The Perceived Effectiveness of Digital Mind Mapping Technique in Reading English Texts

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ABSTRACT

The integration of the digital mind mapping technique has contributed to reading comprehension by providing a multifunctional organizer for the learners. This study aimed to examine the perceived effectiveness of mind maps in reading English texts in a distance education setting. 90 students from the departments of Turkish Language Teaching and Classroom Teaching at a state university in Turkey voluntarily participated in the study. For the collection of data, participants primarily focused on English texts with mind maps during 8 weeks of implementation. After this process, the data were collected through an online questionnaire about the effectiveness of using mind maps in reading English texts as perceived by the learners. Some of the participants (n=10) were also interviewed about their perceptions on using mind maps in English classes. The data were analysed through descriptive statistics and content analysis. According to the findings, the mind mapping technique proved to be effective, helpful, beneficial, and motivating as perceived by the learners. Moreover, visuals in the maps were reported to aid in recalling information. The study also offers some implications pertinent to using mind mapping technique for promoting reading skills and comprehension in English texts.

Key words: *English as a foreign language, mind mapping, reading comprehension*

INTRODUCTION

Reading comprehension has been an issue of great concern among researchers and practitioners who seek ways for improving the reading performance of learners. As a complex cognitive process, reading comprehension involves multidimensional components that serve to derive meaning from a given text (Meniado, 2016). It is influenced by varied components such as the knowledge of vocabulary and grammar, background information, the metacognitive awareness of the readers, and strategies for reading (Koda, 2007). As modelled by Carnine et al. (1990), comprehension is attained at different levels in reading. Primary-level learners are liable to attain literal comprehension, sequencing information, and summarizing. On the other hand, intermediate-level learners tend to make inferences, comprehend sentences, and read for critical analysis. This distinction causes teachers and learners to direct their views on different tracks to pursue.

An essential aspect that is believed to procure reading comprehension is the concept of schemata elaborated with the Schema Theory that deals with how knowledge is structured in the brain (Sadoski, 2005). What is directed by schema theory is that as individuals learn some form of information, they tend to associate that information with another form in memory that helps them connote that information (Lambe, 2017). In reading, readers are initially expected to make inferences and form hypotheses on what they read by using their schemata and previous information about the content. Later, they continue reading to confirm their inferences and theories (Lambe, 2017). Schema theory deals with the process of text assimilation, making inferences, and remembering the text (Anderson & Pearson, 1984). According to An (2013), signalling a certain schema, specific words, and vocabulary items or the title of a text can be highly suggestive, and "all kinds of knowledge can be grouped into some certain units and the building blocks of cognition" (p.132). As a framework with slots to be filled with information (Sadoski et al., 1991), schema strategy is significant in enhancing reading comprehension (Yan & Kim, 2023). According to Sadoski et al. (1991), schema theory takes attention to two essential aspects of reading: "the constructive nature of comprehension and the crucial role of the reader's prior knowledge in that construction" (p. 465). Hence, focusing on areas that promote motivation and understanding in reading will direct readers, practitioners, and researchers; since reading comprehension is a significant aspect in improving the language skills of foreign language learners (Meniado, 2016). Using digital mind maps as a metacognitive tool for English as a foreign language (EFL) learners to connect text and previous schemata through constructing a visual framework proved to be promising in increasing reading comprehension (Yan and Kim, 2023). As one of the most influential graphic organizers, mind maps have a great potential to foster reading comprehension (Tatipang et al., 2021), using "line thickness, colours, pictures or diagrams" (Davies, 2011, p. 280). Within this framework, mind mapping is defined as "a creative and effective means of note-taking that literally 'maps out'" the thoughts (Buzan & Buzan, 2003, p. 15). Unlike other traditional note-taking techniques, mind mapping focuses on important keywords and directs clear links between them (Shi, et al., 2022). Through a combination of visual items of image, color, and keywords, mind maps visually stimulate learning (Biktimirov & Nilson, 2006) rather than traditional note-taking that tends to be linear and monochrome (Buzan & Buzan, 2003). In mind mapping, an image representing the major topic is placed at the centre of a mind map that is extended by other minor branches that represent the subheadings with smaller attached branches (Meier, 2007; Shi, et al., 2022). What is more, comprising a set of related concepts, mind maps allow any idea to be linked to any other ideas or information (Davies, 2011).

Several studies have focused on the effectiveness of integrating mind maps in improving the reading comprehension of foreign language learners (Malekzadeh & Bayat, 2015; Sabbah, 2015; Tatipang, et al., 2021; Zhang, 2018). Yet, this area needs more focus to reveal the effect of mind mapping in reading comprehension at distinct levels and different settings in English as a foreign language learning and teaching. Following these premises, this study aims to examine the perceived effectiveness of higher education levels of EFL learners in reading comprehension in a non-native online education setting. To further the study, the following research questions were directed:

1- What is the agreement level of learners on using of mind mapping technique in reading English texts?

