repeating, translation, grouping, note taking, deducting, imagery, auditory representation, keywords, contextualization, elaboration, transfer); and
3. Socio affective Strategies: (e.g., social-mediating activity and transacting with others.
4. Furthermore, it has been outlining five recommendations that teachers should follow in order to apply reading strategy instruction successfully. They are:
 - a) Explain the strategy to be covered in the lesson
 - b) Describe the importance and benefits of using the strategy
 - c) Model how to use the reading strategy
 - d) Highlight when and where to use the strategy. Show students how they can assess whether they are using the strategy successfully or not (Winograd & Hare, 1988, p. 134).

2.6.2. Reading Difficulties among ESL Learners

Reading difficulties are rather prominent globally (International Reading Association 1999, 2007; Montgomery et al., 2007; OECD, 2014; Rasinski, 2012; Westwood, 2008) acknowledged that failure in achieving high standards in reading ability can negatively affect academic and career prospects, it is crucial to study potential sources of reading difficulty, with the principal focus on beginning reading/early reading development in ESL. Grebe and Stoller (2011) contended that reading difficulties appear due to inefficient operation of lower-level and higher-level comprehension processes. The authors explained that this happens when the text is too difficult. The reader does not have adequate background knowledge or linguistic knowledge, or when the reader has not had enough practice in reading for developing reading efficiency. This can be the case both with L1 and L2 readers. In such situations, ESL readers may try to understand the text by translating it slowly and mechanically or by using experience to form a situation model. Translating or guessing as coping strategies of ESL readers generally result in poor comprehension and, if this experience is repeated, ESL learners will lose motivation to become fluent readers. Grabe and Stoller (2011, p. 24), see the solution to the problem of poor comprehension in engaging ESL readers in reading for many hours at the text- and task-level appropriate to their abilities, i.e., in “extended exposure to meaningful print” that can be read efficiently.

2.6.3. Previous Studies

In today’s societies, reading is considered indispensable for a life of high quality (Bahadır 2012, p. 2) as cited in Akin et al. 2015, p. 2445). It is quite important for individuals’ social and academic achievements to gain reading habitats learn how to read and write, and then begin reading with a critical point of view (Gokturk, 1997). The ability to read and comprehend text is a prerequisite for full participation in modern society. Reading, as a receptive skill, has long been regarded as a prerequisite for foreign language acquisition since it functions as an essential source of input for other skills to develop. Reading also plays a vital role in academic development, particularly when learners must work over a huge amount of foreign language materials for their own specialist subjects (McDonough & Shaw, 2013).

Learning to read is a basic need and right of every young learner throughout the world. McNamara (2007) argues that reading can be challenging, particularly when the material is unfamiliar, technical, or complex. Moreover, for some readers, comprehension is always challenging. They may understand each word separately but linking them together into meaningful ideas often doesn't happen as it should. These readers can decode the words but have not developed sufficient skills to comprehend the underlying, deeper meaning of the sentences, the paragraphs, and the entire text (p. 11).

Being a good teacher of reading starts with an understanding of what reading is. What exactly happens between text, brain, and eye when we engage in this delightful, magical practice called reading? Reading is the practice of using text to create meaning. The two key words there are creating and meaning. If there is no meaning being created, there is no reading taking place (Johnson, 2008, p. 4). "It is commonplace in theories of reading to seek to identify skills which underly or contribute to the reading process" (Alderson, 1990, p. 425). Practically, reading skills play a vital role in the ESL classroom and can empower a learner. As readers interact with the written text or their strategies, these actions lead to adequate reading comprehension. Strategic knowledge, in other words, metacognition and learning and monitoring of cognition, are essential skills and aspects in reading.

The fundamentally significant parts of gifted reading were vital mindfulness and checking of the appreciation cycle (Shoerey & Mokhtari, 2001). Besides that, a teacher must know that students need to be told about the purpose of reading for their future use. This is because the English Language is used worldwide, which is vital for everyone. Interesting teaching and learning processes can help students to build their interest in learning English, especially in the reading aspect. According to Grebe (2009), "reading is a strategic process in that a number of the skills and processes are needed on the part of the reader to anticipate text information, select key information, organize and mentally summarize information, monitor comprehension, repair comprehension breakdowns, and match comprehension output to reader goals" (p. 15). Alderson (2000) points out that "the notion of skills and sub-skills in reading is enormously pervasive and influential, despite the lack of clear empirical justification" (p. 10). Nuttall (1996, p. 41-78) states that effective reading involves 'word attack' skill; 'sentence attack' skill, and 'text attack' skill. To her, reading involves not only

looking at sentences and words and going through them at random but also recognizing and understanding them intellectually. It helps students pick up new words, syntax, and style of writing. Reading comprehension is a functioning cycle that must be made if a student needs to be a capable reader. Comprehension is understanding what is being said or read and comprehend, which can be seen in the reader and reading awareness.

In like manner, Davis (2011, p. 5) offers two unique considerations about reading, as needs are, it was referred to that the task is a technique for finding more information about a subject. Oppositely, additionally reading is learning and setting off to the creative mind. It implies that reading is unique; it depends upon the reason behind the task and the kinds of text. Besides, McGinnis and Smith (1982, p. 13) characterized reading as a deliberate cycle of recognizing, interpreting, and assessing thoughts regarding mental content or the reader's complete mindfulness.

It might be inferred that the reader set the reason for the reading before he/she started the understanding cycle. McGinnis and Smith (2001, p. 205) accepted that the accomplishment of reading comprehension depends upon the purpose of reading itself. Additionally, according to Yahya and Noradinah (2012), reading expertise isn't limited merely to message-getting capacity and only reacting to various observation questions, be that as it may, the reading ought to likewise include students' abilities in assessing information to tackle issues, associating the news with a specific event, remarking and making assessments and conclusion based on information got from the reading materials. Students have to rule in the English language during their tertiary level to proceed further in preparing or to make sure about a sensible movement in an authentic affiliation, where the English language reading is an essential section of direction. (Yahya & Ghazali, 2010).

Different researchers on reading comprehension read the accompanying reviews to encourage metacognition to examine further and expand the exploration for upgrading guessing among tertiary students through mind mapping planning. The researchers further recognize that 'metacognition is additionally isolated into; metacognitive information and metacognitive control measures, the first refers to what students think about insight.

The subsequent one refers to how students utilize that information to direct perception' (Brown, 1987; Baker, 1991). In other words, metacognition is knowledge or awareness of an individual of his/her cognitive system or knowing about knowing. The root 'meta' means beyond, so the term refers to 'beyond thinking'. Specifically, this means that it encompasses the process of planning, tracking (monitoring), and testing (assessing) our own understanding or performance (evaluating) (Flavell, 1979). There exist three types of metacognition, they are known about a person, knowledge about the task, and knowledge about the strategy. Similarly, according to Costa and Kallick (2011), metacognition plays an important role in education because it helps the learner to be capable of developing a plan, monitor, and evaluate how much it's effective, which means metacognition helps the learner to be more involved in the learning process.

On the same note, it has been stated by (Afflerbach et al., 2008) that "Metacognitive reading strategies are related to an individual's mental process and the behaviors that control the reader's effort of deriving meaning and understanding of the context.' Keeping the above view and the individual's mental process, mind mapping will be utilized as a tool to help individuals in their reading comprehension. The results of the studies indicate that mind-mapping techniques can help improve students' reading comprehension ability, especially for poor readers. The present work, thus, adopts the use of mind-mapping techniques to improve poor readers' reading ability. In addition, an effort is made to investigate the students' attitudes toward the use of mind-mapping techniques to enhance their reading ability.

