The Effectiveness of Digital Mind Mapping Using GitMind Application to Teach Writing Descriptive Text

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Abstract. This research is conducted to determine the effectiveness of digital mind mapping using GitMind application to teach writing descriptive text. A pre-experimental research design with a one-group pretest-posttest design was used in this study. The study sample consisted of 36 students enrolled in Class XE that was obtained through cluster random sampling. Pre-test and post-test instruments were administered, revealing an increase in the students' mean score from 69.56 to 78.42. The paired sample t-test resulted in a t-statistic of 6.396, which was higher than the t-critical (2.03). This result demonstrated a statistically significant difference observed between pre-test and post-test scores. Moreover, the findings confirmed the alternative hypothesis (H_a) and refuted the null hypothesis (H_0), based on a p-value of 2.33E-07, which was significantly lower than the established significance level (0.05). The results supported that digital mind mapping using GitMind effectively facilitated the teaching of descriptive text writing. Furthermore, the results showed that the effect size of the treatment was 1.066, categorized as a "strong effect". Based on these findings, it is recommended to utilize GitMind, a digital mind mapping tool, for teaching writing descriptive text.

Keywords: GitMind, Digital Mind Mapping, Teaching writing descriptive text

1. INTRODUCTION

Writing is a fundamental skill that English as a Foreign Language (EFL) students should master alongside other language skills. Writing is a productive skill that enables students to produce ideas creatively [1]. Writing skills are crucial for students over the course of their education, as they allow for the effective organization of ideas and emotions while conveying meaning through well-written text [2]. Students are able to convey their thoughts, views, and personal narratives through English writing [3].

Writing skills become important for EFL students due to the various writing activities in school. For secondary-level students, especially those in senior high school, English writing plays a significant role in activities, including projects, assessments, and even final examinations [4]. As part of their education, students are taught to write in a variety of text types, including narratives, descriptions, procedures, expositions, recounts, reports, and authentic texts.

One crucial text type for senior high school students is descriptive text. Descriptive text clearly describes a person, place, object, or event using appropriate details to convey the meanings [5], [6], [7], [8]. This text type requires a detailed description of a person, place, occurrence, or an item, utilizing sensory words and metaphors to create vivid imagery, focusing on how it looks, feels, smells, tastes, and sounds [5], [9], [10]. Thus, students must be able to describe a specific object and provide a detailed illustration.

Additionally, descriptive texts generally adhere to a structure that incorporates both identification and description. The identification part introduces the general description of the person, place, animal, or object that will be described [11]-[13]. On the other hand, the description part contains a detailed explanation of the characteristics of the described object that evoke the readers' senses and feelings [12]. Furthermore, descriptive text has distinct language features, such as simple present tense and adjectives [14].

Nevertheless, writing a descriptive text can be challenging for students. Students face difficulties in composing descriptive text such as in developing ideas and selecting appropriate vocabulary [5], [15]-[17], and along with challenges related to the generic structure, grammar, and spelling of their writing [18]. This is further supported by an interview with an English teacher revealing that many

tenth-grade students lack grammar knowledge and vocabulary, and face problems in organizing and developing their ideas [19], [20], [21].

Given these challenges, appropriate teaching techniques are necessary. One effective technique is mind mapping. Mind mapping is a teaching technique whereby students transcribe superordinate concepts onto paper and subsequently establish connections between those concepts and subordinate concepts as necessary [22]. Mind mapping is a visual note-taking method that provides an overview of a topic and its complex details, helping students understand, generate ideas, and connect their thought [23].

Mind mapping is one of the techniques for prewriting. It helps students generate and organize ideas while brainstorming before they start writing. Mind mapping is excellent for the English writing process, particularly prewriting activities in which students develop and explore ideas related to the topics they intend to write about [24]. By mind mapping, all of the ideas generated during the brainstorming session can be organized into categories, allowing them to be structured into meaningful concepts [25]. In essence, mind mapping technique supports students in the pre-writing phase by aiding in idea generation and organization related to descriptive text topics.

