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Digital Mind Mapping Using MindMeister on Writing: The Effect and Students' Perceptions

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Abstrak

Penelitian ini bertujuan untuk menyelidiki efek penggunaan digital mind mapping melalui MindMeister terhadap performa menulis siswa dalam teks hortatory exposition serta mengeksplorasi persepsi siswa terhadap penggunaannya dalam kelas menulis. Penelitian ini menggunakan pendekatan mixed-method embedded dengan desain quasi-eksperimental, melibatkan 68 siswa dari sebuah SMA negeri yang berlokasi di wilayah Kabupaten Gresik, Indonesia. Data dikumpulkan melalui tes menulis dan kuesioner. Temuan penelitian memperlihatkan adanya peningkatan yang signifikan pada kemampuan menulis siswa kelompok eksperimen ($p = 0.000 < 0.05$) dibandingkan kelompok kontrol. Selain itu, siswa juga menunjukkan persepsi positif terhadap penggunaan digital mind mapping melalui MindMeister dalam hal sikap, aktivitas, dan pengalaman menulis secara keseluruhan. Temuan ini menunjukkan bahwa digital mind mapping merupakan alat yang efektif untuk meningkatkan keterampilan menulis dan keterlibatan siswa dalam pembelajaran.
Kata Kunci: digital mind mapping, MindMeister, performa menulis, teks hortatory exposition, persepsi siswa.

Abstract

The purpose of this research is to explore the effect of applying digital mind mapping using MindMeister on students' writing performance in hortatory exposition texts and to examine students' perceptions regarding its implementation in writing classes. An embedded mixed-method approach combine with a quasi-experimental design was employed involving 68 students from a public senior high school in Gresik Regency, Indonesia. Data were collected through writing tests and questionnaires. It was found that students in the experimental group significantly enhanced their writing performance ($p = 0.000 < 0.05$) in comparison to those in the control group. In addition, students demonstrated positive perceptions of digital mind mapping using MindMeister in terms of their attitude, activities, and overall writing experience. The findings indicate that digital mind mapping serves as a beneficial tool for enhancing students' writing skills and engagement in the classroom.
Keywords: digital mind mapping, MindMeister, writing performance, hortatory exposition text, students' perceptions.

INTRODUCTION

In Indonesia, English a mandatory subject and it includes four essential skills which include listening, speaking, reading, and writing. One of the most critical of these skills is writing, as it plays a significant role in helping students articulates their thoughts clearly. Yusrah and Yuli Pera Fitria (2024) stated that writing serves as a vital form of communication, allowing individuals to effectively convey ideas, share information, and knowledge.

However, writing is widely recognized as a highly complex skill, requiring mastery of various elements. It involves the use of grammar rules, writing mechanics, and sentence structures (Sabarun et al., 2021). According to Agustina (2020), writing is often perceived as a boring and draining task by students, as it requires significant mental and physical effort.

Teaching writing is widely regarded as one of the most challenging tasks for teachers. Afifah and Sarudin (2020) claimed that writing instruction is perceived as a major challenge that contributes to the failure of effective writing. Similarly, in Indonesia, issues in teaching writing are also prevalent. Teachers often ask students to write without providing clear instructions or guidance on how to approach the task (Dayu & Aprilia, 2022).

The most common strategy used to teach writing is mind mapping. According to Buzan (1996) mind mapping reflects radiant thinking where ideas expand visually from a central theme into related subtopics, like how the brain naturally thinks and connects information. Traditional mind mapping, where students manually draw their ideas on paper or a whiteboard, may no longer be appealing to 21st-century learners (Samonlux, 2020). Instead,

integrating mind mapping by utilizing various online platforms and applications can enhance student motivation in this era of technological advancement. According to Karim et al. (2022) digital mind mapping utilizes technology to allow students to arrange their thoughts and knowledge visually, thus simplifying their understanding of intricate materials, especially in technical areas.

