Investigating Zhe Jiang University Students' Views on Mind Mapping for EFL Reading Comprehension

WM Wang [a], M. S. H. B. Abdullah [a,b*] and M. M. J. Shuhaily [c,d]

[a] Faculty of Languages and Communication, Universiti Pendidikan Sultan Idris, Tanjong Malim- 35900, Malaysia.
[b] Institute of Malay Civilization, Universiti Pendidikan Sultan Idris, Tanjong Malim 35900, Malaysia.
[c] Universiti Kebangsaan Malaysia, Bangi, Selangor 43600, Malaysia.
[d] Universiti Malaya, Kuala Lumpur 50603, Malaysia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The purpose of the study was to explore Zhe Jiang University students' beliefs and perceptions on the use of mind mapping technique (MMT) in EFL reading comprehension (ERC). The objective of this study was to examine Zhe Jiang University students' views on the use of mind mapping technique in EFL reading comprehension (ERC). The participants of this study were 144 first-year English major students purposely selected from Zhe Jiang University. The researcher adopted mixed-method. The instruments for data collection used in this study were Five-Likert

*Corresponding author: Email: mariashb@fbk.upsi.edu.my;

questionnaires and semi-structured interview. It showed that there is high reliability with the 4 parts of questionnaires, and each part got high Cronbach's Alpha values of 0.802, 0.942, 0.737 and 0.837 respectively. The findings of quantitative survey revealed participants hold the belief that the use of mind mapping technique (MMT) is useful for EFL reading comprehension (ERC). The qualitative interview suggested that students hold positive perception of using mind mapping technique (MMT) in EFL reading comprehension (ERC). As a conclusion, this study suggested that Zhe Jiang University students hold positive beliefs and perceptions on the use of mind mapping technique (MMT) in EFL reading comprehension (ERC). This study provides theoretical basis for subsequent related academic research. It provides empirical evidence on the effectiveness of mind mapping techniques in enhancing EFL (English as a Foreign Language) reading comprehension among university students.The results of this study have the potential to guide educational practices and curriculum design, and may inspire further research into innovative teaching strategies in the EFL context, thereby contributing to the improvement of educational outcomes globally.

1. INTRODUCTION

With the globalization of the economy and culture, English plays an important role around the world. English language ability includes speaking, listening, reading, and writing. Among these aspects of English language learning, reading is vital. Reading enables users synthesize and evaluate information [1]. But many Chinese EFL first-year English major students find it difficult to read and comprehend reading in English, they can barely absorb information in reading English in a short time (Wulandari, 2019). Reading skill is not about allowing learners to translate and understand text word for word, but enable readers to read the text and find out useful information in the text precisely and quickly [2]. However, the most common mistake learners make when reading literature is reading word for word instead of seeking useful information. This inefficient method increases reading time and requires more energy to study [3]. Mind mapping is a technique which can help efficiently locate and find out useful information like main topics, subtopics, concepts, images and the interrelationships in a short time and can visually display them [4]. Therefore, this study aims to explore students' beliefs and perceptions towards using mind mapping technique (MMT) in English reading comprehending (ERC).

2. LITERATURE REVIEW

2.1 Reading Comprehension (RC)

According to Chen R [5], reading comprehension (RC) is a fundamental ability that is critical to academic achievement. Written materials must be understood, interpreted, and analyzed in order for students to learn new information, expand their vocabulary, and refine their critical thinking skills. The RC process in this study consists of two parts: the reader and the reading text [6]. The reader is first considered to be the user of the language, and the text is considered to be an instance of the language in use. With the help of reading ability, readers can absorb textual meaning and interpret meaning from texts [7].

2.2 The Importance of ERC in Chinese University

ERC refers to the process of readers' understanding and interpretation of English text content [8]. ERC refers to the ability to understand English text through reading, obtain information from it, understand the meaning of English text, infer, analyze, evaluate and solve problems [9]. ERC requires readers to have the ability of literacy, language comprehension, background knowledge and thinking ability, to understand the expressions and logical relations of words, sentences, paragraphs and chapters in the text, and to transform them into their own thinking and understanding [10]. ERC is the basis of learning English and thinking in a foreign way, and also an important way to acquire knowledge and information of foreign language [11].

Reading is an active process regulated and controlled by readers according to different purposes [12]. It cultivates people's sentiments and improves self-cultivation. Reading involves a thinking process to understand, comprehend, absorb, appreciate, evaluate, and explore the text [13]. It can change our minds, potentially altering our fate. When reading literary works, it

is easy to overlook their unique characteristics, which may lead readers to misinterpret the historical context of literary ideas [4].