Furthermore, integrating technology into the EFL classroom provides valuable assistance in facilitating the learning process [26], [27], [28]. Technology provides students with essential tools for success both in and beyond the classroom, offering engaging interactive learning experiences and online resources to simplify complex topics [26]-[28]. Additionally, online software and technology-based materials provide students with further opportunities to enhance their language skills, encompassing writing, reading, listening, and speaking [32].

A notable development in technology is the shift from traditional to digital mind mapping, which offers a useful way to generate mind maps through specialized software. The purpose of those softwares is to visually illustrate the connections and relationships between concepts and ideas graphically [33]. In contrast to the traditional way, digital mind mapping allows users to develop mind maps through the use of computer software that can automatically generates the branching ideas originating from the central concept instead of manually drawing them on paper with a pen [34]. Additionally, digital mind mapping is beneficial in terms of accessibility and ease of saving. The digital format enables access to mind maps from a variety of devices, including computers, tablets, and smartphones [35]-[38].

There are numerous tools available to support digital mind mapping. This study employed the GitMind application as a digital mind mapping tool to assist students in organizing their ideas for descriptive texts. GitMind is a free online tool designed for brainstorming new ideas and creating mind maps. It facilitates users to create dynamic mind maps that depict the relationships between various elements of their thoughts. It also provides a variety of customization options, such as colors, icons, and templates, allowing users to adjust their mind maps to their particular needs and preferences.

Numerous studies have explored the utilization of digital mind mapping for teaching writing descriptive text. Sudibyo found that students' descriptive paragraph writing improved significantly after they used digital mind mapping [39]. Similarly, Elhawwa found that the majority of students, particularly for computer science majors, agreed that digital mind mapping was appropriate as a technique in writing classes to assist them in organizing their ideas before writing [40]. Moreover, Hemeira, Nugraha, and Abas confirmed its effectiveness in enhancing descriptive text writing skills [41]. These findings emphasized the effectiveness of digital mind mapping as a valuable tool for enhancing students' skills in composing descriptive texts.

This study builds on previous research by focusing on the effectiveness of digital mind mapping using GitMind for teaching writing descriptive text to tenth-grade students. Unlike earlier studies, which primarily focused on junior high school or university students, this research targets senior high school learners as its participants. Specifically, this research seeks to provide answers to the following questions:
1. Is digital mind mapping using GitMind application effective for teaching writing descriptive text?
2. If it is, how strong is the effect size of digital mind mapping using GitMind application for teaching writing descriptive text?

2. METHOD
Research Design
This study employed pre-experimental research utilizing a one-group pretest-posttest design. This design involves the researcher conducting a post-test on a single group of participants after they have completed a pretest and received an experimental treatment [42]. The illustration of the research design is presented in Table 1 [42].

Table 1. Illustration of Pre-Experimental Research with One Group Pretest-Posttest Design

Pre-test	Treatment	Post-test
O_1	X_T	O_2

According to Table 1, the pre-test (O_1) was given to students to determine their scores on descriptive text writing prior to implementing the treatment. In addition, the treatment (X_T) in this study was implementing digital mind mapping using the GitMind application for teaching students to write descriptive text. Moreover, the post-test (O_2) was administered after the treatment had been completed.

In addition, this study employed both dependent and independent variables. The independent variable was the digital mind mapping using the GitMind application. On the other hand, the dependent variable was students' scores in descriptive text writing.

Research Participants

This study utilized SMA Negeri 10 Pontianak as its research locale. The researcher chose the school because the teacher had never used digital mind mapping for teaching writing. Additionally, the school has utilized technology, particularly smartphones, to support learning. Thus, these criteria supported the researcher's aim of implementing GitMind application as a digital mind mapping tool for creating mind maps related to descriptive text topics.

The study population comprised all tenth-grade students. The school had seven tenth-grade classes, ranging from XA to XG. The researcher chose the sample for this study by using the cluster sampling technique utilizing the Spin the Wheel application to randomly select the sample. The research sample consisted of Class XE, which included 36 students.

Data Collection Technique

To gather the data, the researcher utilized measurement technique using a writing test as the research instrument. The tests were divided into pre-test and post-test. The test task involved composing a descriptive text about a specific person, particularly a family member.

The pre-test involved students compose a descriptive text about a family member. The descriptive text must consist of 100-150 words in at least three paragraphs. The first paragraph was about the identification part. In addition, the second and third paragraphs were about the description parts. The students should complete writing descriptive text in 60 minutes.