2- What is the agreement level of learners on visuals in mind maps in English reading texts?

3- What are the learners' perceptions about using the mind mapping technique in reading an English text?

REVIEW OF LITERATURE

Reading comprehension

Reading comprehension is an essential part of the reading act to understand what is implied or given in a reading text (Meniado, 2016) and it addresses both students and professionals (Al Noursi, 2014). Some individual factors affect the reading performance of the learners such as learners' motivation and attitude towards reading, efficient instruction for comprehension in reading, ample vocabulary, fluency in reading, text structure, and tendency towards different genres (Trehearne & Doctorow, 2005). Nergis (2013) encompasses that learners' reading performance is affected by their knowledge of vocabulary, and metacognitive and syntactic awareness. In a similar vein, psychological factors may have a great impact on reading motivation. Considering this effect, Hermosa (2002) noted that as positive reinforcements affect reading motivation, engaging learners with motivating reading activities will arouse reading passion and improve comprehension in reading. Analysing the patterns in reading, Lambe (2017) designated a process of comprehension in reading covering 3 related elements. These are "reader's prior experiences to understand the message that relates to schema theory, the interaction reader and text associates to metacognitive theory, and the text in facilitating reading links to the text structure theory" (p.268). Based on this designation, these aspects need to be considered in combination for improving reading skills and enhancing the comprehension of the learners.

Mind mapping strategy

As the prevalence of technological tools increases in the educational fields, computer-assisted language teaching has also become popular in language classes. Similarly, computer-based generation of learning and teaching tools have opted for their promising contributions to language education. In this sense, software programs are commonly used to generate ideas and information in a much more eligible way through graphic organizer tools such as concept maps (Chang, et al., 2002; Furtado, et al., 2019; Liu et al., 2009), mind maps (Davies, 2011; Tatipang, et al., 2021), or semantic maps (Udaya, 2021). Compared to concept mapping which involves a hierarchical structure and relational phrases to help understand the relationship between sorts of information (Davies, 2011), mind mapping is distinguished by its representation of a central theme revolving around diagrams or other visuals to assist in recalling information (Kusmaningrum, 2016; Malekzadeh & Bayat, 2015; Sabbah, 2015; Shi, et al., 2022; Yan and Kim, 2023).

As displayed by Davies (2011), the reason for integrating an organizing technique lies behind the fact that if learners can puzzle out "a complex set of relationships in a diagram", they will comprehend and analyse the relationship between these components (p. 280). Next, it is also stated that maps are found to be more facilitating compared to verbal or written descriptions and learners got engaged which leads to learning (Davies, 2011). Another aim of forming mind maps

is to make associations across ideas which also causes them to be named "association maps" (Davies, 2011, p. 280).

Originally, the concept of mind maps was first coined by Buzan in the 1960s. It was used as a graphic organizer for representing abstract ideas and information to facilitate thinking and learning (Zhang, 2018). In other words, they are just like route maps that allow learners to organize facts and ideas to operate as knowledge in the brain (Buzan & Buzan, 2003). To make this operation clear, the Dual Coding Theory posits a distinction between verbal and nonverbal codes and explains how information is encoded and retrieved (Davies, 2011) Additional acoustical or visual processing also facilitates memory retention at the sensory level (Brown & Perry, 1991). In this regard, Paivio and Descrochers (1980) explain how cognitive activity is mediated by encoding, organising, storing, and retaining information concerning the imagery system and the verbal system. While verbal code deals with the verbal representation of the language items, nonverbal codes cover the representation of nonverbal forms such as mental imagery (Sadoski, 2005). Through mind mapping, the knowledge is represented by organizing it in a network or diagram that incorporates verbal and symbolic elements in schemas (Liu et al., 2014). The information is represented in a visual and nonlinear way (Biktimirov & Nilson, 2006). Through mind mapping, any kind of detailed information can be highly organized in memorable forms of diagrams (Buzan & Buzan, 2003). Moreover, mind mapping can help learners organize and clarify ideas (Tee et al., 2014), to study more efficiently, and to save time (Buzan & Buzan, 2003). The reason that lies behind the effectiveness of mind mapping in recalling information can also be attributed to the visual recognition of the brain (Buzan &Buzan, 2003).

An important aspect of mind mapping is that it evinces thoughts and information in an organised way of representing the interconnections between them (Zhang, 2018). As identified by Linse (2005), these organizers are helpful drafts for improving comprehension. Used in a variety of contexts, mind mapping is preferred to represent knowledge and ideas on a specific theme or topic (Meier, 2007). When accompanied by a mind map draft, a reading text can be more motivating for readers to understand the flow of the events or information in the given text (Tatipang et al., 2021). Furthermore, improving learning conditions, and mind maps make the learning process more productive and help users to save time (Liu et al., 2014). As a note-taking technique, a mind map is identified as the easiest way to absorb information and remember it when necessary (Buzan & Buzan, 2003). One essential aspect of mind mapping is that it can be designed both by paper and pencil and by computer software (Nebojsa et al., 2011) that allows users to design multi-functional mind maps to sort ideas, notes, information, and knowledge.