2.7. Conceptual Framework/Perspective and Background

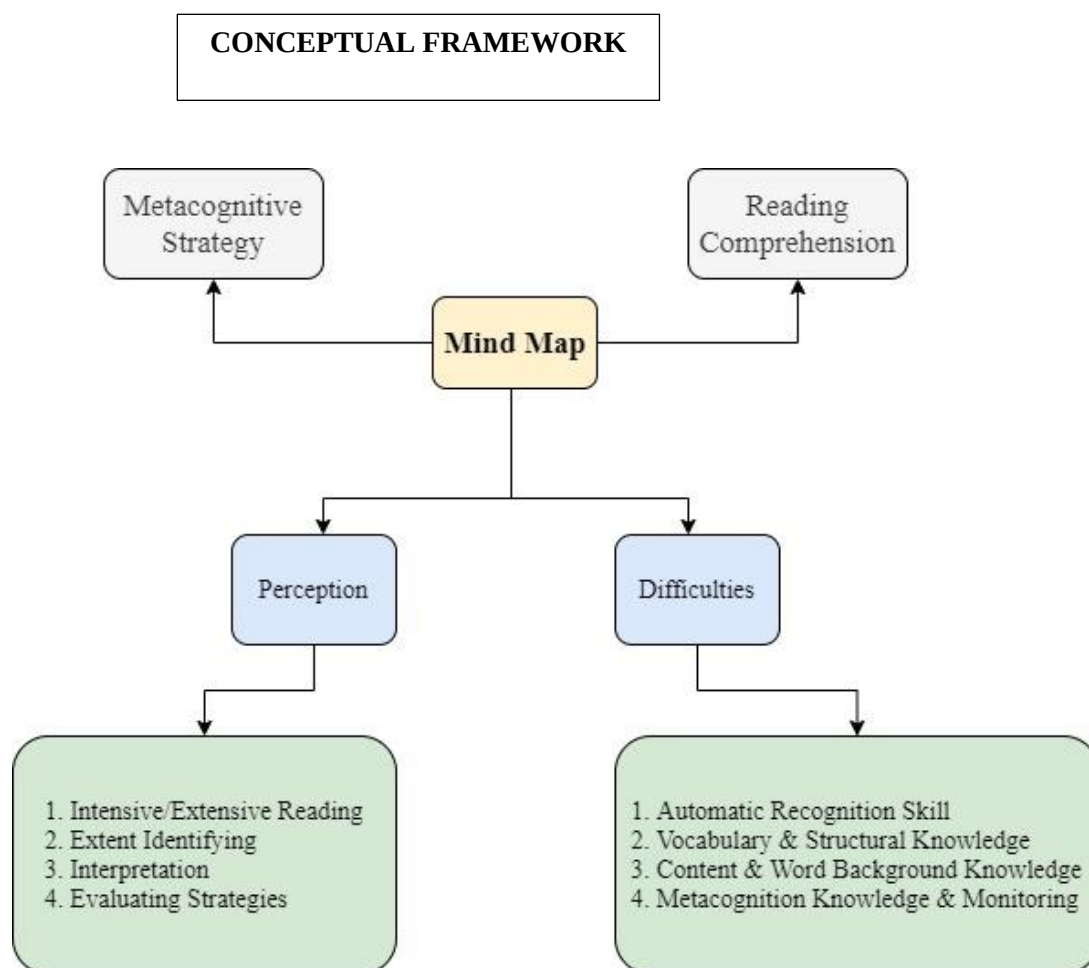


Figure. 2.7

2.7.1. Explanation of Conceptual Framework

Table 2.1: Perception

Task	Explanation
Intensive reading	It is related to further progress in language learning under the teacher's guidance.
Extensive reading	Reading for pleasure or to gain further improvement in language.
Interpretation	An explanation or way of explaining.
Evaluating strategies	Making a judgement.

Table 2.2: Difficulties

Task	Explanation
Automatic Recognition Skill	Immediate recognition
Vocabulary & Structural Knowledge	Knowledge of words and how to use it in sentences
Content & Word Background Knowledge	Connection to the text what is read
Metacognition Knowledge & Monitoring	One's own thought processes and one's existing state of knowledge

2.8. Summary:

This chapter concludes to enhance reading comprehension among tertiary learners using (MM) mind mapping as a tool to enhance (MS) metacognitive strategy to use in (RC) reading comprehension. MM can be a useful tool to take notes and brainstorm essays and comprehend the topics read. Consequently, the MM technique seems to be particularly suited to help students in reading and creating interest among the students for comprehension reading, with understanding; critical and according to the researcher, most of the facilitators in tertiary undergraduate classes are using standard techniques for reading comprehension, which constitutes a teacher-centered approach rather than a learner-centered. Besides, in their mind map, students may use a graphic representation that may help in the brainstorming process.

Chapter 3

RESEARCH METHODOLOGY

3.1. Introduction:

This chapter describes the formulation of a research design and methodology adopted to achieve the stipulated goals for the study. It is also to investigate and enhance metacognitive strategies for reading comprehension among tertiary students, using MM as the tool. MM plays an important role as a tool for reading and understanding comprehension. The elements involved in this study are research design, population sample, instrument used, data collection techniques, and data analysis procedures in detail. Keeping in mind the ‘thinking about thinking’ (metacognitive strategy).

3.2. Research Design:

The research design for this study will focus on the qualitative methodology to gather data. Further to highlight this research study will focus on the descriptive case study to describe the natural phenomena within the data in question. For example , what different strategies are utilized by a reader and how the reader applies them in reading comprehension? The primary purpose set by the researcher is to describe the data as they occur. (McDonough & Mc Donough, 1997).

There are two basic types of case study designs. The first one is called a single-case study which examines one case. This type of case according to Merriam (2002), allows the phenomena to be described in dept. Another type is known as a multiple-case study, which, as the name indicates, includes more than one case each within its separate context. Yin (2009) further divides case studies into holistic and embedded ones based on the number of units of analysis. In holistic studies, the unit of analysis is the case itself while in embedded case studies; two or more units of analysis may exist within the single case. This study follows a holistic single-case design where the case is one intact classroom of heterogeneous ESL learners focusing only on reading comprehension skills, involving MS via MM.

3.3. Population and Sample:

It depends on 'Purposive' sampling, which is a finite part of a numerical population whose properties are studied to gain information about the whole. When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for a survey.' (Webster, 1985). The above statement is the focal point of this study as it will depend on the larger population than will be sub-divided, this study is set in a local (ESL) language center, where tertiary learners come to learn English language. The language center is located in the Klang Valley of Kuala Lumpur, Malaysia. Most tertiary college students learn English as a second language. More importantly, English is the medium of instruction in most tertiary colleges in Malaysia. This study involved 40 learners combination of female/male learners who were required to undergo an intervention program under the MS via MM program to help enhance their reading comprehension performance. Respondents in sample A also respond to a questionnaire at the end of the intervention program, to investigate their perspectives of MS via the MM program, further the same population was required to go through the reading comprehension test before reading (pre-test), and after reading (post-test)

The language center is selected, by the researcher as she is serving here, as a head teacher, it was convenient to reach the students, since the researcher is also teaching them the usage of MS and MM to improve their English comprehension skills.. The researcher selected one intact ESL classroom of the tertiary learners who are enrolled in the language center.