Before administering the post-test, the researcher carried out two treatment sessions where students were taught to write descriptive texts using digital mind mapping with the GitMind app. In the treatment, students first brainstormed and listed ideas about the object they were describing on a mind map through the GitMind on their smartphones. They then used the organized ideas from the mind map to practice writing their descriptive text.

Following the treatment sessions, a post-test was conducted to evaluate the impact in students' descriptive writing after intervention. The post-test involved students creating mind maps with GitMind to develop and organize ideas related to the family member that they were going to write about. The students were given 20 minutes to make a mind map on GitMind. After they finished making mind maps, they were given 40 minutes to compose descriptive text based on their organized ideas in the mind map.

Content validity was utilized to assess the instrument's validity. It addresses the degree to which a measurement precisely reflects the full scope of the construct it intends to assess [43]. The researcher applied content validity to ensure that the instruments were valid and formulated in accordance with the school's syllabus for tenth-grade students. Table 2 presents the specifications for the writing test instrument which adapted from Jacobs et al. [44].

Table 2. The Table of Specification for the Writing Test

No.	Items to be evaluated	Specification
1	Content: Topic Development	It refers to students' mastery of describing a specific person being described to provide introduction and detailed description.
		It refers to the relevance of the text to the topic being assigned (the topic is describing a specific person including a family member).
2	Organization: Paragraph Structure	It refers to the main ideas and supportive ideas are smoothly and systematically developed.

	1) Identification part 2) Description part	It refers to the students writing the identification part well (identifying and describing the general information of the person being described).
		It refers to the students writing the description part well (describing the characteristics of the person being described in detail, e.g., her or his personality, physical appearances, hobbies, profession, etc.).
3	Vocabulary: Word choice/diction	It refers to the use of an accurate and useful choice of words or diction for writing descriptive text.
4	Language Use (Grammar)	It involves the correct application of simple present tense, adjectives, and pronouns.
5	Mechanics: 1) Spelling 2) Punctuation 3) Capitalization	It relates to the correct usage of spelling, punctuation, and capitalization.

Data Analysis

The researcher analyzed the collected data using statistical methods. In addition, several established formulas and guidelines were utilized in the analysis of the data. Firstly, the researcher calculated individual scores by evaluating the descriptive texts written by students during the pre-test and post-test phases using the scoring rubric adapted from Jacobs et al. [44]. The rubric was utilized to analyze the descriptive text based on five components of writing, such as content, vocabulary, organization, language use, and mechanics. After obtaining students' individual scores, the researcher calculating the mean difference between the pre-test and post-test, calculating t-test, testing the hypothesis, and calculating the effect size of treatment.

3. FINDINGS

By implementing digital mind mapping using GitMind application, the results indicated that students achieved gains in their scores. The table presented below displays the mean scores acquired from the pre-test and post-test in terms of writing components, including content, organization, vocabulary, language use, and mechanics.

Table 3. Descriptive Statistics of Pre-Test and Post-Test Mean Scores (Writing Components)

Data	Statistic	Writing Component					Total
		C	O	V	LU	M	
Pre-test	Mean Score	21.36	12.81	13.69	17.53	4.17	69.56
Post-test	Mean Score	23.83	15.33	14.75	20	4.5	78.42

According to Table 3, the test results highlight an improvement in all writing components after the treatment. As a result, the mean score on the post-test is greater than that of the pre-test.
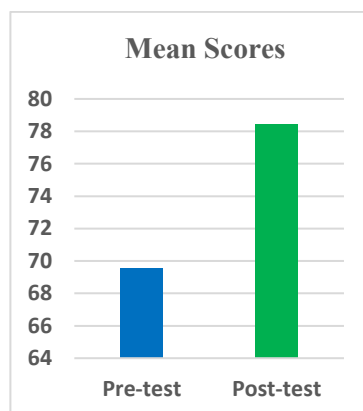
Figure 1. Students' Pre-Test and Post-Test Mean Score

As illustrated in Figure 1, the pre-test showed a mean score of 69.56, while the post-test demonstrated an increase to 78.42. The mean difference score between the pre-test and post-test is 8.86.

