



## The Effect of Using Online Mind Mapping as Pre-Writing Strategy on the Quality of Students' Academic Essays

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### Info Artikel

Diterima Januari

Disetujui Februari

Direvisi

Dipublikasikan Maret

DOI:

<https://doi.org/10.24905/596ta647>

### Abstract

*Writing academic essays is an important part of student literacy, but many still struggle to organize ideas in the pre-writing stage. Online mind mapping platforms such as the Coggle application offer interactive visual solutions for writing planning. The purpose of this study was to determine the effect of using online mind mapping as a pre-writing strategy on the quality of students' academic essays. This quasi-experimental study with a non-equivalent control group design involved first-semester undergraduate nursing students at Bhamada Slawi University, divided into experimental (online mind mapping) and control (conventional) classes. Data were obtained through essay assessments on the pretest-posttest and analyzed using paired t-tests and independent t-tests. Both classes experienced significant improvement, but the experimental class showed a higher increase (12.48 points) compared to the control class (11.36 points). The independent t-test showed a significant difference with the experimental class' posttest average being 3.26 points superior (Sig. = 0.003). Online mind mapping proved to have a significant effect and was more effective than conventional strategies in improving the quality of students' academic essays.*

**Keywords:** *online mind mapping, essay writing, students*

## **INTRODUCTION**

Academic essays are a crucial ability for college students. Academic essay writing demands more than organisation and expression. How to choose the right arguments, structure, language, and write and use grammar are equally important. Many students struggle with pre-writing, the prerequisite to writing. This is especially important for arranging thoughts, connecting concepts, and establishing a literary framework. Writing abilities are a vital academic competence for students, not only for success in their studies but also in their professional jobs (Sakaria, 2018). The results (PISA, 2022), which show a drop in reading literacy, show how important it is to change how we teach and make literacy a bigger part of our culture. Writing abilities are particularly important, especially for students, because not everyone can say what they mean directly (Widayati & Mahendra, 2021). Students should write not just for schoolwork, but also to express their ideas and be creative. However, writing can be hard for some students (Kurniasih, dkk, 2024). They need practise writing (content, organisation, language, and mechanics). Imitation and reading help people learn new ideas and ways of speaking (Connor, 1996).

Academic writing plays an important role in students' success, but it remains a challenge. The correct use of grammar and spelling is important for supporting clarity in scientific communication. This study aims to develop a learning guide based on effective essay writing strategies (Lopres, et al., 2023; Subandowo, 2023). This condition indicates that students' writing skills need serious attention from various parties (Khuzaemah, 2017). The application of innovative learning can create a more dynamic classroom atmosphere and reduce rigidity and boredom. One strategy considered effective is the use of online mind mapping in the pre-writing stage. Through online mind mapping tools like the Coggle application, students can visually and structurally organise their ideas, making it easier to develop paragraphs for academic essays (Buzan, 2018). Mind mapping is also understood as an information processing technique with a specific pattern that can optimise overall brain function through synergy between the right and left hemispheres (Salamah, & Hesti, 2023).

The development of digital technology has introduced various online mind mapping platforms like Coggle, which provides interactive visual media to support the writing planning process. The existence of the platform serves as a more dynamic, flexible, and needs-based alternative pre-writing strategy for students in the digital age. Despite its increasing application, empirical studies examining the effectiveness of online mind mapping in the context of academic essay writing in higher education are still relatively limited. Based on these conditions, this study aims to analyse the influence of using online mind mapping as a pre-writing strategy on the quality of students' academic essays.

## **METHOD**

This research used a quantitative approach with a non-equivalent control group quasi-experimental design (Sugiyono, 2019). Two classes were used as a sample through purposive sampling; the experimental group in class IA used online mind mapping, while the control group in class IB used a conventional strategy. The subjects of this data collection were second-semester students taking "Bahasa Indoensia" subject in the S1 Nursing Science Study Program, Faculty of Health Sciences, Bhamada Slawi University, Academic Year 2024/2025. The independent variable in this study was the use of online mind mapping, while the dependent

variable was the quality of students' academic essays. The instruments used were an essay scoring rubric (content, structure, language, and writing mechanics aspects) and mind mapping documentation. Data was collected through essay writing tests (pre-test and post-test), observation, and documentation. Data were analysed using normality and homogeneity tests, followed by a paired sample t test to measure pretest-posttest differences within groups and an independent sample ttest to compare posttest means between the experimental and control groups with a significance level of 0.05 using SPSS (Field, 2018).

## RESULT AND DISCUSSION

Before conducting the main data analysis test, a prerequisite test, namely the normality test, was first carried out. Subsequently, a t-test was used to analyse the final data between the experimental and control groups. The purpose of this t-test was to determine the difference in student learning outcomes between the pretest before treatment and the posttest after treatment. The analysis of the t-test was based on the pretest results.

### 1. Normality Test

The normality test verifies data distribution is normal. Kolmogorov-Smirnov and Shapiro-Wilk were used, with a significance criterion of  $> 0.05$  for normally distributed data (Field, 2018).

**Table 1. Results of Data Normality Test**

Group	Stage	Kolmogorov-Smirnov Sig.	Shapiro-Wilk Sig.	Description
Experimental	Pretest	0.200	0.847	Normal
Experimental	Posttest	0.176	0.505	Normal
Control	Pretest	0.200	0.778	Normal
Control	Posttest	0.102	0.163	Normal

The test findings demonstrate that all significance values (Sig.) from both Kolmogorov-Smirnov and Shapiro-Wilk exceed 0.05. This indicates that the data from both the experimental and control groups in the pretest and posttest are regularly distributed. Consequently, the normalcy assumption is satisfied, permitting the application of parametric analysis (Field, 2018; Santoso, 2019). This condition verifies that the measurement instrument has generated data appropriate for subsequent analysis.

