

IMPROVING EFL LEARNERS' READING COMPREHENSION THROUGH MIND MAPPING: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

This study investigates the implementation of the Mind Mapping method to improve reading comprehension among eleventh-grade students at SMAN 5 Palu. The purpose of this study is to examine the effect of mind mapping on students' reading comprehension. A quantitative experimental design was employed, with the sample divided into two groups: an experimental group of 35 students taught using the mind mapping method and a control group of 31 students taught through conventional instruction. Pre-tests and post-tests were administered, and the results showed that students taught using mind mapping had better reading comprehension. The data analysis indicated that the mean pre-test score of the experimental group was 46 and the control group 51, which increased after the intervention to 75 for the experimental group and 61 for the control group. An independent sample t-test was conducted, resulting in a t-count of 7.261 compared to a t-table value of 1.997, with 64 degrees of freedom and a significance level of 0.05. Since the t-count exceeds the t-table, the hypothesis is accepted. These findings demonstrate that mind mapping is effective in enhancing reading comprehension, and English teachers are recommended to apply this technique as an easy and effective strategy to help students understand texts

Keywords: Mind Mapping Method, Reading Comprehension, Reading Skills

INTRODUCTION

Reading is one of the four essential language skills taught in English language learning, besides listening, speaking, and writing. As a receptive skill, reading enables students to obtain information, construct meaning from written texts, and strengthen their overall language proficiency. Reading is one of the most important skills for learners because it is required to achieve success in English classes as well as other subjects that use English written materials (Nunan, 2003). Reading comprehension is the process of understanding a reading text that involves thinking, using logic, and processing information with the purpose of obtaining information (Norhayati et al., 2022). Laličić and Dubravac (2021) state that good reading skills contribute directly to academic success in the context of learning a language as a foreign language, because reading provides constant access to written information and text-processing strategies.

In the context of modern learning, studies over the last decade have strengthened the importance of reading strategies and reading interest as determining factors in text comprehension. Martinez, R., and Torres (2023) Reading strategies (such as global strategies, problem-solving, and support strategies) greatly help senior high school students overcome difficulties in understanding English texts because these strategies make learning easier and more transferable. Contemporary research also confirms the importance of reading for students' academic success and cognitive development. students' motivation and interest in reading play an important role in text comprehension (Sutiadiningsih, 2022). Wahyuningsih (2022) through classroom action research, found that the implementation of extensive reading significantly improved the reading comprehension of eleventh-grade students at SMA Negeri 1 Kebomas, which had a positive impact on their academic success.

Although reading is one of the most important language skills, international data show that Indonesian students' reading literacy still faces major challenges. Based on the PISA 2022 results, the average reading literacy score of Indonesian students was only 359 points, placing Indonesia at a low ranking compared with many other countries (OECD, 2023). According to OECD, only a small proportion of Indonesian students reached high levels of reading literacy: almost no students reached Level 5 or above in the PISA 2022 reading test, which indicates limitations in handling complex, abstract, or inferential texts. Other data reinforce this, showing a declining trend in Indonesia's PISA reading scores from the 370s to 358 in 2022, far below the global average (Economy, 2022).

Nationally, low reading literacy in Indonesia is not only an academic issue but is also related to literacy culture. Aspects of "access to reading materials" and "reading habits" (dimensions of literacy culture) are still very low, as reflected in the low national Alibaca Index (Badan Bahasa, 2022). These findings indicate that although students may have access to texts, the reading culture in society (including among students) has not yet developed optimally. In addition, policy analysis highlights that fewer than 50% of students reach the minimum competency in reading literacy, which poses a significant challenge in efforts to improve learning quality and national literacy. In terms of policy, low literacy scores also influence curriculum direction. The Merdeka Curriculum, for example, emphasizes literacy competence and text comprehension as core competencies, but the phenomenon of low PISA scores shows that there is a gap between curriculum expectations and students' actual abilities, meaning that more effective learning interventions are needed to help students develop better comprehension strategies.