Moreover, the paired sample t-test using Excel program was employed to test whether the research hypothesis is accepted or rejected. The table below presents the outcome of the t-test calculation.

Table 4. The Results of the t-Test Calculation

No.		Pre-test	Post-test
1.	Mean	69.55555556	78.41666667
2.	Variance	83.62539683	15.33571429
3.	Observations	36	36
4.	Pearson Correlation	0.41699962	
5.	Hypothesized Mean Difference	0	
6.	df	35	
7.	t Stat	-6.39613863	
8.	P(T<=t) one-tail	1.16509E-07	
9.	t Critical one-tail	1.689572458	
10.	P(T<=t) two-tail	2.33E-07	
11.	t Critical two-tail	2.030107928	

The results show that the absolute value of t-statistic is 6.396, while the t-critical value (two-tailed test) is 2.03. These findings indicate a statistically significant difference between the pre-test and post-test results, since the t-statistic is greater than t-critical value. Additionally, the p-value (2.33E-07) was less than the significance level of 0.05, which resulted in the rejection of the null hypothesis.

Thus, the null hypothesis (H_0) stating, "Digital mind mapping using GitMind application is not effective for teaching writing descriptive text to the tenth-grade students' of SMAN 10 Pontianak", is rejected. On the other hand, the alternative hypothesis (H_a) stating, "Digital mind mapping using GitMind application is effective for teaching writing descriptive text to the tenth-grade students of SMAN 10 Pontianak", is accepted. According to these findings, digital mind mapping using GitMind application is effective for teaching writing descriptive text.

The researcher calculated the effect size of the treatment to know the significant effect of implementing digital mind mapping using GitMind application for teaching students writing descriptive text. The calculation showed that the effect size was 1.066. An effect size that is larger than 1.00 can be interpreted as a strong effect [45]. These results confirm that digital mind mapping using GitMind had a strong effect on teaching tenth-grade students to write descriptive text.

4. DISCUSSION

The data analysis indicates that digital mind mapping using the GitMind application was effective in teaching students to write descriptive text. Specifically, the t-test showed a statistically significant difference between the score obtained before and after the treatment, which justified rejecting the null hypothesis. Furthermore, the calculated effect size was classified as strong, suggesting that the

implementation of digital mind mapping through the GitMind application had a strong effect on teaching students descriptive text writing.

The finding is in line with a similar result from a previous study conducted by Sudibyo, who utilized EdrawMind as a digital mind mapping tool for teaching writing descriptive paragraphs [39]. The results revealed that utilizing digital mind mapping significantly enhanced students' ability to compose descriptive paragraphs, leading to improved scores. Similarly, this study demonstrated a significant difference in students' scores in descriptive text composition before and after their utilization of the GitMind application for creating mind maps on descriptive text topics.

Moreover, the present results are in accordance with previous studies conducted by Elhawwa [40] and Hemeira et al. [41]. These studies used descriptive research methods. The findings of these studies revealed that digital mind mapping is an effective strategy in classroom setting, particularly for writing descriptive text. These findings support the recommendation of digital mind mapping for teaching descriptive text composition

Furthermore, drawing conclusions from the research findings, it is important to highlight that although the sample in this study consisted of senior high school students, previous studies involved junior high school students and university students. This consistency across different educational levels highlights how digital mind mapping is effective for teaching descriptive writing, particularly within academic settings.

The similar results found at various educational levels indicate that the advantages of the intervention may apply to other situations, especially within senior high school education. This discovery not only strengthens the evidence supporting the usefulness of digital mind mapping tools but also emphasizes their ability to help different groups of students.

5. CONCLUSION

After analyzing and discussing the data, the researcher concluded that digital mind mapping using the GitMind application is effective for teaching students to write descriptive text. This was supported by the significantly higher mean scores achieved in the post-test compared to the pre-test. Furthermore, the t-value surpassed its critical value, thus accepting the alternative hypothesis (H_a) and rejecting the null hypothesis (H_0). In addition, the use of digital mind mapping through GitMind in teaching descriptive text writing demonstrated a strong effect. Therefore, the researcher recommends the integration of digital mind mapping using GitMind for teaching descriptive text writing, particularly during the prewriting stage.

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