### 2. Homogeneity Test

The homogeneity test is designed to guarantee that the variations between groups are equal. The test was performed using Levene's Test, with Sig.  $> 0.05$  suggesting homogeneous data (Ghozali, 2016).

**Table 2. Homogeneity Test Results (Levene's Test)**

Stage	Levene Statistic	Sig.	Description
Pretest	1.102	0.297	Homogeneous
Posttest	1.788	0.185	Homogeneous

The pretest and posttest significance levels are more than 0.05. This shows that experimental and control groups have similar variance. Since both groups' data is the same, the t-test is superior for comparing means.

## 3. Independent Sample t-test (Pretest)

This test compares the experimental and control groups' starting ability before treatment.

**Table 3. Independent Sample t-test for the Pretest**

Variable	T	df	p	Mean Difference
Pretest Scores: Experimental vs Control	1.68	91	0.099	2.14

The pretest independent samples t-test has a significance level greater than 0.05, indicating that there was no significant difference between the experimental and control groups prior to the intervention. In other words, the students' beginning talents in both groups are roughly comparable. This condition is necessary to ensure that any changes shown in the posttest are actually related to the therapy administered, specifically the use of an online mind mapping-based prewriting approach, rather than differences in participants' beginning ability. This is consistent with the concept of experimental design, which states that equal initial circumstances must be provided to all groups in order for the intervention effect to be legitimately evaluated. (Creswell, 2018).

## 4. Paired Sample t-test

This test is used to compare learning outcomes before (pretest) and after (posttest) within the same group.

**Table 4. Paired Sample t-test**

Pair	Mean	T	P
Experimental Class Before and After Pre-Post	-12.48	-9.60	0.000
Control Class Before and After Pre-Post	-11.36	-9.99	0.000

The paired-samples t-test demonstrated a significant enhancement in both groups. Both the experimental and control groups had significantly higher posttest scores compared to pretest (mean difference = -12.48;  $t = -9.60$ ;  $p < 0.001$ ). These data indicate that writing education, whether through conventional or online mind mapping-based pre-writing techniques, is beneficial in enhancing students' essay writing abilities. This study aligns with (Hyland, 2019), who asserted that regular writing practice is essential for improving students' academic abilities.

## 5. Independent Sample t-test (Posttest)

This test compares the final outcomes of the experimental and control groups following treatment.

**Table 5. Independent Sample t-test Posttest**

Variable	T	df	p	Mean Difference
Posttest Scores of the Experimental Class and the Control Class	3.02	91	0.003	3.26

The results of the independent samples t-test revealed a significant difference in posttest scores between the experimental and control groups ( $t = 3.02$ ;  $df = 91$ ;  $p = 0.003$ ; mean difference = 3.26), with the experimental group using online mind mapping-based prewriting strategies improving essay writing ability more than the control group. The findings of this study show that online mind mapping models are successful in teaching college students how

to write academic essays. The average student score increased from 71.58 to 84.06 after treatment, or posttest, utilizing the online mind mapping methodology.

This finding confirms that the online mind mapping strategy is more effective in improving the quality of students' academic essays because it allows them to organize their ideas before writing systematically and creatively, which is consistent with the concept of mind mapping as explained by (Buzan, 2018), who stated that using a structured writing strategy can improve academic writing skills. This finding is consistent with previous research, which indicated that the mind mapping technique greatly helps students organize thoughts and enhance writing scores (Wahid, & Sudirman, 2023). Furthermore, studies comparing electronic and manual mind mapping found that both forms increased participants' writing performance, but electronic mind mapping had a greater advantage (Al-Inbari, et al., 2023). Online mind mapping has several advantages over traditional methodologies, including ease of modification, concept storage, and real-time collaboration (Yunus, & Chien, 2016). These characteristics allow pupils to generate ideas more freely than manual mind mapping. This strategy's success is further reinforced by cognitive mechanisms such as idea generation facilitation, concept structuring, and dual visual and verbal processing, which improve recall and writing organization (Farrand, et al., 2002). As a result, the pedagogical and technological benefits of online mind mapping may explain the considerable difference between the experimental and control groups. Historically, research (Al-Jarf, 2009), has shown that using mind mapping software for brainstorming and arranging ideas in EFL writing classes resulted in a significant increase in posttest scores when compared to control groups who did not use it.

The results of this study are consistent with previous findings indicating that online mind mapping-based prewriting strategies are more effective than conventional approaches in improving academic essay writing skills. The paired sample t-test proves that using online mind mapping results in higher average scores compared to the problem-based learning model. This effectiveness is not only reflected in the improvement of writing quality but also in the students' ability to organize and develop ideas systematically and creatively. Thus, these findings confirm that online mind mapping is worthy of integration into college writing instruction.

## CONCLUSION

This study's findings enhance the literature by validating the efficacy of online mind mapping in academic essay writing education at the university level. This strategy improves writing and pupils' organisation, arrangement, and ideation. To better understand online mind mapping's mechanisms, future research may broaden the context to other disciplines, examine long-term effects through longitudinal studies, and study students' cognitive processes qualitatively.

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