Several studies yielded promising results with regard to the effectiveness of mind mapping in improving reading comprehension, overcoming problems in reading comprehension, and making the lesson more interesting (Tatipang et al., 2021). Regarding this point, generating mind maps as a metacognitive aid in the comprehension of a reading text also yielded promising results in EFL reading instruction (Sabbah, 2015; Shi et al., 2022; Yan & Kim, 2023). Within this scope, mind maps are preferred not only for improving reading skill, but also for improving learners' writing performance (Kusmaningrum, 2016; Zhang, 2018) and cognitive achievement (Shi et al., 2022). Using the meta-analysis of 21 research studies, Shi et al., (2022) investigated the effectiveness of mind mapping-based instruction on learners' learning outcomes compared to conventional instruction. The results showed that mind mapping-based instruction had a more positive effect on learners' cognitive learning outcomes than the latter one. The results also figured that for the effectiveness of mind mapping-based instruction, the subject matter and the educational level were essential. Malekzadeh and Bayat (2015) examined the effectiveness of mind mapping

in enhancing the reading comprehension of English L2 learners. Using a quasi-experimental design, the researchers examined the test scores of two groups of learners with an experimental group who took mind mapping as a treatment and the control group with no treatment. The results proved the effectiveness of the mind-mapping strategy in enhancing learners' reading comprehension.

Sabbah (2015) explored the influence of ESL learners' self-formed mind maps designed through computer software. The study also investigated the attitudes of learners in designing mind maps. Employing a quasi-experimental pre-test and post-test design in which the experimental group self-generated computerized mind maps for reading texts by the learners, whereas the control group was taught through teacher-generated whiteboard maps. The results showed significance in favour of the experimental group. The results of the questionnaire which was conducted to identify the attitudes of the learners in the experimental group revealed that learners found designing computerized mind maps enthusiastic and satisfying for their neuro-linguistic needs. They also expressed that using colors and different shapes facilitated their understanding of the connections between the ideas and the details given in the reading texts.

METHODOLOGY

Research Design

In the study, a mixed-method research design was employed to confirm the reliability and to provide a more complete understanding of the research problems (Creswell, 2014). For the quantitative data collection, a questionnaire with 19 items was conducted and for the qualitative procedure, semi-structured interviews were operated with 10 of the participants.

Sample

The sample of this study consisted of 90 EFL learners (F=64; M=26) aged between 19-21 determined by purposeful sampling (Creswell, 2007). The learners were 1st-grade students, enrolled at the department of Turkish Language Teaching (*n*=44) and Classroom Teaching (*n*=46) at an Education Faculty in a state university in Türkiye. The participants were A1-level English learners with native Turkish Language backgrounds and they all consented to take part in the study. 10 of the participants (F=7; M=3) were also interviewed to confirm the reliability of the quantitative data.

Instrument

For the quantitative data collection, an online questionnaire involving attitudinal questions was applied to the participants (Dewaele, 2018). The questionnaire was generated by the researcher in consideration of the recommendations in Dörnyei (2007). It consisted of 19 items with 3 parts: Part 1 involved questions 1-3 that focused on participants' demographic information for participants' gender, age, and department; part 2 covered learners' beliefs about the effectiveness of mind mapping technique in reading English texts with questions 4-13 (α = .92) and part 3 involved 6 items examining learners' beliefs about the effectiveness of visuals in mind maps (α = .80). Each values for Cronbach's Alpha for the questionnaire displayed a high internal consistency. These items in the second part were designed in a 5-point- Likert scale form involving options 'completely agree', 'agree', 'neutral', 'disagree', and 'completely disagree'. For content validity, the questionnaire was pilot tested on a subset of intended respondents to collect preliminary data

(Rattray and Jones, 2007) and some minor changes such as rephrasing and ordering of the items were made.