SMAN 5 Palu is one of the senior high schools implementing the Merdeka Curriculum, which emphasizes the development of essential competencies, including reading comprehension skills. However, based on observations, the eleventh-grade students at this school still show low reading comprehension skills. Many students experience difficulties in identifying main ideas, understanding implicit information, and drawing accurate conclusions from texts. In the Indonesian EFL context, students often face limited vocabulary, low inferential ability, and a lack of metacognitive strategies. Mind mapping is a

strategy that helps reduce cognitive load, map relationships between ideas, and strengthen both literal and inferential comprehension. Research shows that mind mapping is an effective strategy for improving students' reading comprehension at various educational levels.

Although mind mapping has been widely used to improve reading comprehension, several important research gaps are relevant to this study. First, in terms of educational level, most studies take samples from elementary or lower secondary schools. Karsono (2020) shows that mind mapping is useful for improving reading skills in elementary school. Similarly, this research shows that mind mapping is effective for improving narrative text reading comprehension in junior high school, but there was no control group in that study (Sari et al., 2017). There was also a study using a one-group pre-experimental design on eighth-grade MTs students. In addition, that study did not use a control group, making it difficult to compare the effectiveness of mind mapping with conventional methods (Fadhilah et al., 2025).

Another study shows that mind mapping is effective in improving recount text comprehension for eighth-grade junior high school students. The observation duration was limited, and the study was conducted at the junior high school level, so the results cannot be directly generalized to eleventh-grade senior high school students (Silvia et al., 2022). Dahlani (2019) applied a mind mapping learning model at SDN Bunisari and found a significant improvement in students' reading comprehension. On the other hand, a study testing eleventh-grade senior high school students using mind mapping and semantic mapping showed effects only on narrative text comprehension (Sinambela et al., 2023). Zebua (2022) used mind mapping on narrative texts at a vocational school but only measured overall reading ability. In terms of text types, most studies use narrative texts Aristiawan and Herman (2024) and fable texts (Indriawati, 2023). Regarding learning duration and process, most studies still focus on short interventions involving only one or two teaching sessions. A pre-experimental study in junior high school used only a pre-test and post-test after applying the mind mapping technique, without a long-term design that would allow observation of students' development over time (Rahmaida, R., & Agustina, 2023).

Although mind mapping has been widely used to improve reading comprehension, there are several important research gaps that are relevant to this study. First, in terms of educational level, research designs that use only one class are mostly conducted in elementary or lower secondary schools, and the duration may not be very extensive. Based on the research gaps described earlier, this study aims to improve the reading comprehension ability of eleventh-grade EFL students at SMA Negeri 5 Palu through the application of mind mapping to recount texts. This study also observes students' cognitive processes during the implementation of mind mapping, providing a more comprehensive picture of effective reading instruction strategies in English language classes.

Based on these objectives, this study focuses on one main research question: “Does the application of mind mapping improve the reading comprehension ability of eleventh-grade EFL students at SMA Negeri 5 Palu?” Thus, this study offers significant novelty by examining eleventh-grade EFL students, using mind mapping on recount texts, and exploring students’ cognitive processes through an intervention design with adequate learning duration (more than one meeting) to capture students’ comprehension development over time. This study uses a quasi-experimental design with a control group, providing stronger empirical evidence regarding the effectiveness of mind mapping compared with conventional methods. This study is also expected to make a significant contribution to developing effective reading instruction strategies for EFL students at the senior high school level, as well as strengthening empirical evidence on the effectiveness of mind mapping in the context of English education in Indonesia.

METHODS

This study employed a quasi-experimental design with a quantitative approach to investigate whether the mind mapping technique can improve the reading comprehension skills of eleventh-grade students at SMAN 5 Palu. This design was chosen because the researcher used existing classes without random assignment, making the quasi-experimental approach appropriate. The study involved two groups: the experimental group, which received instruction using the mind mapping technique, and the control group, which received conventional reading instruction. Both groups were administered a pre-test before the treatment and a post-test after the treatment.