Furthermore, the students are from different socio-economic background, belongs to the different Asian country where English is used as a second language and the local national school learners' where Bahasa Malaysia (the national language of Malaysia) is the medium of instruction and students need to take English as a compulsory subject, to pursue their studies overseas. In this study, most of the students in the selected intact ESL classroom are referred as Sample A. (local and international learners). Upon getting permission and discussion with administrator, the researcher started the research study. who is the facilitator of this selected group of students, the researcher worked to utilize metacognitive strategy

instruction via mind mapping, (MM). Besides the selection of sampling for this research study depend totally on ‘Simple Random’ sample, every member of the population has an equal chance to being selected.

3.4. Instrumentation:

Data in this study is collected using questionnaires, pre-test, post-test, and semi-structured interviews. Researchers such as (Creswell, Plano Clark, et al., 2003) highlight that collecting data using multiple sources will help triangulate findings in the study. Triangulation refers to a method for validation or verification, qualitative researchers generally use this technique to ensure that an account is rich, robust, comprehensive, and well-developed. Quite simply, triangulation is a useful tool to use in qualitative research, but one should weigh the advantages and disadvantages before application in extension work. If researchers decide that triangulation is desired, several types of triangulation can be used: data, investigator, theory, methodological, and environmental. The benefit of triangulation includes “ increasing confidence in research data, creating innovative ways of understanding phenomena, revealing unique findings, challenging or integrating theories, and providing a clearer understanding of the problem”(Thurmond, 2001).

- Questionnaire/Observation
- Pre-Test and Post Test
- Semi-structured Interview

3.4.1. Questionnaires/Observation: (RC & MS & MM)

This tool is deemed ideal as it allow for the collection of a variety of data from the sample over a relatively short period of time. Secondly given the guarantee of anonymity, the researchers believed that it provides tender data of a quality beyond that expected from a face-to-face interview. Also, it is necessary to constantly bear in mind that, the response of the students are their own perceptions, and therefore, it is not indisputable fact. In this study, the researcher focus on open-ended questions, as it is designed to encourage a full, meaningful answer using the subjects own knowledge and/or feelings. It is the opposite of closed-ended questions which encourages a short or single-word answer. The instrument questionnaire will highlight in, (*Appendix:A & B*)

3.4.2. Pre-Test and Post Test: (before reading, during reading & after reading)

It was conducted to quantify the knowledge attained in the class for a group of students with diverse learning styles and educational backgrounds. More specifically, the tests indicate how the students accumulate the learning process and understanding regarding their course. Besides, pre-test help to measure a starting point or the amount of pre-existing knowledge of the students' on the course topic. Post-test help the researcher or facilitator, to target any instructional needs to improve the course. The instrument pre & post-test, in this study, was reflected in RQ 1. (*Appendix C*)

3.4.3. Semi- structured Interviews:

Interviews was conducted after handing out the consent letter to the tertiary ESL learners' who is involved in the research study. Interviews are included to enable the researcher to triangulate data obtained via the other tools of inquiry, namely questionnaires, observation etc. According to Creswell (1998) “ Interviews provide useful information when data are impossible to get directly from observation. Compare to the observer, the interviewer also has better control over the types of information received, because an interviewer can ask specific questions to elicit the information”. The full semi- structured interview will be presented as (*Appendix D*).

3.5. Data Collection Procedures:

The following table depict the data collection procedure:

Phases	Week	Instruments	Participants
1	One	Questionnaires/Observation	Students/the teacher in charge, during the explanation of MS.
2	Two	Pre/Post test	For students
3	Five	Semi-structued interview	With students

Table: 3.1

The pre-test questionnaires for students are administered in the first week of the semester while the post-test was administered after all the pre-test was conducted, and the

questionnaires. Simultaneously, the semi-structured interview with the students was conducted in the fifth week so that students can discuss about their experiences, The interview was written down by the researcher herself, to save time.

3.5.1. Data collection dependable:

Research Questions	Interview Questions
Q1. To what extent are RC (reading comprehension) skills improved by using MM(mind mapping) as a tool to facilitate MS(metacognitive skills)	1. What do you think of your ability to automatically recognized words in RCP(reading comprehension process).
Q2. What are the students' perceptions of MM, and MS in facilitating RC?	2. What do you think about your pronunciation or difficulty in pronouncing certain words?
Q3. Does the MM technique help to enhance student's ability in RC?	3. Do you understand formal discourse structural knowledge?
Q4. What are the difficulties in using MM to comprehend English reading text?	4. Do you read a text and can predict what situations it could occur in, or do you need the title of a book and can predict what text could occur in it?
	5. In your opinion, it is essential to have prior knowledge of any situations, content, or information?

Table: 3.2

3.6. Data Analysis:

Qualitative data analysis is a search for general statements about relationships among categories of data." Marshall and Rossman, (1990:111). Qualitative content analysis focuses on forming a picture of the phenomenon as it is within a certain context. Yin (2003) speaks of qualitative data analysis as the recombination of evidence through examination, categorization, or tabulation to address the initial study questions. Keeping in view data analysis for this study depends on the instrumentation as mentioned earlier, and each research

question will answer the instruments used for the study. For example, Observation/Questionnaire, Pre-Post Test, and semi-structured interview. Further elaboration of data analysis is as under:

Table: 3.3 Data Analysis Table:

Research Question	Data Collection Procedure	Instruments	Data Analysis How?
RQ 1	Use of MS in facilitating RC	Questionnaires Structured Interviews	Focusing on PMA: Planning, monitoring & assessment
RQ 2	Students' perception in the use of MM, MS, facilitating RC.	Questionnaires Structured Interview	No right or wrong answer
RQ 3	MM as a tool to enhance RC	Observation Structured Interview	Analyses of mind mapping activity.
RQ 4	Difficulties in using MM to comprehend	Structured Interview	Analyses of the interview transcript. The responses will help to know whether MS is understood by the use of MM.

Table of Data Analysis. 3.3

3.6.1: Explanation of the above table:

RQ. 1: To what extent are RC skills improved by using MM as a tool to facilitate MS?

This question is addressed using the instruments mentioned in the table, which focus on MS: (PMA) planning, monitoring, and assessment. Learners will focus on how to plan learners reading activity, to monitor their understanding along the way of planning, at the same time it will help them to assess learners prior knowledge of the given expository text on COVID- 19 to create MM. This will motivate the learners to improve their RC skills.

RQ. 2: What are the student's perceptions of MM, and MS in facilitating RC?

The tools used in RQ1 will answer RQ2. Each and every learner including the teacher concerned will express their own opinion by creating MM while focusing on MS to facilitate RC, there is no right or wrong answer.

RQ. 3: Does the MM technique help to enhance students' ability in RC?

Creating the required MM of the given article which will show the learners prior knowledge and understanding of RC.

RQ. 4. What are the difficulties in using MM, to comprehend English reading text?

The difficulties faced by the learners will be their prior knowledge and vocabulary, which will be reflected in their structured interview at the same time this will reflect in creating MM, which will further convey the message and understanding of MS.