The qualitative data collection involved semi-structured interviews. The interview questions focused on learners' ideas on the use and perceived effectiveness of mind-mapping techniques in reading English texts. There were 4 questions that asked participants to report their ideas 1) on using mind mapping techniques in reading English texts; 2) whether they suggest designing mind maps in reading text to improve understanding in a given text; 3) the advantages and disadvantageous of forming mind maps; 4) their ideas on the effectiveness of designing their own mind maps for a reading text. The interview was conducted through phone calls as the education process was maintained through distance learning for English courses at the higher education level in Türkiye. Participants consented to be interviewed and shared their phone numbers to be contacted. The interviews took approximately 5 minutes. Figure 1 below depicts the process of data collection.
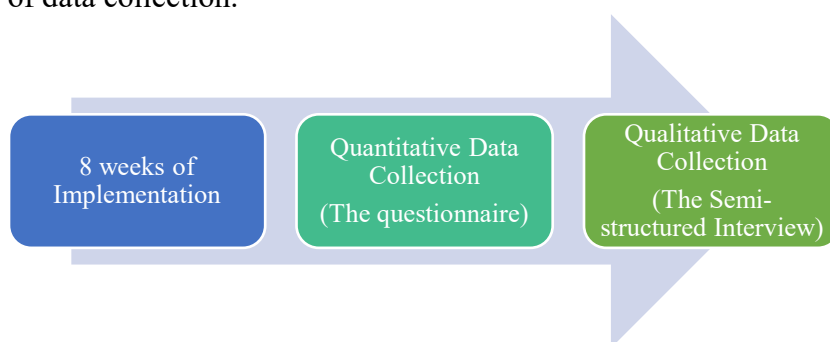

Figure 1. Data Collection Process

Data Analysis

For the quantitative data analysis, descriptive and frequency statistics were conducted through SPSS 21. The descriptive statistics such as frequency, percentage, and mean values were used for the data description of the learners' perception toward the perceived level of effectiveness of using the mind mapping technique in reading English texts. The qualitative data analysis was followed by reflecting quotations based on each interview question through content analysis.

Mind maps

For each reading text a mind map that shows the association of information in the reading texts was designed by the researcher through an online program. The program enables the users to add image, note, comment, hyperlink, equation, and sticker on the maps. During the implementation, the mind maps were reflected on the same page of the reading texts to provide learners examine the visuals, graphics, and connections in the maps. Each mind map involved a synthesis of the texts displaying brief explanations and keywords of the characters, events, time, and place in each reading text. A sample of a mind map used for one of the reading texts is given in Appendix A.

Procedure

The implementation process was conducted through a distance education program which has been officially used by the university of the research conducted. To determine the effectiveness

of the mind mapping technique in reading text in learning EFL classes, learners applied reading sessions with mind maps designed for reading texts with an average of 125 words. The reading sessions were conducted each week at the second class hour allocated for learners' English classes based on their schedule and took approximately 10 minutes to read the text and 5 minutes to answer the comprehension questions. The reading texts were selected from an A1 level English course book and workbook and for each text, 5 questions measuring the reading comprehension of the learners were prepared. During the implementation, the researcher as the learners' English instructor read along the texts that were supplemented with mind maps that summarised the content of each text. Later learners took an online test with a maximum of 5 minutes to complete it. Finally, the results were checked. After completing 8 weeks of implementation, learners were sent a questionnaire link on an online form. After data collection at this phase, participants were asked whether they would like to be interviewed on the use and effectiveness of mind mapping. 10 of the students consented to take part and shared their telephone numbers to be contacted. Respondents were interviewed through phone calls that were recorded by the researcher to analyse data. Each respondent in the interview was assigned numbers and their responses were transcribed by the researcher. Though the interview was administered in the native language of the participants, the responses were translated into English by the researcher. After the data collection, quantitative and qualitative findings were analysed in succession. The process of the implementation of reading English texts with mind maps is displayed in figure 2 below.
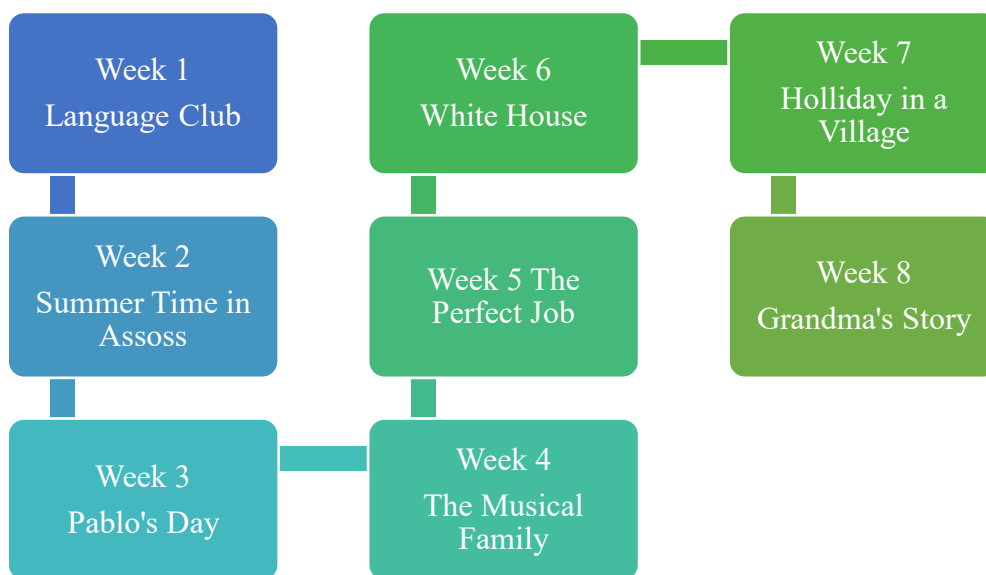

Figure 2. The process of implementing English reading texts

FINDINGS

To examine the agreement level of learners on using mind mapping technique in reading comprehension, the results were analysed. Table 1 below shows the results of participants' agreement on using mind mapping technique in English text.