The population of this study consisted of all eleventh-grade students at SMAN 5 Palu, totaling 234 students divided into seven classes. The sample was selected using purposive sampling, a technique that involves selecting samples based on specific considerations. Class XI M1 was chosen as the experimental group and Class XI M2 as the control group because both classes demonstrated similar challenges in learning English, particularly in reading comprehension. This consideration ensured that the selected classes were suitable for examining the effect of the mind mapping technique.

The research instrument was a reading comprehension test consisting of 20 items, including 15 multiple-choice questions and 5 essay questions. Each correct answer in the multiple-choice section was scored as 1, while the essay questions were evaluated using a rubric with a score range of 1 to 3 (incorrect answer, correct but grammatically inaccurate answer, and correct and grammatically accurate answer). The items were designed to measure two levels of reading comprehension: literal and inferential comprehension. The instrument development process included material analysis to ensure alignment between the test items and the research objectives.

Data collection was conducted in three stages: pre-test, treatment, and post-test. The pre-test was administered to both groups to measure students’ initial reading comprehension ability. The treatment was given only to the experimental group over six

sessions, each lasting approximately 90 minutes according to the school schedule. During the treatment, students practiced applying the mind mapping technique, which involved identifying main ideas, finding supporting information, and organizing information visually in a structured mind map. The researcher provided examples before students practiced independently. In contrast, the control group received conventional reading instruction without the use of mind mapping. After the treatment period, both groups were given a post-test with a similar format but different items from the pre-test to evaluate improvement in students' abilities.

The data were analyzed using quantitative statistical techniques (Arikunto, 2006). The mean scores were calculated for both the experimental and control groups, followed by the computation of the sum of squared deviations for each group. To determine whether there was a significant difference between the two groups, the study used an independent sample t-test. The t-test results were interpreted using the p-value, which indicated the significance level of the difference in mean scores between the groups. p-value of less than 0.05 was interpreted as a significant difference, while a p-value greater than 0.05 indicated that the difference was not statistically significant.

RESULTS

In this chapter, the researcher presents the results of the research and data analysis. . The researcher gave a pretest and posttest to both groups. The pretest was given to determine students' initial abilities in understanding recount texts.

The Result of Pre-Test Experiment and Control Group

Table 1. Summary of pre-test experiment and control results

Group	N	Highest Value	Lowest Value	Total score	mean
Experiment	35	60	37	1.626	46
Control	31	67	30	1.598	51

Based on the results above, it is shown that in the experimental group (n = 35), the highest score obtained was 60 and the lowest score was 37, resulting in a total score of 1,626 for all students. Using Arikunto (2006) formula, the mean pre-test score for the experimental group was $M = 46$. These data indicate the initial distribution of students' abilities before the treatment. Meanwhile, in the control group (n = 31), the highest score was 67 and the lowest score was 30, yielding a total score of 1,598. The mean pre-test score for the control group was $M = 51$. This difference in mean scores serves as the initial point of measurement for comparing changes in scores before the treatment was administered.

The Result of Post-test Experiment and Control Group

Table 2. Summary of post-test experiment and control results

Group	N	Highest Value	Lowest Value	Total score	mean
Experiment	35	90	57	2.614	75
Control	31	77	47	1.894	61

The post-test was administered after the treatment to measure the final reading comprehension ability of students in each group. In the experimental group ($n = 35$), the highest score increased to 90 and the lowest score to 57, resulting in a total score of 2,614 and a mean score of $M = 75$. This improvement indicates a substantial numerical increase in the score distribution compared to the pre-test. In the control group ($n = 31$), the highest post-test score was 77 and the lowest was 47, with a total score of 1,894 and a mean score of $M = 61$. These results show the final performance of the control group, which remained lower than that of the experimental group.

The Students Score and Deviation of Pretest and Posttest of Experiment and Control Group

After obtaining the average pre-test and post-test scores, the researcher calculated the deviation scores for all students in both research groups, namely the experimental class and the control class. The score deviation is obtained by calculating the difference between the post-test and pre-test scores for each student, while the square deviation is calculated from the square of the score deviation to obtain a measure of the variability in score changes between students.