3.7. Summary:

This research study aimed at highlighting the effects of using metacognitive strategy (MS) via mind mapping (MM) on the performance of English reading comprehension. The methods and techniques and the research study is presented to the selected group of students from one of the local international college, located at Klang Valley, as mentioned earlier. Keeping in mind that the researcher cannot rule out that some students were already using metacognitive strategies instructions via mind mapping in their reading intuitively, the overall level of metacognition/metacognitive via mind mapping will be able to rise in all students. But metacognition can be taught only by teachers/facilitators who practice metacognition and only if it is supported by those who decide on the curriculum of ESL. Thus, according to (Anderson, 2005) 'metacognition is the essential skill that teachers should develop both in themselves and their students'. Although most of the Malaysian teachers' are using MS, very few may be incorporating it with MM, especially in ESL classes

Chapter.4

RESULT AND FINDING

4.1. Introduction:

This chapter presents the research findings of the data collected from the case study samples. The main source of data is the interview and is also supplemented by library research. The findings will be presented in relation to the research objectives stated in the study. The method used to analyze the data is already discussed in the methodology chapter.

4.2. Demographics of the students' interviewees:

Out of 40 respondents, 22 were female while 18 were male. Approaching male respondent was easier as they are willing to be interviewed in a short notice compared to female respondents.

Informants	Numbers	Age
Male	18	19 - 25
Female	22	19 - 30

Table 4.1: Category of Informants

Learners are local Malaysian, as well as from different Asian countries where English is a second language.

4.3. Paradigmatic considerations

Qualitative paradigm Creswell (2008:2) defines qualitative research as “an enquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting.” In other words, qualitative research is concerned with the meaning of human behavior and experiences, and their social functions.

This view is further advanced by Merriam (2002:12), who defines qualitative research as “an umbrella concept covering several forms of inquiry that help us understand and explain the meaning of social phenomena with as little disruption of the natural setting as possible.” To enable the researcher to gain an in-depth understanding of the phenomenon under investigation, qualitative research makes use of a variety of methods and data collection strategies. In this study, researcher used classroom observations, focus group interviews, and content analysis. By using different methods at various points in the research process, it could build on the strength of each type of data collection and minimize the weaknesses of a single approach.

4.4. Reflections on the interview process:

Before each interview, started by verbally explaining the aims and objectives of each interview within the study, by the researcher. It was also explained to each ESL learner, they are free to express their feelings about MS or MM, there are no right or wrong answers, it is individual choice and expression. As mentioned above in chp.3, earlier the researcher wants to audio record but due to poor reception, it was decided by the researcher to write it down on her own.

There were 40 participants/learners, but for this study, the researcher is only providing 10 of the interview transcripts., to save time., Besides similarity exists between the learners’ perception and the reply to the open-ended questions. This stage comprises transcription, analysis, and reporting of the interview material. Judging from her experience, the researcher suggest that, only a very small part of what has been said by interviewees can be included in publications and even in the analysis. ‘To accomplish a text that gives a good account in the sense of mirroring a reality, represented in all this realistic material is very difficult, if not impossible’. The researcher needs to make tough decisions about which data should be used and which will be omitted. Researchers (from then on authors) often find it more favorable to include in the final production the statements by interviewees that support their arguments. Alternatively, it was given some priority to some data over others that they classify as more important. These are very subjective decisions with various implications for the research outcomes. .

4.5. Stages of Data Analysis:

In this study the researcher used “Thematic analysis” is a method for analyzing qualitative data that involves reading through a set of data and looking for repetitions in the meaning of the data to find themes. It is an enthusiastic process of reflexivity in which the researcher's subjective experience is at the center of making sense of the data.

The key features of this study involving thematic framework approach, when analyzing qualitative data involve five stages which are outlined below and presented within the below:

Table 4.2: Five Stages of Data Analysis adapted from Pope & Mays 2000 (p.86)

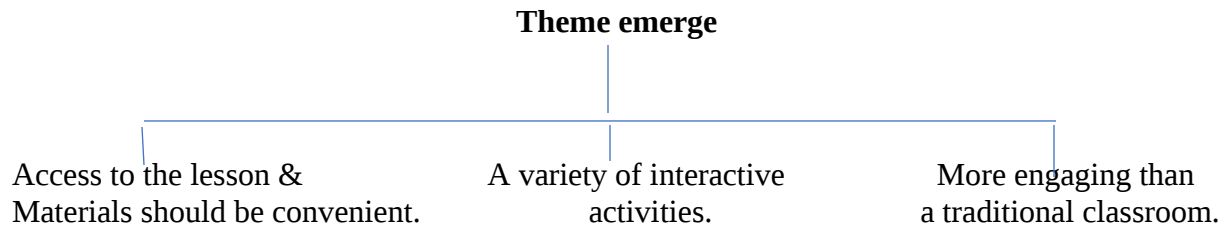
Process	Explanation
1. Familiarization	The researcher immerses themselves in the raw data by listening to tapes, reading transcripts, and studying reflective notes. Individual transcripts from interviews are read through (immerses the researcher in the data to aid integrity and validity of process). Thematic summaries of the content of the interviews are noted and a list key ideas and recurrent themes are created.
2. Identifying a thematic framework 3. Indexing/Refining the data.	The researcher identifies all the key issues, concepts, and themes. The emerging themes from the data are selected and linked, such as issues raised by the respondents and experiences and views that recur in the data, with the overall aims and objectives of the study. A detailed index of data which labels the data into manageable sections can be retrieved from the data and explored. A categorization of the data as themes are sorted and labelled. A hierarchy of themes and sub themes from the text is important. Cross sectional codes in which a system of categories can be applied. This may enable comparisons and connections.
4. Charting/Retaining data in context:	Each main theme is displayed in a chart allocating a row to each respondent and a column denoting a separate subtopic. This rearranges the data using a matrix format and retains the links to the original data which is important when revisiting the original data
5. Mapping and interpretation	Data from each case is synthesized into the framework. Associations between themes are used to explain findings. Links to literature and actual quotes aid an actual reflection and interpretation of data collected. It is important that the researcher is explicit in how their views are developed through an audit-trail.

4.6. Data Analysis:

Table: 4.3

Sample	Interview transcript	Codes	Theme
1.	I read a lot and understand the words from previous texts or articles, some words are always repeated in the article or stories. I think we need to read a lot to be able to recognize words, whenever we see them, this will improve our reading comprehension process.	Understand Recognize-words Reading-comprehension.	A variety of interactive activities.
2.	I like reading but depending on what the topic is about, I like adventures and a good beginning and ending. Reading can help us to improve our second language which is English. Certain English words, I do have a problem understanding. I don't know what MS or RC is.	Understanding Second-language Reading English	A variety of interactive activities.
3.	RC, the abbreviation was confusing, when I heard it, it was alarming because I never knew it or didn't heard about it. I didn't know I can achieve 100% of reading perception in English. Teachers should help us to understand what MS (metacognitive strategy) is.	Motivation Understanding Reading ability in English.	More engaging than a traditional classroom
4.	To improve my reading and writing performances I want to learn more about MS it was not explained or never ever spoken in our regular language class by our language teacher.	Reading second language	A variety of interactive activities
5.	Reading is essential but needs to have separate lesson plans for different levels of students. Before and after motivation classes for English are too important. Different levels of learners must be given chances to learn and interact in class, without hesitation.	Reading Motivation interact Different levels of learners.	More engaging than a traditional classroom.
6.	Having different level of classes for learners of different levels is important, but on the other hand in my opinion, it is only useful when the learners themselves must show interest and effort to improve their English abilities in reading, speaking, and writing.	Different levels of learners, Reading ability	Access to the lesson and materials should be convenient.
7.	Mind mapping is the good way of learning any subject but students should show interest and willingness to learn English as their second language.	Interest and willingness, english as a second language.	A variety of interactive activities.
8.	Learning English is not easy, must focus and keep on reading a lot, sometimes will read but very hard to understand. Needs lots of motivation and guidance to read English and to keep on revising.	English as a second language, guidance of teacher.	Access to the lesson and materials should be convenient.
9.	Reading is important but to be a good reader we need to keep on motivated and learning. Sometimes teachers are lacking in motivation and don't have the patience to motivate slow learners.	Motivation. Reading English as a second language. Guidance of a teacher.	Access to the lesson and materials should be convenient
10.	I will use mind mapping in my lessons specially to improve my English language. I like my teachers they motivate and carry on the concept of MS, before any lesson in English.	English as a second language, Guidance of a teacher. Strategy	Access to the lesson and materials should be convenient.