Table 1. Results of participants' agreement on using mind mapping technique in EFL reading

Statement		Strongly Agree			Agree		Neutral		Disagree		Strongly Disagree	
		Mean	f	%	f	%	f	%	f	%	f	%
1	Mind maps in reading English texts help me understand the texts better.	4,32	40	44,4	40	44,4	-	-	9	10	1	1,1
2	Reading English texts with mind maps are more effective in reading comprehension.	4,35	39	43,3	45	50	-	-	5	5,6	1	1,1
3	Mind maps in reading English texts motivate me in reading.	4,04	29	32,2	40	44,4	-	-	17	18,9	4	4,4
4	Reading English texts with mind maps help me score better in reading comprehension tests.	4,30	37	41,1	44	48,9	-	-	8	8,9	1	1,1
5	I prefer reading English texts with mind maps rather than texts without mind maps.	4,14	37	41,1	36	40	11	12,2	5	5,6	1	1,1
6	I feel relaxed when studying on English texts with mind maps.	4,20	31	34,2	48	53,3	-	-	9	10	2	2,2
7	Mind maps in reading texts help me improve my English.	4,14	32	35,6	43	47,8	-	-	11	12,2	4	4,4
8	Reading English texts with mind maps help me build English vocabulary.	4,07	30	33,3	42	46,7	15	16,7	1	1,1	2	2,2
9	Reading English texts with mind maps help me improve my reading skill.	4,04	30	33,3	40	44,4	16	17,8	2	2,2	2	2,2
10	Mind maps in reading texts affect reading English texts positively.	4,28	35	38,9	46	51,1	9	10	-	-	-	-

As shown in the table above, more than half of the learners agreed on the idea that mind maps in reading English texts help them understand the texts better (M=4,32), motivate them in reading (M=4,04). Most of the participants also revealed that reading English texts with mind maps is more effective in reading comprehension (M=4,35) and helps them score better in reading comprehension tests (M=4,30). It was also found that the level of learners' preference for reading English texts with mind maps rather than texts without mind maps was high (M=4,14). In addition, it was revealed that a great deal of participants feels relaxed when studying English texts with mind maps (M=4,20) and they think that mind maps in reading texts help them improve their English as an L2 (M=4,14). Moreover, as reflected by the majority of the participants, reading English texts with mind maps help them build English vocabulary (M=4,07), improve their reading skill (M= 4,04), and affect their reading English texts positively (M=4,28).

The findings in relation to the agreement level of learners on visuals in mind maps in English reading texts, the results are as follows:

Table 2. The agreement level of learners on visuals in mind maps in English reading texts

	Statement	Mean	Strongly Agree		Agree		Neutral		disagree		Strongly disagree	
			f	%	f	%	f	%	f	%	f	%
1	Visuals and graphics in mind maps help me understand the reading text.	4,25	33	36,7	47	52,2	10	11,1	-	-	-	-
2	I examine visuals and graphics for better comprehension in an English reading text.	4,17	35	38,9	40	44,4	11	12,2	4	4,4	-	-
3	Visuals and graphics enable me to associate the events and information in an English reading text.	4,33	39	43,3	43	47,8	7	7,8	1	1,1	-	-
4	Visuals in mind maps in reading English texts facilitate reading comprehension.	4,34	38	42,2	47	52,2	-	-	2	2,2	3	3,3
5	Visuals in with mind maps arouse my interest.	4,11	35	38,9	38	42,2	10	11,1	6	6,7	1	1,1
6	Visuals in mind maps help me remember the information in the text.	4,28	35	38,9	46	51,1	9	10	-	-	-	-

As demonstrated in the results of the items related to visuals and graphics in mind maps, it was found that the majority of the participants (M=4,25) agreed that visuals and graphics in mind maps help learners understand the reading text. The participants also reflected a high level of agreement (M=4,33) upon the idea that mind maps enable them to associate the events and information in the reading text. It was also found that more than half of the participants (M=4,28) agreed with the idea that reading texts involving mind maps helps them remember the information in the text. In examining visuals and graphics for better comprehension of the reading texts, the greater part of the participants (M=4,17) agreed to reveal that they examine mind maps and graphics for better comprehension. Most of the participants agreed that visuals in mind maps facilitate their reading comprehension (M=4,34) and arouse their interest in reading English texts (M=4,11).