Table 3. Summary of Deviation and Squared Deviation Scores for Experimental and Control Groups

Group	N	deviation	Mean of deviation	(Deviation)	(Mean of deviation)
Eksperimen	35	971	27.74	29.217	834.77
Control	31	304	9.80	3,588	115.74

In the experimental class, which consisted of 35 students, the total deviation for all students reached 971, with an average deviation of 27.74. The total squared deviation for this group was 29,217, resulting in an average squared deviation of 834.77. These figures indicate the changes in students' scores from the pre-test to the post-test as well as the variation in score improvement among students in the experimental class. Conversely, in the control class, which consisted of 31 students, the total deviation was 304, with an average deviation of 9.80. The total squared deviation for the control class was 3,588, producing an average squared deviation of 115.74. These data provide information regarding score changes and the relatively small improvement observed in the control class.

The next step involved comparing the score deviations between the experimental and control classes using the t-test. The mean deviation in the experimental class was 27.74, while in the control class it was 9.80. With a total of 66 students, the degree of freedom for the t-test was 64. The t-test results showed a t-count value of 7.621. This value was compared

with the t-table value at the 0.05 significance level, which was 1.997. Since the t-count was higher than the t-table value, it indicates that the difference in mean deviation scores between the two groups was statistically substantial. In the experimental group were better able to identify main ideas, organize information systematically, and understand the relationships between pieces of information in recount texts. Meanwhile, students in the control group still demonstrated limitations in capturing key information and arranging it in a structured manner. This is likely due to the conventional teaching method, which focuses more on reading and answering questions without guiding students to visually organize ideas.

DISCUSSION

The findings of this study indicate that the application of the mind-mapping technique has a significant positive effect on the reading comprehension ability of eleventh-grade students at SMAN 5 Palu, particularly in understanding recount texts at both literal and inferential levels. The average score of the experimental group increased from 46 on the pre-test to 75 on the post-test, while the control group improved only from 51 to 61. The t-test analysis confirmed a significant difference between the two groups, demonstrating that mind mapping contributed meaningfully to students' reading comprehension within the context of this study.

During the initial treatment sessions, students struggled to understand texts because they tended to read them literally without identifying the main ideas or recalling key content, which affected their ability to answer comprehension questions. After several sessions using the mind-mapping strategy, students became more capable of extracting essential information and understanding text structure more effectively. This improvement can be attributed to the way mind mapping enables students to visualize information through branches and diagrams, making it easier to recognize relationships among ideas. This aligns with Tony Buzan (2018) claim that mind mapping enhances cognitive processing by integrating both creative and logical thinking. The use of mind mapping also increased student motivation and engagement. Throughout the learning sessions, students actively participated, particularly when creating mind maps that involved drawing, coloring, and organizing ideas visually. These interactive elements made the learning experience more meaningful and enjoyable, especially for the eleventh-grade students involved in this study.

Similar results were found in the study Tuzahra and Ropiah (2025) involving seventh-grade students at SMP Negeri 2 Jalaksana, where the average pre-test score increased after the implementation of mind mapping with the same research design. Their study also reported an improvement in student participation and engagement, indicating that mind mapping not only enhances test performance but also facilitates information organization, text structure understanding, and active involvement in learning. Likewise, in SDN Ganting Sidoarjo, student scores increased from 45.53 to 72.50 (Azhaarjauza & Wachidah, 2025). Although these findings are positive, differences in grade level, text type, and context suggest

that the effectiveness of mind mapping must be interpreted contextually rather than assumed universal.

Research conducted at MAN 2 Probolinggo similarly showed that mind mapping helped twelfth-grade students improve their reading comprehension, supporting the use of the strategy at the senior high school level, though still limited by specific contexts and text types. The present findings are consistent with other studies examining the effectiveness of mind mapping on reading comprehension. A Classroom Action Research (CAR) design, reported improved student performance.

Similarly, research at MTs Assalam Bangilan (2018/2019) found improvement from cycle I to cycle II through the implementation of mind mapping in group work and visual activities (Nasution et al., 2023). Both studies emphasized that mind mapping helps students understand texts more easily and increases engagement in learning. However, the quasi-experimental design used in the present study provides stronger statistical evidence supporting the effectiveness of mind mapping.