4.6.1. Data analysis chart of ‘Themes’ emerge: (Thematic analysis)



4.7. Validity and Reliability:

This research study is conducted in a single local intact tertiary language class, and validity and reliability are key aspects of all research. Particular attention to these two aspects can make the difference between good research and poor research and can help to assure that fellow researchers accept findings as convincing and trustworthy. Keeping given the single tertiary college, the researcher is unable to prove that validity and reliability of this intact case study can be the same as others. This is particularly vital in qualitative work, where the researcher’s subjectivity can so readily cloud the clarification of the data, and where research findings are often questioned or viewed with disbelief by the researcher’s community.

4.8. Summry:

It is learned through the data analysis that, lack of motivation in learning English as a second language., is reflected by most of the learners, it is the first difficulty that could affect reading comprehension. As stated by Alderson, “motivation of readers can affect the outcome of reading”. Studies of poor readers from first and second languages have shown that poor readers lack the motivation to read or improve their reading abilities; as a result, less motivation becomes an obstacle to reading comprehension. In other words, teachers are the ones who can motivate students to read by selecting appropriate texts according to their interests. Secondly, the respondents also found a lack of reading strategies. The last problem perceived by the respondents was language knowledge.

Chapter 5

DISCUSSIONS/ SUGGESTION.LIMITATION AND PRACTICAL IMPLICATION

5.1. Introduction:

This chapter presents the discussions, suggestion and the difficulty faced during the practical implication of MS and MM. Further this chapter provides the results discussed revealed an answer to all the research question.

5.2. Discussion:

After collecting the data and analyzing the result of the research, the researcher came into conclusion , that most of the ESL learners face difficulties to comprehend English reading text. It was found that, the students' difficulties about reading comprehension include: First was difficulty in language knowledge, the second was learner's background knowledge, the third was motivation, the fourth was lack of reading strategies, availability and reading process.

5.3. Suggestion:

Considering the result of the research, through the data analysis, the researcher would like to give some suggestions as follow;

a. Suggestion for the teachers:

- Teachers must be able to observe the difficulties of reading comprehension faced by ESL learners, teachers must keep a track and awareness of learner's demography, exposur to English as a second language. In order to help and solve the students 'learning difficulties in English language.
- Teachers are expected to give students material which can boost learners' motivation to learn more.
- Teachers are also expected to try to find better techniques, methods or strategies for teaching-learning, so that, they can increase the students' motivation to learn and create a better class environment.

- Use mind mapping to improve students' reading comprehension. As mentioned earlier MM uses concise words, pictures, color, associations and other visual aids to convey of an idea or information. (Abdul, 2015).

b. Suggestion for the students:

- Students can increase and deepen their knowledge after knowing the difficulties in reading comprehension then can apply and used of metacognitive strategies.
- Metacognitive strategies are one of the strategies that students', can use in learning reading comprehension.
- Beside students are advised to use mind mapping in any sort of their reading comprehension, whether exploratory/expository text, in co-operate with metacognitive strategies.
- Additional information and knowledge are needed to strengthen the students' background knowledge towards the material provided, by doing so the learners can sharpen their knowledge, improve their vocabulary, and can easily comprehend, especially in reading comprehension.

c. Suggestion for the next researcher:

The present researcher also hoped that the next researchers will continue this study by conducting further investigation, using MM and MS for example: Engaging in Inter- actional Processes that Aid Student Understanding for students' difficulties in reading comprehension and Strategies for Supporting Student Motivation in reading comprehension.

5.4. Limitation of the study:

The researcher believe that, the findings in her study are an overall success. However, shortcomings were unavoidable. Firstly, the researcher only uses survey questionnaires/semi-structured interviews to collect data on the views of the students from ESL class, about reading difficulties and their needs in teaching and learning reading. The number of students taking part in the survey is only from a single intact ESL class

(40 students), which may not be sufficient for the researcher to have precise judgments. Secondly, not all the suggested techniques for teaching and learning reading are appropriate, so the researcher can't conclude the effectiveness. Therefore, the suggestions to improve reading comprehension for ESL tertiary learners may be subjective and uncompleted. Finally, this study was carried out within the area of one language center, so the mentioned teaching strategy may not be suitable to apply to other tertiary language classes because of learners' differences in language proficiency and other social constraints. Despite such limitations, the researcher strongly believes that her research is successful to some extent. Though this is just a small-scale study on the issue, it provides some helpful suggestions for teaching reading comprehension by using MS and MM. However, any further research that employs supplementary instruments such as experimental research can carry out over a longer period, on a larger scale can help to prove the above results more strongly and persuasively and can also help to avoid the subjective assessments from the researcher of this study.

5.5. Practical Implication:

Reading strategies in the ESL context have some implications for both teachers and students. The reader's metacognitive knowledge about reading may be influenced by several factors, including previous experiences, beliefs, culture-specific instructional practices, and, in the case of non-native readers, proficiency in English as a second language, and it may be triggered, consciously or unconsciously, when the reader encounters a specific reading task. Furthermore, teachers learn to raise students' awareness of strategies which helps them to use these strategies where it is relevant and suitable. By raising awareness, students have more responsibilities for using the proper strategies independently. Finally, strategies help students to improve reading comprehension and efficiency in reading. Besides they assist readers to process the text actively and connect what they read to their background knowledge and other parts of the text. When students use strategies, it will be in the way that expert readers do, so it is helpful for students.

5.6. Summary:

This present researcher faced a lot of mental stress while using and explaining the strategy of using MM in reading and understanding. In this research study, some learners were not ready to cooperate, it was a challenge. The researcher's purpose in conducting this research is to, aware the students and teachers about the reading strategies to use in particular contexts. Just as the findings of the literature review generally report the benefits of reading strategies, the researcher believes that, this study can help students to learn another language. All researchers believe that reading strategies need to be taught to students. Reading is a very important skill. So, students should learn the strategies to read best. There are a lot of strategies that, are not conversant, to students. We believe that teachers should spend more time on strategies that help students to choose the best one.

Chapter 6

CONCLUSION

6.1. Introduction:

The above chapters have presented the findings and discussion regarding the effect of reading strategy on the students' reading comprehension. It has discussed the findings and the discussion of the data collected from tests, questionnaires, and interviews. This current chapter provides the conclusion, of the study, and recommendations for further study. The conclusion are summarized from the data taken from the findings and arguments from the previous chapters.