With reference to the learners' perceptions about using the mind mapping technique in reading an English text in distance education, 9% of the participants were interviewed. Regarding the first interview question that asked participants to share their ideas on using mind mapping techniques in online English classes, all of the respondents (100%) reflected that they think that mind mapping technique in reading sessions in English classes was helpful for their understanding of the text and for performing better in the reading tests. Some of the participants emphasized that a complicated reading text can be easier to comprehend with a mind map illustration. As reported by P1:

'Mind maps facilitate understanding the reading text. It becomes easier with the keywords in the maps, they are like clues that help us remember the information in the text'.
On the same issue, P3 stated that
'A complicated reading text becomes basic to understand through mind maps. It works for me when I understand what people are doing, who they are, etc.'.
As reflected by P9,

> *'Sometimes I cannot understand what is happening in a text. But when I examine the information given in the mind maps, it becomes easier to associate ideas and knowledge given in the text.'*

In response to the second interview question, participants suggested that it would be more effective to understand a reading text if course books also involved mind maps for the texts. P3 suggested that

> *'I think it will be facilitating and motivating in reading. It is hard for me to understand a text without clues and short descriptions or figures. For example, I can make inferences when I examine the mind maps.'*

P4 stated that

> *'Reading texts with mind maps is more comprehensible and interesting to me. Visuals are more effective, I think. Some other texts should also involve mind maps. It is more effective to understand the text and it serves as a promoter. Sometimes, I get distracted by the characters, who they were, what they were doing or did, etc. I can forget the time and place of the events. It is efficient when I examine the mind maps in reading texts.'*

P6 explained that

> *'Mind maps are just like the syntheses of the reading text that help me understand the gist of the events. They not only improve my visual memory but prevent me to forget what I read in a text. So, they keep the information permanent in my mind. It would be helpful if all English texts and passages involve graphics or tables or maps we use in English classes.'*

The third interview question asked participants to reflect on their ideas on the pros and cons of using mind maps given in a reading text. The participants did not utter any disadvantages. They commonly emphasized the beneficial points of mind maps in a reading text. On this issue, P2 addressed that:

> *'Mind maps are like the summary of the text and they present unequivocal information. So I commonly direct my attention to mind maps in the texts and it is more useful this way.*

P1 remarked that mind mapping in a reading text is useful sharing that,

> *'They help us understand the essential points that go unnoticed. Thus, since mind maps involve visuals, graphic organizers, and maps, I find them beneficial and understandable compared to traditional texts.*

P10 focused on her own experiences with drawing mind maps stating that,

> *'I used to underline the important points while reading an English text. When I noticed that I can also draw maps, it became more understandable to me. It was difficult when I searched for the information underlined, now I just gaze at the mind maps and can easily find what I look for.*

The last interview question addressed participants to elicit their ideas on preparing their mind maps for reading comprehension. P5 reported that:

> *'I don't draw mind maps when reading, but it would be more helpful if I did. Moreover, if course books involved mind maps in reading parts, it would be more effective for us to understand and analyse the information given in the text.'*

P7 stated that it would be effective to emphasize the important points in a text.

> *'It would be catchy for me to remember since we note it ourselves. It may also improve our understanding of the events in the text. Briefly, it can help us analyse the text.'*

On the same issue, P8 governed the idea that:

'It is sometimes boring with traditional reading texts and as mind maps have graphics, visuals, etc. it takes my attention. I sometimes draw clouds on the page and note important points in the text. Then reading becomes more interesting and I can easily get engaged in the reading activity.'

DISCUSSION

1- What is the agreement level of learners on using of mind mapping technique in reading English texts?

As demonstrated in the findings, the majority of the learners agreed upon the idea that mind maps in reading English texts help them understand the text better, improve their English level and reading skills, and build English vocabulary. Moreover, it was also found that mind maps facilitate their comprehension since they are more effective in reading comprehension compared to traditional texts without mind maps and in performing reading tests. Furthermore, it was demonstrated that mind maps spark their interest in reading and they feel more relaxed when reading English texts with mind maps. These findings are in line with the descriptions in the literature about using mind maps in improving reading performance and reading comprehension of the learners. It was underlined that mind maps have great potential to enhance reading comprehension (Linse, 2005; Tatipang et al., 2021) and to consolidate learners' knowledge (Liu et al., 2014). Moreover, it was implicated that mind maps are highly suggestive in improving the reading comprehension of EFL learners (Sabbah, 2015; Shi et al., 2022; Yan &Kim, 2023). As identified by Hermose (2002), engaging learners with motivating reading activities will instigate learners in reading and will enhance comprehension of reading. On this ground, designing reading activities with mind maps will greatly contribute to learners' understanding of the given text and perform better in activities.

2- What is the agreement level of learners on visuals in mind maps pertaining to English reading texts?