A number of researchers have investigated how effective digital mind mapping is for teaching writing skills. Hariati & Mizkat (2024) investigated the impact of mind mapping using Canva on students' writing skills, particularly in composing procedural texts. Their findings indicated that learners utilizing digital mind mapping demonstrated notable progress in arranging ideas, developing text structure, and presenting content in an organized way. Similar studies have also shown that learners generally view the use of digital mind mapping in writing positively (Amansyah et al., 2023; Karim & Mustapha, 2022). Furthermore, Yoedo et al. (2025) analyzed the influence of MindMeister as a digital mind mapping on 4C skills in an elementary school setting and found that digital mind mapping is an effective instructional tool that fosters students' critical thinking, creativity, collaboration, and communication.

Although many studies have investigated the impact of digital mind mapping on students' writing, research specifically focusing on the effect of MindMeister as a digital mind mapping tool in writing remains limited. As a result, there remains a lack of clarity regarding how MindMeister as a digital mind-mapping helps students enhance their writing performance. Therefore, this research intend to address that gap by examining how the use of MindMeister as a digital mind-mapping tool on students' writing performance in hortatory exposition texts, as well as exploring their perceptions of its implementation.

Based on the background of the study, the following are the specific research questions aimed to be addressed in this study:

1. To what extent does the digital mind mapping using MindMeister affect students' writing performance in hortatory exposition?
2. What are the students' perceptions after being taught using digital mind mapping in writing hortatory exposition text?

METHODS

The research method employed in this study was an embedded mixed-methods approach and adopted a quasi-experimental design of the non-equivalent control group type. This design involved two intact classes: one as the experimental group and the other as the control group, without random assignment, and both were given a pre-test and post-test to measure the effect of the treatment. The subject of this study were twelfth-graders of public senior high school in Gresik with a total 68 students. Convenience sampling was applied, a non-probability method where participants are selected based on accessibility, availability, and proximity to the researcher (Ary et al., 2010).

The data collection process was carried out over the course of three meetings in March 2025. To answer the first research question regarding the effect of digital mind mapping on students' writing performance, writing assessments were conducted for both the control and experimental groups before and after the treatment phase. Meanwhile, a questionnaire was employed to address the second research question, which involved investigating students' perceptions on the use of digital mind mapping in writing tasks. This instrument was administered solely to the experimental group following the treatment and consisted of 25 items using a Likert scale, along with several open-ended questions designed to gain deeper insights into students' attitudes, engagement, and overall learning experience with the use of MindMeister. For the questionnaire items, the researcher adapted an original and existing questionnaire from Karim et al. (2022) and focused on measuring students' perceptions using digital mind mapping.

The writing test results were analyzed using both paired-sample and independent-sample t-test to examine the significance of the treatment. Meanwhile, the questionnaire responses were analyzed using descriptive statistics by calculating the mean scores and standard deviations. The open-ended responses were analyzed qualitatively by grouping similar answers and identifying common themes to support and complement the quantitative findings from the Likert-scale items.

RESULTS AND DISCUSSION

Table 1. **Pre-Test and Post-Test Score of the Control Class**

Class	N	Min.	Max.	Mean
Pre-Test Control Class	34	60.0	73.0	67.15
Post-Test Control Class	34	67.0	80.0	73.79
Differences	-	7.0	7.0	6.65

The results in Table 1 showed the pre-test and post-test scores of the control class. The mean score increased slightly from 67.15 in the pre-test to 73.79 in the post-test, with a mean difference of 6.65.

Table 2. Pre-Test and Post-Test Score of the Experimental Class

Class	N	Min.	Max.	Mean
Pre-Test Experimental Class	34	61.0	73.0	67.12
Post-Test Experimental Class	34	78.0	92.0	85.71
Differences	-	17.0	19.0	18.59

The mean score increased significantly from 67.12 in the pre-test to 85.71 in the post-test, resulting in a mean difference of 18.59.

The analysis of pre-test and post-test results revealed that implementing digital mind mapping via MindMeister significantly enhanced students' writing performance. In the experimental class, the mean score increased from 67.12 (pre-test) to 85.71 (post-test), while the control class only improved slightly from 67.15 to 73.79.