6.2. Summary:

This thesis primarily concerns the application of Mind Mapping in English reading teaching in tertiary institutes/schools. Based on the analysis and discussion in the last chapter, the conclusion can be safely drawn that Mind Mapping has positive effects on students' English reading. Mind Mapping is proven to be effective in any English reading teaching and learning. It can help the teacher to present and teach the texts as well as help students to learn more effectively. The result indicates that reading with the help of Mind Mapping is more effective than the traditional grammar-translation method. Although the present study has many limitations, it has significance both in practice and in theory. As for the practical significance, the research tries to explore a new way to teach English reading with Mind Maps; along with Metacognitive Strategy. As far as the theoretical significance is concerned, the research could enrich Mind Map theory in the application, especially in English reading among tertiary learners. The results gained from the study may give some inspiration for further research on reading teaching. Last, but not least, future studies should be carried out on larger samples with much more time. Thus, the conclusions would be more convincing and powerful.

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APPENDIX A

Classroom Direct Observation sheet.

Researcher:_____

Course:_____

College:_____

Date and Time:_____

Following are the criteria used for observation:

No.	Review Section	Description/Comments
1.	Subject Matter Content: Show good command and knowledge of subject. (COVID-19)	
2.	Mind Map: Organization: Organizes subject matter, evidences, preparation, is thorough and states clear objectives, emphasizes and summarizes main points, teacher meet class at scheduled time.	
3.	Reading Comprehension/Rapport: Holds interest of students, is respectful, fair, and impartial, provides feedback, encourages participation, interacts with students, shows enthusiasm.	
4.	Teaching Methods: Uses relevant teaching methods, aids, materials, techniques, and technology, includes variety, balance, imagination, group involvement, uses examples that are simple, clear, precise, and appropriate, stays focused on and meets stated objectives.	
5.	Presentation: Establishes online course or classroom environment conducive to learning, maintains eye contact, uses a clear voice, strong projection, and standard English	
6.	Management:	

	Uses time wisely, attends to course interaction, demonstrates leadership ability, maintains discipline and control.	
7.	Sensitivity: Exhibits sensibility to students' personal culture, gender differences and disabilities, responds appropriately in a non-threatening, pro-active learning environment.	
8.	Assistance to Students: Assists students with academic problems.	
9	Personal: Evidence self-confidence, maintains professional comportment and appearance	
10	Physical aspects of Classroom: State location and physical attributes of classroom, distractions if any, list any observations of how physical aspects affected content delivery.	

Strengths Observed:

Suggestions for Improvement:

Teaching Effectiveness:

APPENDIX: B

Open -ended (Questionnaire)

The purpose of this survey is to collect information from the students of the tertiary level and the concerned teacher about the reading comprehension performance (RCP) using the metacognitive strategy (MCS) incorporate with (MM) mind mapping.

Please tick the appropriate column. (✓)

Before I start reading an English text

No	Item	Always	Sometimes	Never
1.	I activated background knowledge to get a general idea of the comprehension			
2.	I tried to predict the subjects from the title			
3.	I previewed the instructions, so I could understand what to do			
4.	I read the task before reading the text			
5.	I read the text before I read the task			
6.	I determined the main topic I pay attention to headings and sub-headings, the pictures the topic sentence, and the text structure			
7.	I recalled my weakest points in reading comprehension and tried to comprehend when reading began			
8.	I located the main questions in the specific paragraph of the text because I think it is easier			
9.	I planned before I read because I think it will be helpful			
10.	I try to imagine the scenario of the text which can help me to understand the purpose			

While reading an English text

No	Item	Always	Sometimes	Never
1.	I first read for the general ideas of the text			
2.	I paid serious attention for the information in the text read			
3.	I can find out ways to overcome the problems when I cannot understand certain vocabulary			
4.	I can find ways to overcome on my reading even when there are many distractions around me			
5.	I skipped words, sentences, or phrases if I did not understand			
6.	I translate sentence by sentence while reading			
7.	I underlined difficult sentences, phrases and words and tried to understand them			
8.	I use reading strategies to help me comprehend the text better			
9.	I consider and focused on the beginning and the ending of the text correctly			
10.	I changed the strategies if they could not help me in accomplishing the reading comprehension process and purpose			

After reading an English text

No	Item	Always	Sometimes	Never
1.	I used my own reading plan to judge my reading			
2.	I realized that my major concern is becoming better by completing the task			
3.	I like to see whether my reading strategies were helpful for the text comprehension			
4.	I like discussions with my classmates and to exchange views to find out whether I have missed some points in the comprehension field			
5.	I referred to the reading goal to evaluate if I achieved it			
6.	I spent time to motivate myself to improve the reading, even sometimes I do a poor job			
7.	I spent time reflecting on my reading performance			
8.	I could think of ways to exchange and evaluate my reading problems, even they are too difficult			
9.	I keep on thinking, recalled, evaluate, and summarized the reading strategies used			
10.	I set a higher reading goal for the next comprehension level			

APPENDIX: C

Student's No. _____ Semester: _____ Date: _____

Semi- Structured Interview for students based on:

RCP: (Reading Comprehension Performance), MCS: (Metacognitive Strategy), and MM: (Mind Mapping)

Section A: RCP (Reading Comprehension Performance)	
I.	Do you like reading. Give any two reasons for your answer.
II.	Do you understand what RCP is, how much do you know about RCP
III.	How can you improve your reading performance?

Section B: MCS (Metacognitive Strategy)
I. Do you plan what you will be reading, Yes or No.
II. Do you monitor your reading: before, during and after?
III. How often did you or anyone evaluate your reading performance

Section C: MM (Mind Mapping or Graphic Organizing)
I. Do you hear about MM or GO? Please explain.
II. Would you prefer using MM before, during, and after reading.
III. Give us your own opinion -regarding RCP, MCS and MM

Appendix: D

Expository Article: (Mind Mapping)

How Corona Virus started and what happen next? Explained

By: Matt Reynolds and Sabrina Weiss; 27th May 2020

On December 31, 2019, the World Health Organization's (WHO) China office heard the first reports of a previously-unknown virus behind several pneumonia cases in Wuhan, a city in Eastern China with a population of over 11 million.

What started as an epidemic mainly limited to China has now become a truly global pandemic. There have now been over 5,595,091 confirmed cases and 350,547 deaths, according the John Hopkins University [Covid-19 dashboard](#), which collates information from national and international health authorities. The disease has been detected in more than 200 countries and territories, with the US, Brazil and Russia experiencing the most widespread outbreaks, followed by the UK, Spain, and Italy. In the UK, there have been 265,227 confirmed cases and 37,048 deaths as of May 26. The true number of infections and deaths is likely to be considerably higher.

What are the symptoms of Covid-19?

Covid-19 shares many of its symptoms with the flu or common cold, although there are certain symptoms common to flu and colds that are not usually seen in Covid-19. People with confirmed cases of Covid-19 rarely suffer from a runny nose, for instance.

The most common Covid-19 symptoms are a fever and a dry cough. Of 55,924 early Chinese cases of the disease, nearly 90 per cent of patients experienced a fever and just over two-thirds suffered with a dry cough. That's why the UK government is advising anyone with a high temperature or a new, continuous cough to stay at home for seven days or, if they live with other people, for the entire household to isolate for 14 days from the first onset of symptoms.

Other Covid-19 symptoms are less common. Just under 40 per cent of people with the disease experience fatigue, while a third of people cough up sputum – a thick mucus from within the lungs. Other rarer symptoms include shortness of breath, muscle pain, sore throats, headaches or chills, loss of smell or taste. According to the WHO, symptoms tend to appear between five and six days after infection.