2.3 Use of Mind Mapping Technique (MMT) in University

MMT was originally a note-taking method created in the 1960s by Tony Buzan [2], an Englishman. Tony Bazan (1999) believed that the traditional drafting and note-taking methods had four disadvantages: burying keywords, difficulty in remembering, wasting time and failing to effectively stimulate the brain, while brevity, efficiency and active personal participation were crucial to successful note-taking. In the case of the diminishing effectiveness of drafting and note-taking methods, there was a need for a method that can continuously increase the return, and this method was mind mapping (Cahill, M., & Fonteyn, M. 2021).

Although the initial purpose of mind mapping was only to improve note-taking methods, its role and power continue to show up in future research and applications, and it was widely used in individuals, families, education and enterprises [14]. Tony Buzan [2] argued that mind mapping was an expression of divergent thinking and therefore a natural function of the human mind, what's more, he believed that mind mapping was a very useful graphic technique, a master key to unlocking the potential of the brain, which could be applied to all aspects of life, and its improved learning ability and clear thinking would improve human behavior.

According to Andrade C [15], Mind mapping uses both graphical and spatial skills to show the relationships between themes at all levels, with mutual subordination and hierarchical charts. It establishes memory links between theme keywords and images, colors, and other elements [16]. By making full use of both the left and right brain functions and utilizing the principles of memory, reading, and thinking, mind mapping helps balance development between science and art, logic and imagination, and unlocks the infinite potential of the human brain [17]. Deshatty and Mokashi [18] defined a mind map as a chart that focuses on fundamental keywords or topics, showing the relationships that connect various ideas, words, and phrases. This chart illustrates how these elements are related to one another among university students.

Teachers who employ mind mapping technique in their reading practice towards learners can help them have a better understanding of the relationship between concepts and encourage learners to classify those concepts. Abd Karim, R., & Mustapha, R. [19] pointed out that mind mapping was a simple and comprehensive way to organize university students' thoughts and helped them to convey their opinions to the audience in a simple and meaningful way. Mind mapping strategy was also a simple way to clarify learning, meanwhile, was helpful for the visual-oriented university students.

3. RESEARCH METHODOLOGY

3.1 Research Approach

The research methodology of this study was mixed-mode approach. Qualitative research focuses on understanding how people make sense of their lives, how they experience their world, internally and externally, how they process the information that they perceive and how they structure what is observed [20]. The qualitative data from 10 open-ended interview questions will be thematically analyzed using NVivo to investigate the perceptions of Zhe Jiang University students regarding the use of mind mapping techniques in EFL reading comprehension.

Creswell [20] asserted that triangulation adds credibility and reliability to qualitative research; therefore, this study utilized the survey questionnaire in addition to focus group study to add validity to the research design. During the procedure of quantitative data collection, the researcher prepared 40-item Five-Likert questionnaire as instruments, Before middle of March, the researcher already contacted with 144 students of English major first-grade in Zhe Jiang University via Wechat. Then in middle of March, the researcher sent questionnaire to participants through Questionnaire Star (a Chinese popular questionnaire APP). Within 7 days, the participants all finish the questionnaire. During the process of qualitative data analysis, in middle of March, the researcher finished collecting data, then begin to analysis data in middle of May. Then SPSS was used to analyze data, cronbach's alpha was used to get coefficient to test reliability and then KMO test was used to identify validity.

As for qualitative study, the researcher employed 10 items open-ended interview as instrument. Before middle of March, the researcher randomly