Table 3. Independent Samples T-Test

	t	Sig. 2-tailed	Mean	Std. Error
Equal variances assumed	13.26	0.000	11.91	0.898
Equal variances not assumed	13.26	0.000	11.91	0.898

According to table 3, the Sig. (2-tailed) value was 0.000, which fell below the 0.05 level of significance. This result indicated that the treatment was effective in enhancing students' writing performance in hortatory exposition texts. This finding is congruent with the study conducted by Al-Inbari et al. (2023) which demonstrated that students using electronic mind mapping outperformed those using traditional methods.

Table 4. Paired T-Test Results of Experimental Class

Paired Differences			t	df	Sig.
Mean	Std. Dev.	Std. Error Mean			Two-Sided p
-18.59	2.62	0.45	-41.40	33	0.000

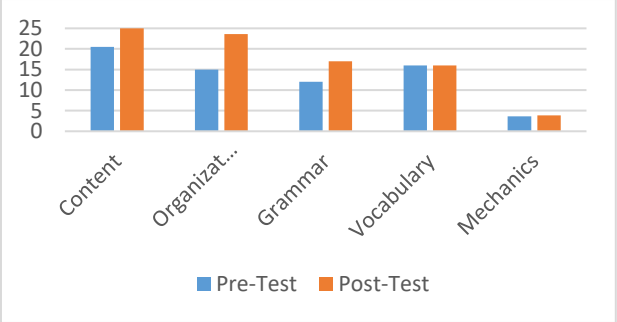
The analysis using paired sample t-test yielded a 2-tailed significance value of 0.000, demonstrating that the difference observed between pre-test and post-test results in the experimental class was statistically significant.

Table 5. Effect Sizes of Pre-Test and Post-Test Score

	Standardizer[a]	Point Estimate
Cohen's d	2.62	-7.10

The analysis of Cohen's *d* resulted in a value of 7.10, indicating a very large effect size (> 0.8). This means that digital mind mapping greatly contributed to the improvement of students' writing performance in the experimental class. These results reinforced the view that digital mind mapping functions as a highly impactful educational aid. The visual structure provided by tools like MindMeister helped students map out their arguments more logically and systematically. This finding was consistent with those reported by (Sabarun et al., 2021), who also observed improvements in students' writing quality through the use of mind mapping strategies. Digital mind mapping using mobile application aided in producing more precise, coherent, and well-organized written work.

Figure 1. The Comparison of Writing Pre-Test and Post-Test Mean Scores in Each Writing Aspect of Experimental Class



As illustrated in Figure 1, organization demonstrated the most notable increase, with the mean score rising significantly from 16.1 to 24.5. The findings indicated that the integration of digital mind mapping using MindMeister effectively enhanced students' ability to organize ideas and structure paragraphs. The improvement aligned with prior research by Yawiloeng and Tarin, (2023), which also reported enhanced writing outcomes in students taught using digital mind maps as reflected in the increased post-test scores of the experimental group especially in organization aspect. In addition, the positive impact of digital mind mapping on students' writing performance found in this study was further supported by the findings of Yusrah and Yuli Pera Fitria (2024) This consistent progress illustrated how integrating digital mind mapping into the learning process could enhance students' writing performance.

Table 6. The Result of Students' Attitude Towards Digital Mind Mapping

No	Statement	Mean	Interpretation
1.	I found that there are a lot of benefits in designing a mind map	3.97	Agree

	using digital mind mapping.		
2.	I really like the digital mind mapping technique because it offers an innovative tool to improve my writing.	3.94	Agree
3.	I believe that digital mind mapping is easy to use.	4.06	Agree
4.	Using digital mind map via MindMeister would help me to become more skillful for mobile learning	3.68	Agree
5.	If I were given the choice, I would use digital mind map technique for writing.	3.91	Agree
6.	I advise my friends in other classes to use the digital mind mapping.	3.47	Agree
7.	Whether or not I use digital mind mapping, significantly impacts my writing outcomes.	3.82	Agree
8.	I intend to include digital mind mapping ing my daily planning beyond classroom use.	3.65	Agree
9.	Creating a digital mind mapping using the mobile application is not a time-consuming task.	3.74	Agree
	Average	**3.80**	**Agree**

The data in the table 5 presented the results of students' attitudes regarding the implementation of digital mind mapping in the writing process. The average score (M=3.80) was obtained, which fell into category of agree. This showed agreement with the students' positive attitude toward digital mind mapping. These findings were consistent with those of Geminastiti Sakkir (2023), who found that students showed a strongly positive attitude toward using mind mapping in developing their writing performance. The majority of students perceived digital mind mapping as beneficial, easy to use, and supportive of their writing development.