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international health authorities. The disease has been detected in more than 200 countries and territories, with the US, Brazil and Russia experiencing the most widespread outbreaks, followed by the UK, Spain, and Italy. In the UK, there have been 265,227 confirmed cases and 37,048 deaths as of May 26. The true number of infections and deaths is likely to be considerably higher.

The Chinese government responded to the initial outbreak by placing Wuhan and nearby cities under a de-facto quarantine encompassing roughly 50 million people in Hubei province. This quarantine is now slowly being lifted, as authorities watch to see whether cases will rise again. The US is now the new epicenter of the Covid-19 outbreak. As of May 27, the country has 1,681,418 confirmed infections and 98,929 deaths. In Italy, where the death toll surpassed that of China on March 19, the government took the unprecedented step of extending a lockdown to the entire country, shutting cinemas, theatres, gyms, discos, and pubs, and banning funerals and weddings. In the UK, the government has shut schools, pubs, restaurants, bars, cafés, and all non-essential shops for at least nine weeks. On May 10 Boris Johnson outlined a flexible plan that would see some schools reopen by June depending on the current threat posed to the UK by the virus.



On March 11 the WHO officially declared the Covid-19 outbreak a pandemic. "WHO has been assessing this outbreak around the clock and we are deeply concerned both by the alarming levels of spread and severity, and by the alarming levels of inaction," said its director-general Tedros Adhanom Ghebreyesus. Although the WHO designated Covid-19 a "public health emergency of international concern" (PHEIC) on January 30, it had been reluctant to call it a pandemic. "Pandemic is not a word to use lightly or carelessly. It is a word that, if misused, can cause unreasonable fear, or unjustified acceptance that the fight is over, leading to unnecessary suffering and death," Adhanom said.

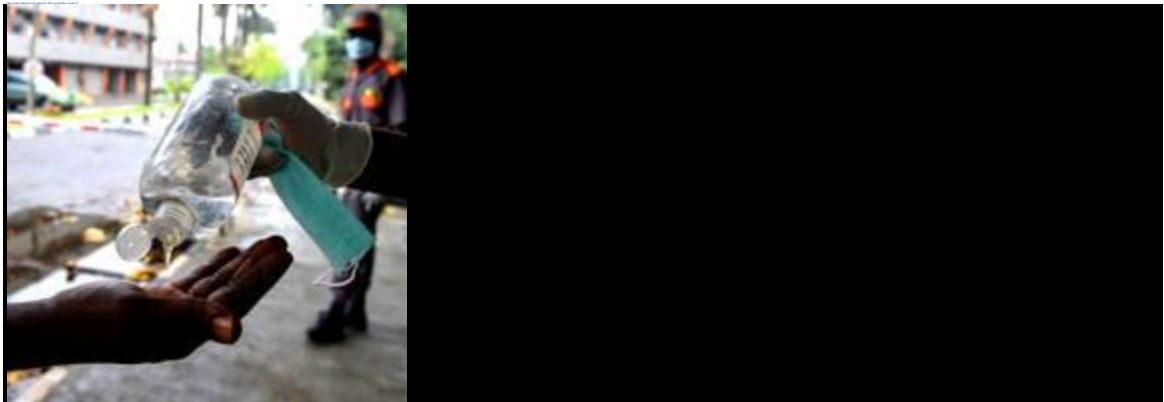
A quick note on naming. Although popularly referred to as coronavirus, on February 11, the WHO announced the official name of the disease: Covid-19. The virus that causes that disease is called Severe Acute Respiratory Syndrome Coronavirus 2, or Sars-CoV-2 for short.

How did Covid-19 start?

The disease appears to have originated from a Wuhan seafood market where wild animals, including marmots, birds, rabbits, bats and snakes, are traded illegally. Coronaviruses are known to jump from animals to humans, so it's thought that the first people infected with the disease – a group primarily made up of stallholders from the seafood market – contracted it from contact with animals.

The hunt for the animal source of Covid-19 is still unknown, although there are some strong contenders. A team of virologists at the Wuhan Institute for Virology released a detailed

paper showing that the new coronaviruses' genetic makeup is 96 per cent identical to that of a coronavirus found in bats, while a study published on March 26 argues that genetic sequences of coronavirus in pangolins are between 88.5 and 92.4 per cent similar to the human virus. Some early cases of Covid-19, however, appear to have inflicted people with no link to the Wuhan market at all, suggesting that the initial route of human infection may pre-date the market cases. The Wuhan market was shut down for inspection and cleaning on January 1, but by then it appears that Covid-19 was already starting to spread beyond the market itself. On January 21, the WHO Western Pacific office said the disease was also being transmitted between humans – evidence of which is apparent after medical staff became infected with the virus.



The world could learn a lot from how Africa is handling Covid-19

By **MUNYARADZI MAKONI**

What exactly is Covid-19?

Coronaviruses are a large group of viruses that are known to infect both humans and animals, and in humans cause respiratory illness that range from common colds to much more serious infections. The most well-known case of a coronavirus epidemic was severe acute respiratory syndrome (Sars), which, after first being detected in southern China in 2002, went on to affect 26 countries and resulted in more than 8,000 cases and 774 deaths.

While the cause of the current outbreak was initially unknown, on January 7 Chinese health authorities identified that it was caused by to a strain of coronavirus that hadn't been encountered in humans before. Five days later the Chinese government shared the genetic sequence of the virus so that other countries could develop their own diagnostic kits. That virus is now called Sars-CoV-2.

Although symptoms of coronaviruses are often mild – the most common symptoms are a fever and dry cough – in some cases they lead to more serious respiratory tract illness including pneumonia and bronchitis. These can be particularly dangerous in older patients, or people who have existing health conditions, and this appears to be the case with Covid-19. A study of 44,415 early Chinese Covid-19 patients found that 81 per cent of people with confirmed infections experienced only mild symptoms. Of the remaining cases, 14 per cent were in a severe condition

while five per cent of people were critical cases, suffering from respiratory failure, septic shock, or multiple organ failure. In the Chinese study, 2.3 per cent of all confirmed cases died, although the actual death rate is probably much lower as many more people will have been infected with the virus than tested positive.

Common question

How should I protect against COVID-19?

COVID-19 transmission and protective measures.

- Clean your hands often.
- Cough or sneeze in your bent elbow - not your hands!
- Avoid touching your eyes, nose, and mouth.
- Limit social gatherings and time spent in crowded places.
- Avoid close contact with someone who is sick.
- Clean and disinfect frequently touched objects and surfaces.

Protect yourself and others from COVID-19

If COVID-19 is spreading in your community, stay safe by taking some simple precautions, such as physical distancing, wearing a mask, keeping rooms well ventilated, avoiding crowds, cleaning your hands, and coughing into a bent elbow or tissue. Check local advice where you live and work. **Do it all!**

What to do to keep yourself and others safe from COVID-19

- **Maintain at least a 1-metre distance between yourself and others** to reduce your risk of infection when they cough, sneeze, or speak. Maintain an even greater distance between yourself and others when indoors. The further away, the better.
- **Make wearing a mask a normal part of being around other people.**

Here are the basics of how to wear a mask:

- Clean your hands before you put your mask on, as well as before and after you take it off.
- Make sure it covers both your nose, mouth, and chin.