choose and contact with 10 students among 144 students mentioned above via Wechat. Then in middle of March, the researcher met those 10 students one by one and interviewed them. The researcher spent 5 days to finish the interview. After data collection, which was completed in mid-March, the researcher began analyzing the data in mid-May, the researcher used NVIVO to perform thematic analysis. The themes were recorded and coded using labels that highlighted aspects of the mind mapping technique in reading comprehension. According to Lochmiller, C. R. (2021), thematic analysis consists of several methods of analysis, each with a different goal, philosophical basis, and approach. It has far-reaching significance for qualitative research. Based on the results of both qualitative and quantitative data analyses, the researcher integrated the data and then concluded the findings of the study.
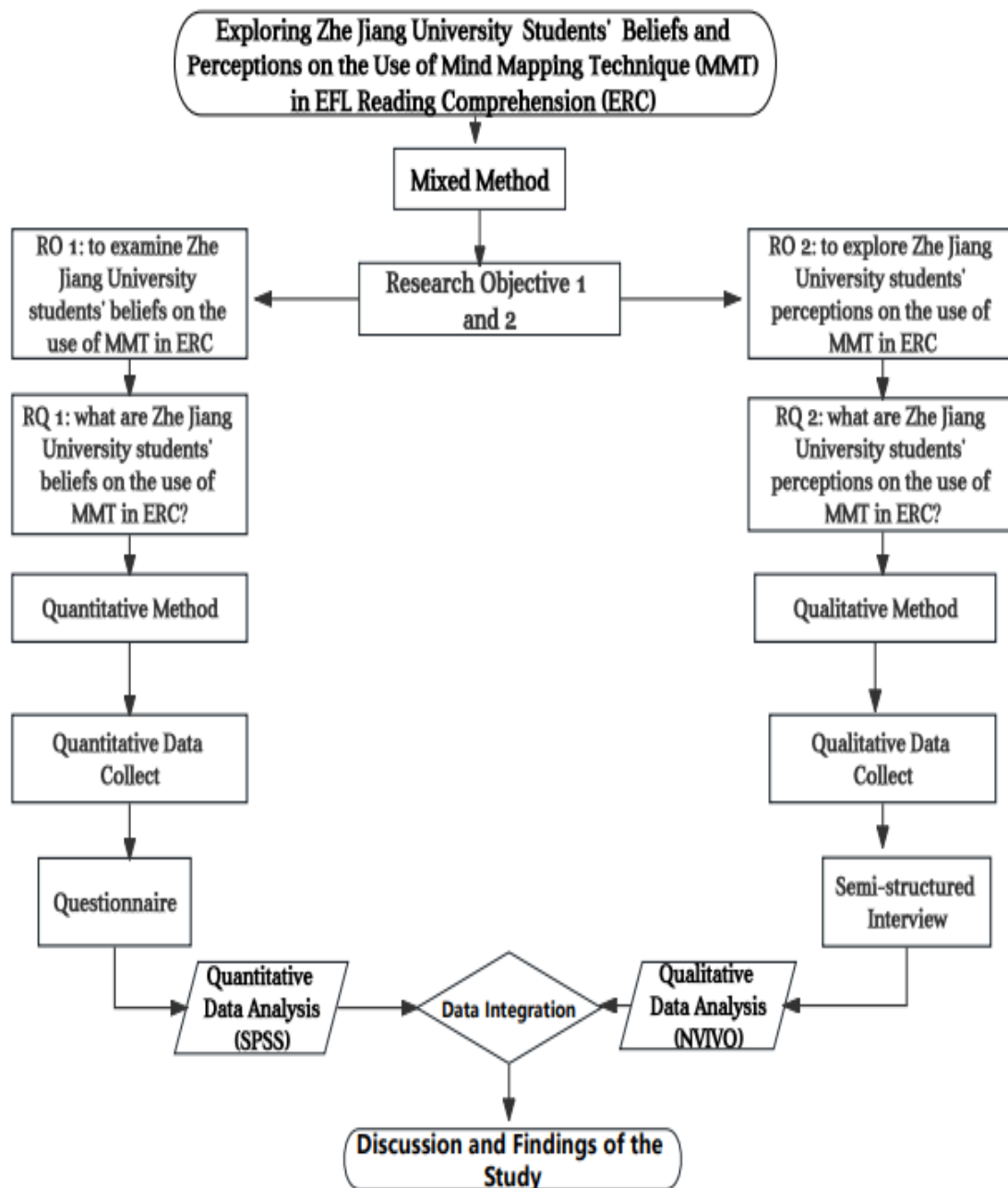

Fig. 1. Research design

3.2 Instruments

In an attempt to explore the beliefs and perceptions of using mind mapping techniques (MMT) in English reading comprehension (ERC) among Zhe Jiang University students, the researcher employed several research instruments to conduct the survey and draw conclusions from the study. The instruments used in this study primarily included survey questionnaires and semi-structured interviews.

3.3 Survey Questionnaires

In this study, questionnaire was used in quantitative study to understand students' beliefs of using MMT in ERC.