The findings on this aspect revealed that learners think that visuals and graphics in mind maps most often help them understand the reading text and associate the information in the reading text with other forms of knowledge given in the texts. Moreover, it was figured out that visuals in mind maps arouse learners' interest. As previously explained, focusing on important keywords and directing associations between them (Shi, et al., 2022), mind maps visually stimulate (Biktimirov & Nilson, 2006) and facilitate (Davies, 2011) learning compared to traditional note-taking. As stated by Davies (2011), the reason for providing information in an organized way enables readers to analyse the relationship between the components. As helpful drafts for increasing comprehension (Linse, 2005), these organizers represent the interconnections across thoughts, ideas, and knowledge (Liu et al., 2014; Meier, 2007; Zhang, 2018). This representation can be visual or in a nonlinear way (Biktimirov & Nilson, 2006) and it also allows readers to focus on key components in a reading text (Meier, 2007). The results also reflected that the level of examining visuals and graphics for better comprehension proved to be high. With reference to this point, it is essential to consider that mind maps are also used as a visual aid to discuss key

components or tasks of projects (Meier, 2007). Commonly mind maps originate from the centre and use links, symbols, words, and images. This illustration gets readers' attention on certain areas in the text and helps them focus on reading or other activities in reading. This was also emphasized by Sabbah (2015) addressing that colours and different shapes in mind maps have a facilitating role in building the links between the ideas and the details given in the reading texts.

3- What are the learners' perceptions about using the mind mapping technique in reading an English text?

With reference to the learners' perceptions about using mind-mapping technique in reading an English text in distance education, the interviewees shared their ideas and perceptions on using mind-mapping techniques in English classes through distance education. They reflected that the mind mapping technique in reading sessions in English classes was helpful for their understanding of the text and performing better in the reading tests. As stated by Buzan and Buzan (2003), mind mapping can be labelled as the easiest way to absorb information and remember it when necessary. This can be attributed to the significance of visuals in the maps that enable noticing and recalling of information (Buzan & Buzan, 2003). As stated by Linse (2005) mind maps help increase comprehension. One important efficacy of this form of information is that these organizers may help learners clarify ideas (Tee et al., 2014), study more efficiently, and save time (Buzan & Buzan, 2003).

Some of the participants also emphasized the importance of mind maps, especially with complicated reading texts that serve as keywords and clues to understand and remember the information in the text stating that it becomes more basic and easier to associate ideas and knowledge given in the text. This finding is confirmed by the fact that the content of a mind map on a particular theme or topic is visually presented in an organised way and the information relating to important points in the map is illustrated through links, symbols, words, and images which lead the reader to understand the content in a better way (Biktimirov & Nilson, 2006). Hence, through mind mapping, the visual recognition of the brain is activated which results in more effective outcomes in terms of reading comprehension (Buzan & Buzan, 2003).

It was also offered that it would be more effective, facilitating, and motivating if course books also involved mind maps for the reading passages. Mind mapping is undoubtedly a multifunctional technique allowing users to map ideas, notes, information, and inferences and mind maps can be designed both by paper and pencil and by computer software (Nebojsa et al., 2011). Hence, course books can also involve mind map templates for inserting information related to the prompts given in a text activity.

The respondents also focused on the effectiveness of mind maps in terms of visuals that help them remember the components in the text. They also stated that mind maps enable them to make inferences about the events and to make an analysis of the most important units in the text. Furthermore, respondents reflected that in presenting unequivocal information, mind maps are like the summary of information in the text and they can notice the apperceived points in the text. Due to the fact that mind maps consist of visuals, graphic organizers, and maps, learners clarified that they find mind maps beneficial and understandable (Biktimirov & Nilson, 2006). They also manifested that mind maps improve their visual memory and help them store information and remember what they read in a text. It is remarkable that mind mapping can consolidate learners' knowledge and reduces the working memory load and may help learners to remember the knowledge in a clearer way (Liu et al., 2014). As an important step to grasp what is implied or

given in a reading text, some information should be stored in readers' minds. In this step, mind mapping shapes the information like a map in which the whole text can be broken into smaller units to enhance understanding (Tatipang et al., 2021).

CONCLUSION

This study aimed to examine the perceived effectiveness of using mind mapping strategy in improving the reading comprehension of EFL learners. The results confirmed that the mind mapping strategy was found to be effective in improving reading comprehension and performance as perceived by the participants. Reading texts with mind maps proved to be helpful, beneficial, interesting, and motivating as addressed by the participants. Moreover, the visuals and graphics were reported to help recall the information. Learners revealed that visuals and graphics in mind maps most often help them understand the reading text and associate the information in the reading text with other forms of knowledge given in the texts. One of the primary advantages of mind maps in reading texts was found to be its effectiveness in presenting significant information through keywords and associations of ideas and information. The additional advantage of using the mind mapping strategy in reading English texts was that it would be helpful if they also prepared their own mind maps relating to the text. Therefore, as concluded, involving templates for mind mapping in course books can pave the way for challenges in designing learners' maps of ideas and information given in a text. Following these premises, it is suggested that mind maps can be used to promote learner participation in reading, improve reading comprehension and help them perform better in reading tasks. Furthermore, mind maps will help learners understand the text better and retrieve information easily, make associations across ideas and information, and utilize visuals to activate their noticing and recall of information. It is also offered that course book designers may consider the integration of mind maps or templates for mind maps for students to engage them during reading.