Here are some specifics on what type of mask to wear and when, depending on how much virus is circulating where you live, where you go and who you are.

- Wear a fabric mask unless you're in a particular risk group. This is especially important when you can't stay physically distanced, particularly in crowded and poorly ventilated indoor settings.
- Wear a medical/surgical mask if you:
 - Are over 60,
 - Have underlying medical conditions,
 - Are feeling unwell, and/or
 - Are looking after an ill family member.
- *For more public advice on masks, read our Q&A and watch our videos. There is also a Q&A focused on masks and children.*
- For health workers, medical masks are essential personal protective equipment when engaging with patients with suspected, probable, or confirmed COVID-19. Respirator masks (such as FFP2, FFP3, N95, N99) should be used in settings where procedures generating aerosols are performed and must be fitted to ensure the right size is worn.
- *Find out more about the science of how COVID-19 infects people and our bodies react by watching or reading this interview.*

How to make your environment safer

- **Avoid the 3Cs: spaces that are closed, crowded, or involve close contact.**
 - Outbreaks have been reported in restaurants, choir practices, fitness classes, nightclubs, offices, and places of worship where people have gathered, often in crowded indoor settings where they talk loudly, shout, breathe heavily or sing.
 - The risks of getting COVID-19 are higher in crowded and inadequately ventilated spaces where infected people spend long periods of time together in proximity. These environments are where the virus appears to spread by respiratory droplets or aerosols more efficiently, so taking precautions is even more important.
- **Meet people outside.** Outdoor gatherings are safer than indoor ones, particularly if indoor spaces are small and without outdoor air coming in.
 - *For more information on how to hold events like family gatherings, children's football games and family occasions, read our Q&A on small public gatherings.*
- **Avoid crowded or indoor settings** but if you can't, then take precautions:
 - **Open a window.** Increase the amount of 'natural ventilation' when indoors.
 - *WHO has published Q&As on ventilation and air conditioning for both the general public and people who manage public spaces and buildings.*
 - **Wear a mask** (see above for more details).

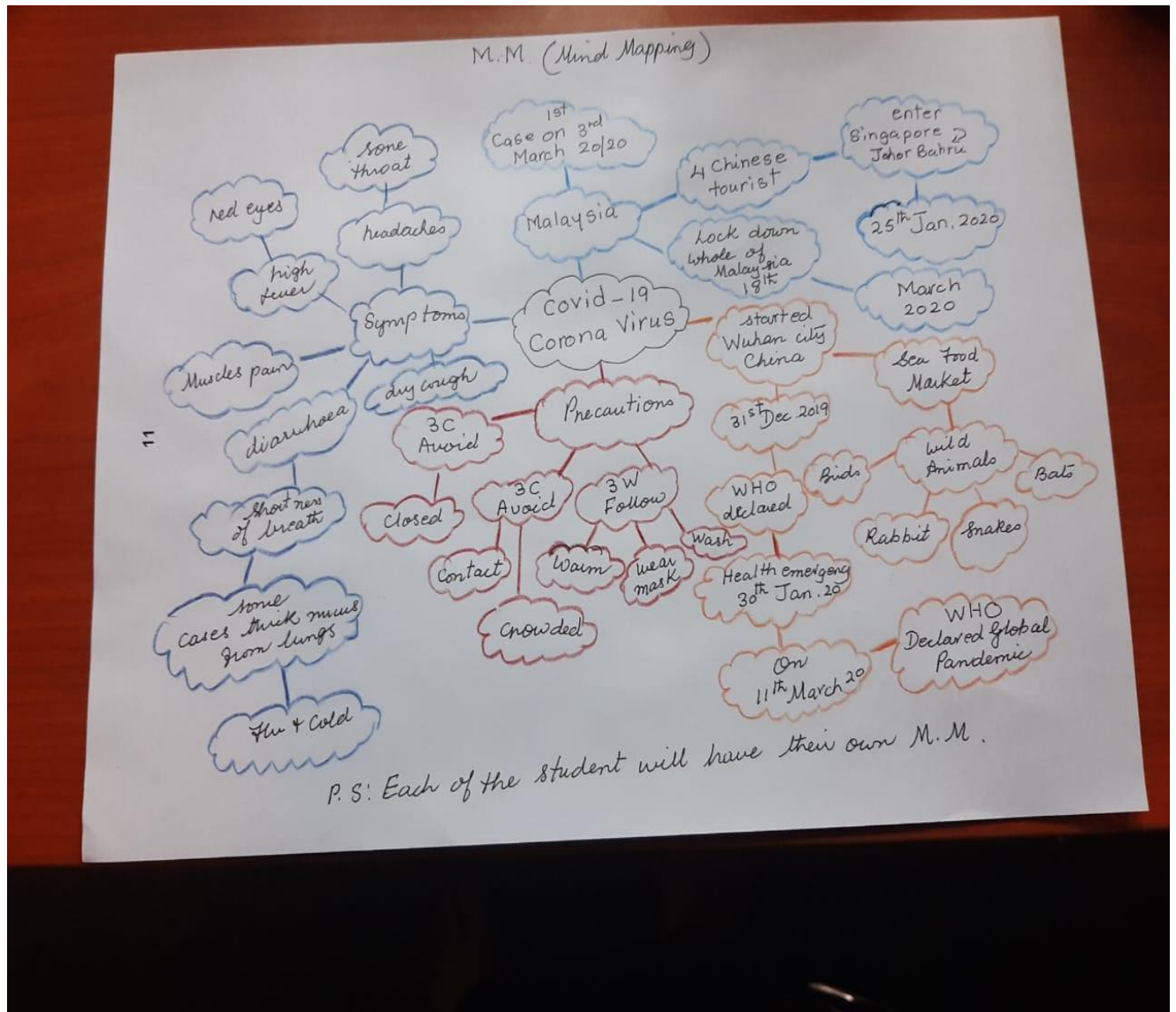
Don't forget the basics of good hygiene

- **Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.** This eliminates germs including viruses that may be on your hands.
- **Avoid touching your eyes, nose, and mouth.** Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose, or mouth. From there, the virus can enter your body and infect you.
- **Cover your mouth and nose with your bent elbow or tissue when you cough or sneeze.** Then dispose of the used tissue immediately into a closed bin and wash your hands. By following good 'respiratory hygiene', you protect the people around you from viruses, which cause colds, flu, and COVID-19.
- **Clean and disinfect surfaces frequently especially those which are regularly touched,** such as door handles, faucets, and phone screens.

What to do if you feel unwell

- **Know the full range of symptoms of COVID-19.** The most common symptoms of COVID-19 are fever, dry cough, and tiredness. Other symptoms that are less common and may affect some patients include loss of taste or smell, aches and pains, headache, sore throat, nasal congestion, red eyes, diarrhea, or a skin rash.
- **Stay home and self-isolate even if you have minor symptoms such as cough, headache, mild fever,** until you recover. Call your health care provider or hotline for advice. Have someone bring you supplies. If you need to leave your house or have someone near you, wear a medical mask to avoid infecting others.
- **If you have a fever, cough and difficulty breathing, seek medical attention immediately. Call by telephone first, if you can** and follow the directions of your local health authority.
- **Keep up to date on the latest information from trusted sources, such as WHO or your local and national health authorities.** Local and national authorities and public health units are best placed to advise on what people in your area should be doing to protect themselves.

Sample of Mind Mapping done by the researcher



Words: 19022

Pages: 72