In this study, a questionnaire was used in the quantitative analysis to understand students' beliefs about using mind mapping techniques (MMT) in English reading comprehension (ERC). The Five-Likert Scale questionnaire used in this study (see Appendix A) was adapted from the study by Abd Karim, R. and Mustapha, R. [19] on the use of mind mapping techniques in EFL reading courses. Additionally, the questionnaire was administered online using popular Chinese survey software (Questionnaire Star), allowing students to complete it at their own convenience and with ample time. In this study, the researcher employed Five-Likert questionnaire including both of open-ended and close-ended questions to test Zhe Jiang University students' beliefs and perceptions on the use of MMT in ERC. The open-ended questions of Five-Likert questionnaire was composed of 5point Likert scale rating from 1 (strongly agree) to 5 (strongly disagree) without a neutral point so that the participants could choose concrete answer. After the subjects answered all the questions, the researcher will calculate the scores for the entire questionnaire according to the criteria. A higher score indicates weaker agreement from the participants.

In total, there are 40 items of questions in Five-likert scale questionnaire. The first section consisted of 7 questionnaire which aims to collect study background of participants, like number account of reading comprehension class and ability of using mind mapping skills. The second part consisted of 33 items close-ended questions which focus on the text areas or skills that students used in MMT for ERC, as well as

advantages, limitations and suggestions for using MMT in ERC.

3.4 Data Collection Procedures

Data collection procedures are an important part of research. Data collection forms the foundation of scientific research, enabling researchers to conduct in-depth analysis and verification, which results in accurate and comprehensive results. For example, in medical research, data collection is used to support the diagnosis and treatment of diseases. In social science research, it helps researchers analyze social phenomena and trends. In the business world, data collection assists companies in understanding market needs, consumer preferences, and competitors, enabling them to make more informed decisions. For instance, by analyzing user behavior and preferences, companies can make personalized recommendations and increase sales conversion rates. Government departments also use data collection to provide better services.

Data collection is crucial for understanding societal, economic, and environmental conditions, forecasting trends and risks, and shaping effective policies and business strategies.

3.5 Procedures of Quantitative Data Collection

In this study, the researcher employed the purposive sampling technique. A total of 144 students were purposively selected from the English department at Zhejiang University. The account of population and sampling was based on Krecjie and Morgan（1970）sample size table. The participants were 144 first-year English majors from the Faculty of English at Zhejiang University. The sample was obtained using a purposive sampling technique.

During the procedure of quantitative data collection, the researcher prepared 40-item Five-Likert questionnaires as instruments. Before middle of March, the researcher had already contacted with 144 students of English major first-grade in Zhe Jiang University via Wechat APP. Then in middle of March, the researcher sent questionnaires to participants through Questionnaire Star (a Chinese popular questionnaire APP). Within 7 days, the participants all finished the questionnaires. The following table showed data collecting procedure of questionnaires.

Table 1. Data collecting procedure of questionnaires

	Students	Total
Day 1	10	10
Day 2	13	23
Day 3	9	32
Day 4	16	48
Day 5	15	63
Day 6	20	83
Day 7	16	99
Day 8	22	121
Day 9	8	129
Day 10	15	144

3.6 Procedures of Qualitative Data Collection

As for qualitative study, the researcher employed 10 items open-ended interview as instrument. Before middle of March, the researcher randomly chose and contacted with 10 students among 144 students mentioned above via Wechat. Then in middle of March, the researcher met those 10 students one by one and interviewed them. The researcher spent 5 days to finish the interview. After data collection, In middle of March, the researcher finished collecting data, then started to analysis data in middle of May.

There are no ethical issues in this study. The researchers obtained ethical permission from the school to use the tools, the participants were given consent form (see appendix A), and they were told that the data would be kept confidential.

4. RESULTS AND DISCUSSION

4.1 Summary of Key Findings

This study aimed to find out Zhe Jiang University students' beliefs and perceptions of using MMT in ERC. In this study, mixed method was employed, both qualitative and quantitative data were used. The study focuses on two research questions:

1) What were Zhe Jiang University students' beliefs on the use of mind mapping technique (MMT) in EFL reading comprehension (ERC)?
2) What were Zhe Jiang University students' perceptions on the use of mind mapping technique (MMT) in EFL reading comprehension (ERC)? The study involved 144 first-year English majors students selected from Zhe Jiang University, participants were purposively selected.

Purposive sampling technique enabled researchers reduced the complexity and diversity of samples, reduced the cost and time of research, and selected samples according to the purpose and demand of research, thus improved the efficiency and accuracy of research.

4.2 Zhe Jiang University Students' Beliefs of Using of MMT in ERC

Based on quantitative data analysis results, it is easy to answer the research question one: what were Zhe Jiang University students' beliefs of using MMT in ERC? Mind mapping affected students' reading comprehension in many ways. For example, MMT helped students quickly find the main idea of the article, improve students' learning efficiency, reduced the amount of time that students needed to solve problems, and thereby enhance students' autonomy and interest in learning.