Furthermore, Puspa (2018) found substantial improvement using semantic mapping—another type of graphic organizer similar to mind mapping—with mastery rising from 43.75% at baseline to 87.5% at the end of the cycle. This comparison highlights that both mind mapping and semantic mapping are effective in enhancing reading comprehension because they help students activate prior knowledge, organize information, and understand relationships among concepts. Thus, this study reinforces the broader finding that visual mapping strategies consistently produce positive effects on students' reading comprehension, regardless of methodological variations.

A qualitative study involving vocational high school students also affirmed the benefits of mind mapping in helping students visualize ideas, identify important details, and increase learning motivation (Iis Suryani Herdiah et al., 2022). However, some studies reported that mind mapping is not always more effective than other strategies. Study involving diploma students in Kediri found no significant difference between mind mapping and pre-questioning strategies (Febrijanto et al., 2022). This suggests that contextual factors such as cognitive maturity, text type, and instructional goals can influence the effectiveness of mind mapping.

A comparative study at Perguruan Advent Cilacap combining mind mapping and story mapping showed that both strategies can be effective, but the outcomes depend on implementation and student characteristics (Wulandari, 2020). Similarly, research at SMP Swasta Al Mukmin Hasibuan (2022) found that students taught with mind mapping showed significant improvement in reading comprehension. However, differences in grade level, text type, and intervention duration limit the direct generalization of those findings to the context of this study. These comparisons further highlight that while mind mapping is beneficial, its effectiveness must be interpreted within specific classroom contexts.

Overall, this study demonstrates that mind mapping is an effective strategy for improving students' reading comprehension, especially in identifying main ideas, extracting

key information, and understanding relationships among ideas in recount texts. These findings affirm that visual information processing helps students organize texts more systematically, enabling them to achieve both literal and inferential comprehension more effectively. The strength of this study lies in its focus on eleventh-grade students and its longer intervention duration, which allowed students to gradually adapt to the strategy and provided a more accurate representation of the learning process.

Nevertheless, several limitations must be acknowledged. The sample was drawn from only one school and two classes, which restricts the generalizability of the findings to a broader senior high school population. Additionally, this study focused solely on recount texts; therefore, the effectiveness of mind mapping for other text types requiring more complex reasoning—such as argumentative or expository texts—remains uncertain. Variations in students' ability to construct mind maps may also have influenced the results, as not all students possess the same level of visual or organizational skills.

Despite these limitations, this study offers important pedagogical implications for reading instruction. Teachers may consider using mind mapping as a strategy to enhance reading comprehension, particularly when teaching texts that require identifying structure, main ideas, or inferential meaning. Teachers are also encouraged to provide clear examples, step-by-step guidance, and visual support during mind-map construction to ensure the strategy benefits all learners. Furthermore, curriculum developers may incorporate visual mapping strategies such as mind mapping into literacy modules of the Kurikulum Merdeka, given their potential to support reading comprehension and strengthen students' reasoning skills.

CONCLUSION

This study concludes that the implementation of the mind mapping strategy is effective in improving the reading comprehension of eleventh-grade students, particularly in recount texts. Mind mapping helps students organize information, identify main ideas, understand the relationships between concepts, and increase their engagement and motivation in learning. Based on these results, teachers are recommended to apply mind mapping in reading instruction by providing step-by-step guidance, clear examples, and adjustments according to students' abilities and classroom context. Curriculum developers may consider integrating visual strategies like mind mapping into the Literacy Modules of the Merdeka Curriculum to enhance reading comprehension and critical thinking skills. For future research, it is suggested to extend the intervention duration, involve larger and more diverse samples, explore the application of mind mapping with different types of texts, and use additional qualitative methods, such as observations or interviews, to better understand the mechanisms behind its effectiveness. Overall, this study provides evidence that mind mapping is an effective teaching strategy, but its implementation should be adapted to the context, student characteristics, and the type of text being taught.

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