Most students agreed that utilizing digital mind mapping brought advantages to the writing process (M=3.97), as supported by the answer to the open-ended question in Part A:

> *"Saya merasa digital mind mapping sangat bermanfaat, terutama ketika saya hendak menulis teks yang cukup panjang. Saya bisa menyusun argumen, bukti dan contoh dengan lebih rapi dan memudahkan ketika akan mulai mengembangkannya menjadi teks."* (Participant 26)

Digital mind mapping using MindMeister was also very easy to use (M=4.06), as supported by the answer to the open-ended question in Part A:

> *"Aplikasi MindMeister yang digunakan untuk membuat mind map mudah di akses dan size nya kecil sehingga mudah di dwonload dan template mind map yang ada didalamnya dapat digunakan untuk membuat mind map secara gratis."* (Participant 30)

Table 7. The Result of Students' Activities Using Digital Mind Mapping

No	Statement	Mean	Interpretation
10.	I found the use of digital mind mapping help me in reinforcing my prewriting stage.	4.15	Agree
11.	I found that the use of digital mind mapping help me to improve the content of my writing	4.09	Agree
12.	The digital mind maps I made enhanced my ability to think critically.	3.91	Agree
13.	By using the mobile app to create digital mind maps, I could generate many ideas and then organizing thoughts easily.	4.29	Strongly Agree
14.	Editing my ideas using the technique is easy as it gives more space than paper and enables me to design easily.	4.41	Strongly Agree
15.	Using digital mind map via mobile	3.47	Agree

	application helped me to understand better the writing lessons.		
16.	Using the technique improve my memory in writing.	3.56	Agree
	Average	**3.98**	**Agree**

The data in the table 6 showed the results of 7 items related to students' activities using digital mind mapping. The average score (M=3.98) was obtained, which is categorized agree, indicating that students perceived digital mind mapping as a beneficial tool in supporting their writing activities.

Most students agreed that using digital mind mapping supported the prewriting stage (M=4.15), as supported by the answer to the open-ended question in Part B:

> *"Menurut saya, menggunakan mind mapping digital sangat membantu ketika menulis, terutama dalam tahap brainstorming. Saya mencatat semua ide atau kata kunci yang muncul dengan cepat di aplikasi dan lebih mudah mengembangkan argumen berdasarkan ide tersebut."* (Participant 16)

Yawiloeng and Tarin (2023) agreed that mind mapping supported Thai EFL students during the prewriting stage by facilitating idea generation and outlining.

Students showed agreement that digital mind mapping enhanced their critical thinking skills in writing (M=3.91), as supported by the answer to the open-ended question in Part B:

> *"Membuat mind mapping sebelum menulis mendorong saya untuk mencari evidence atau contoh-contoh yang cocok dan sessui dengan topik yang akan ditulis. Saya jadi lebih sadar dengan struktur teks dan bagaimana mendukung argumen dengan bukti yang tepat."* (Participant 19)

Yoedo et al. (2025) and Muthmainnah et al. (2022) which demonstrated that the use of MindMeister in writing instruction significantly enhanced students' analytical and critical thinking skills.

Furthermore, many students found that the visual layout and flexibility of the digital tool encouraged idea generation and made it easier to organize and revise their thoughts. These results are also reflected the findings reported by Fadillah (2019) and Susanti et al. (2023), who stated that mind mapping was an effective tool for organizing ideas in writing. Students benefited from the visual nature of digital mind mapping, which helped reduce confusion and made the process of building coherent and well-structured texts more manageable.