The study's findings on students' beliefs of using MMT in ERC was similar to those of Saori, S. (2020). The research question of the study was whether there was a significant difference in reading achievement between students taught using mind mapping and students taught using other methods. The study found significant differences. This was demonstrated by the experimental group having a higher average score (71.76) than the control group (60.24). The average score of the experimental group increased from 62.35 to 71.76, an increase of 9.41 points. Meanwhile, the average score in the control group dropped from 62.59 to 60.24, a drop of -2.35 points. At 32 degrees of freedom, the F-number (23.5) was higher than the F-table (1). The results showed that mind mapping improved EFL students' reading comprehension ability. The study's findings are similar to the study of Alomari (2019), which focused on using

mind mapping techniques to improve "reading comprehension in fourth grade Arabic students in Jordan." And the experimental results showed that reading comprehension effectively improved the reading comprehension ability of Jordanian children. The findings of this study were also in line with those of Rubiyah et al (2019), who used concept mapping techniques to improve students' descriptive writing skills. The results of reading assessment Cycle 1 showed that students' average score improved to 7.35 points, an increase of 11.27%, which means mind mapping technique played important role in improving reading skills.

At the same time, the results of this study were highly consistent with Khatimah and Rachman (2018), who argued that mind mapping techniques improved students' reading and writing skills.

4.3 Zhe Jiang University Students' Perceptions on the Use of MMT in ERC

Based on semi-structured interviews of the study, it was easy to conclude the perceptions of Zhe Jiang University students on the use of mind mapping technique in EFL reading comprehension.

Judged from semi-structured interviews, almost all students used little or no mind mapping in reading comprehension, ninety percent of students don't initiate mind map-related conversations. Most students did not agree that the use of mind mapping was a waste of time, and they thought that the school should introduce relevant courses when appropriate. Most students affirmed that mind mapping was useful for reading comprehension. Participants generally believed that mind mapping could simplify the text, discovered the details of the article faster, helped them quickly found the center of the article, reduced the time to do problems, and helped students quickly master knowledge. MMT helped students build a framework of ideas and gave students effective help in learning. Most students found the use of MMT in ERC to be efficient, convenient, fun and useful and thus can help develop their own learning style. However, to some extent, some participants believed that it was hard to get used to using mind maps for reading comprehension. There were several reasons why they found it difficult to use. First, they cite a lack of imagination as the biggest hindrance. Therefore,

it was somewhat difficult to adapt to the suitability of mind mapping in the initial stage.

The study's findings on participants' perceptions on the use of mind mapping technique in EFL reading comprehension was similar to those of Puspitasari, E. (2020). The research results in the article showed that through repeated reading, selection of basic information, classification and organization of information, identification of relationships between concepts, and mind mapping training through the steps of visual arts and key words presentation, all participants admitted that their understanding of the material discussed in class had improved. Mind mapping had a positive impact on students' reading comprehension. The author suggests using MMT as an alternative method for reading comprehension, encouraged English teachers to use mind mapping in classroom teaching of reading comprehension, and encouraged students to use mind mapping for independent training of reading comprehension accuracy and extensive reading.

5. CONCLUSION

The study's results supported the notion that Zhe Jiang University students held positive beliefs and perceptions of the use of MMT in ERC. With a focus of reading acquisition, this study looked at the beliefs and perceptions of students on the use of MMT in ERC. The results of a review of related research and empirical data showed that applying mind mapping technique in EFL reading comprehension could be good among Zhe Jiang University first-year English major students. It could be inferred that students may have a good learning experience with mind mapping in English reading. It was advised that teachers and educational institutions could increase opportunities to help students access mind mapping because many students needed more opportunities to get familiar with mind mapping technique.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX A

RESPONDENT'S CONSENT FORM

FORM : RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. Study Title :

2. Introduction

3. What will participants have to do?

4. Who should not participate in the study?

5. What will be the benefits of the study:

(a) To Participants as the Subject?

6. What are the Possible Risks to Participants?

7. Will The Information that Participants Provide and Participants Identity Remain Confidential?

8. Who should Participants Contact if Participants Have Additional Questions during the Course of the Research?

9. Consent

I ………………………………… Identity Card No. ……………………………
address…………………………………………………………………………………………………...
…………………………………………………..hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature ……..……………………. Signature ……..……………………….
                        (Witness)   (Respondent)

Date :…………………………….…… Name :……………………………….…..

I/C No. :…………………………….…….

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date ……..…………………….…… Signature ……..………………………….

(Researcher)

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