LIMITATIONS

This study was conducted with 90 students of EFL learners at the higher education level. Maintaining a similar focus with more participants and at different levels of foreign language learners may produce more eligible results. Besides, this study examined the effectiveness of mind mapping strategy as perceived by the learners. Through different sets of research design that examine the performance of learners through mind maps, more analytical data can be obtained. As a last note, the implementation of the study was maintained through distance education. In this context, it is worthwhile to consider the potential benefits of learners' designing their own mind maps, particularly in a face-to-face learning environment.
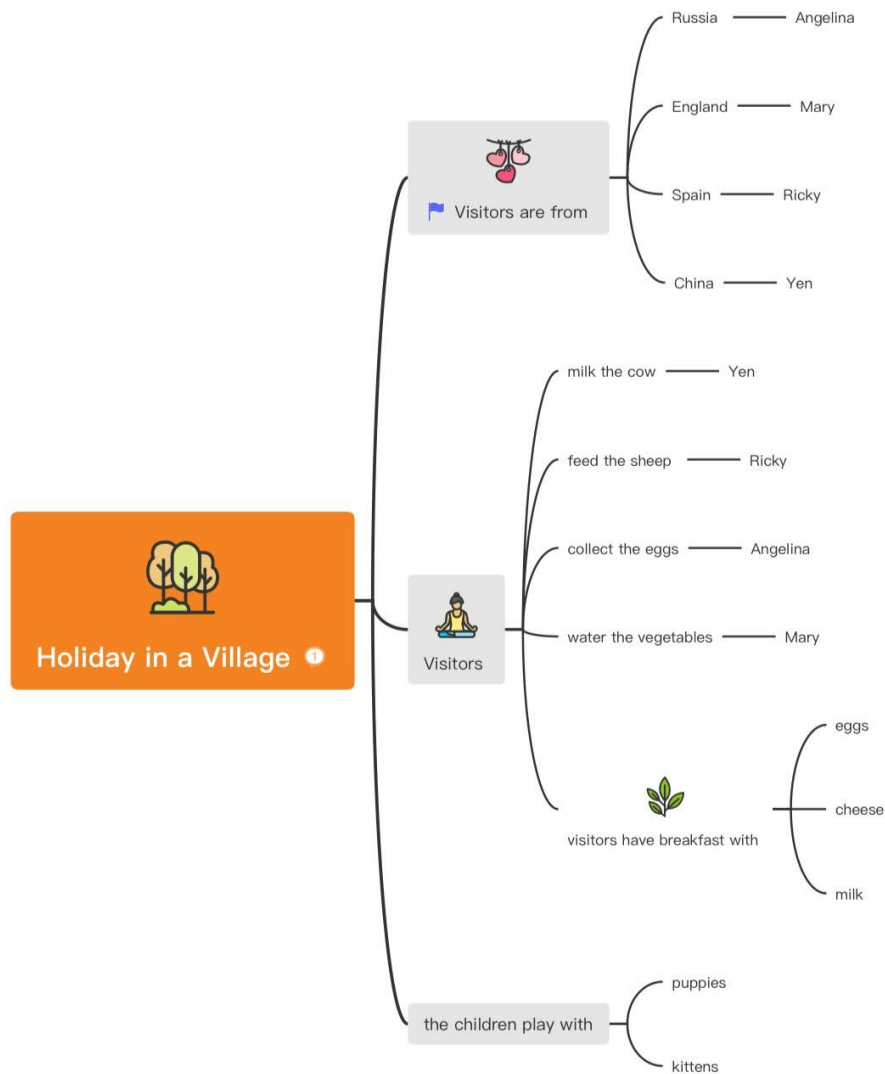
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Appendix A


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                                                Russia ———— Angelina

                                                England ———— Mary
                        🏴 Visitors are from
                                                Spain ———— Ricky

                                                China ———— Yen


                                                milk the cow ——— Yen

                                                feed the sheep ——— Ricky

                                                collect the eggs ——— Angelina
Holiday in a Village ⓘ       Visitors
                                                water the vegetables ——— Mary


                                                        eggs

                                                        cheese
                                 visitors have breakfast with
                                                        milk


                                                puppies
              the children play with
                                                kittens
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