Table 8. The Result of Students' Experience Using Digital Mind Mapping

No	Statement	Mean	Interpretation
17.	I enjoy using the digital mind map via MindMeister.	4.09	Agree
18.	I feel less nervous about writing when I use the digital mind map via mobile application.	3.65	Agree
19.	I have gained confidence in my writing as I worked on the digital mind using MindMeister.	3.85	Agree
20.	Using the digital mind map via mobile application enhances my motivation to learn writing.	4.12	Agree
21.	Using the digital mind map together with mobile application is a good exercise for my brain.	4.12	Agree
22.	Digital mind mapping create a more comfortable and stress-free learning environment	3.94	Agree
23.	Using digital mind mapping through apps helps keep the information well-organized.	3.97	Agree
24.	Incorporating colors and visuals into digital mind maps via mobile apps makes learning more engaging and easier.	4.09	Agree
25.	I do not feel bored or tired when adding colors and pictures to my mind maps using mobile application.	3.65	Agree
	Average	**3.94**	**Agree**

The data in table 7 showed the results of 9 items related to students' experience using digital mind mapping. The

average score (M=3.94) was obtained, which was categorized as agree. This indicated positive perceptions of the students' experience using digital mind mapping.

Most of students agreed that they enjoyed using digital mind mapping via MindMeister (M=4.09), as supported by the answer to the open-ended question in Part C:

> *"Berdasarkan pengalaman saya, saya merasa lebih menikmati proses menyusun teks ketika menggunakan digital mind mapping. Warna, gambar, dan tampilan yang menarik membuat saya lebih semangat dalam membuat teks hortatory."* (Participant 6)

Students had a positive and meaningful learning experience when using MindMeister in writing activities. One of the most notable responses was that students felt the activity was enjoyable, which suggested that the integration of visual and interactive elements helped reduce writing anxiety and made the task feel less monotonous. Karim et al. (2022), claimed that students perceived digital mind mapping as both enjoyable and engaging. Students also reported a sense of confidence when expressing and organizing their ideas using digital mind mapping. The ability to visualize their structure appeared to give them better control over their writing.

The students' motivation also increased (M=3.85), as supported by the responses to the open-ended question in Part C:

> *"Pengalaman saya dalam menggunakan digital mind mapping untuk menulis sangat baik. Saya merasa lebih termotivasi ketika menulis karena ada banyak fitur yang membuat proses menulis lebih menarik. Walaupun pada awalnya saya butuh waktu untuk beradaptasi, sekarang saya bisa menggunakannya dengan lebih efisien dan merasa lebih percaya diri saat menulis."* (Participant 13)

A number of previous studies (Surya et al., 2022; Karim et al., 2022; Muthmainnah et al., 2022), have similarly highlighted the motivational impact of digital mind mapping. Many students indicated that the use of technology in writing made them more eager to participate and complete their assignments, suggesting that the novelty and interactivity of the tool had a positive influence on their engagement. Overall, digital mind mapping not only supported cognitive aspects of writing but also enhanced the affective experience, creating a more encouraging and student-centered environment for writing instruction.

CONCLUSION

The independent samples t-test showed a significant difference between the two groups. The most notable improvement was in the organization aspect of writing, as students were able to generate, structure, and connect ideas more logically. Therefore, in response to the first research question, it can be concluded that digital mind mapping using MindMeister significantly improved students' writing performance, particularly in organizing hortatory exposition text. The analysis of the questionnaire answered the second research question by revealing that students had generally positive perceptions toward the use of digital mind mapping. In terms of attitude, students agreed that the technique was helpful, practical, and easy to use. In terms of activities, they reported that MindMeister helped them during the prewriting phase and enhanced their ability to generate and connect ideas. In terms of experience, students found the learning process enjoyable, engaging, and motivating.

English teachers are encouraged to consider integrating digital tools such as MindMeister into their writing instruction, especially for teaching hortatory exposition texts. The use of digital mind mapping can help students generate ideas, organize arguments, and develop logical structures in their writing more effectively. It also fosters a more interactive and student-centered learning atmosphere, which can increase students' motivation and confidence during the writing process.

However, this study was limited by the short duration of implementation. The findings primarily reflected the short-term impact of digital mind mapping and may not fully capture its long-term effectiveness in improving writing performance. Therefore, future researchers are recommended to conduct longitudinal studies with a larger number of meetings and participants. Further studies can also explore the use of digital mind mapping in other text types or in combination with other digital platforms to examine its broader potential in enhancing language skills beyond writing.

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