

The Write Way Forward: Exploring the Impact of Mind Mapping on Academic Excellence

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Abstract

One of the tasks that students must do as part of the learning process in higher education is scientific writing. However, many students still require assistance in producing high-quality writing. The thought mapping method is one method for improving the quality of student writing. The purpose of this study was to determine the efficacy of applying the mind mapping approach to improve the quality of student writing at Universitas Hasanuddin. An experimental approach using a pretest-posttest control group design mechanism was used in this investigation. The samples for this study came from the second semester of medical school at Universitas Hasanuddin. Class A was the controlled group, and Class B was the experimental group. There were 50 students in each class. The researcher used purposeful sampling. This research employed a quantitative methodology. Furthermore, the study's design was quasi-experimental, and the instrument was a written test. To determine the instrument's dependability, the researcher employed a scoring rubric, specifically analytic scoring, to rate the students' writing on the pre-test and post-test. As a result, the experimental class's pre-test mean score was 58.46, whereas the students' post-test mean score was 85.20. On the contrary, the controlled class's pre-test mean score was 59.54, while the post-test mean score was 62.84. The post-test mean score of the experimental class treated with the mind mapping approach demonstrated a substantial effect. It was higher than the post-test mean score of the controlled class that was not treated with the mind mapping approach. It demonstrated the effectiveness of the mind-mapping approach. In other words, adopting the mind mapping technique for student writing at Universitas Hasanuddin had a beneficial effect on the learning process in higher education.

Keywords: Mapping method, Mind mapping, Article writing, Quasi-experimental.

1. Introduction

As one of the language skills, writing plays significant role, because it helps students for examples to know how to write letters, how to write several kinds of text, how to put written reports, how to reply advertisement, how to write using electronic media, etc., but

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in language class, writing is considered difficult skill because it is not just copying and pasting from the people's text, but students demanded to have ability in organizing ideas into the target language. Writing is a complex activity because students should involve thinking skill and creative skill in the writing process. Moreover, writing process is supported by complicated rules, for examples students have to know vocabularies and tenses, choosing appropriate vocabularies to arrange words into good sentences and to develop it into paragraph. Furthermore, students have to use a compatible tense to express an event in certain time. To create a good writing and to build students' ability is not easy. In addition, students need support and guidance from the lecturer. They also should practice a lot outside the classroom in order to improve their skill.

Writing activities are activities that can dig thoughts and feelings about an object, what things are to be written, and write them so that readers will understand them easily. The ability to write well is closely related to the ability to read well [1,2]. Writing skills are focused on improving the child's cognitive abilities in terms of word frames that are structured in symbolic and written form [3]. Writing activities are activities that can dig thoughts and feelings about an object, what things are to be written, and write them so that readers will understand them easily. The ability to write well is closely related to the ability to read well [4]. Besides, the student's writing skills will affect success in the learning process [5,6]. Therefore, Writing is one of the few tasks that requires both the ability to speak in words and the capacity to understand ideas. In other words, to produce a good scientific work requires a good writing ability as well. But in the midst of the demands to graduate on time, we are faced with another problem: there are still many students who have trouble writing their final assignment, whether it's a thesis or a scientific article [7,8]. Students often face difficulties when writing scientific papers. The difficulties they encountered vary widely, including a lack of understanding of the issues studied, limitations of reference, lack of comprehension of the theory, a loss of desire to start writing, and tight work schedules [9]. Most of the student writings are by lecturers because they are unsatisfactory. It's because the scientific work he produced hit the quality of writing [10]. Students have anxiety when explaining the research problem on the basic part of the problem, so the problem always looks bad [11]. This condition is also experienced by medical students of Universitas Hasanuddin.

Since writing is difficult language skill, some students face problems. They made a lot of mistakes in the text they had written, for example the English writing competence of the Indonesian students to write or produce scientific paper. Currently, the scientific article has become one of the requirements for graduation for bachelor, master, and doctor at Universitas Hasanuddin. The scientific article is in force from August 2019, the students who subsequently graduate are required to make scientific articles. Therefore, one important aspect that students must master to support their academic tasks is the ability to produce scientific papers. Students are expected to be able to make quality papers that can contribute to the development of science. However, not all students can have good-quality articles.

Based on observations and interviews with students and heads of medical faculty at Hasanuddin University. The researchers found that some of the problems that arose as a result of this regulation in particular in the Doctor Education Studies Program of Universitas Hasanuddin were in addition to scientific articles the results of student writings could not be said to be worthy in terms of quality and students are used to making writing according to examples of articles already made by students who have already graduated. Another problem that arises is some points could be found that some students always got difficulties when they were asked to write in Indonesia and English. This problem was caused by some causes, such as some students are lack of vocabulary to arrange sentences and organize ideas, some students were confused to express ideas into paragraph using target language because they were hesitant to do it, moreover did not know the tenses should be used, some students always got stuck then spent too much time

thinking because they did not have ideas, some students often felt dissatisfied with the lecturer’s explanation then open Google Translate to construct sentences word by word, and some students were still confused in distinguishes the main idea from supporting details. The result showed that they score were under lecturer’s expectation.

Because of those reasons, Lecturer needs innovation to encourage students in writing, to build the spirit of their students, to make the students enjoy and fun by presenting the suitable materials and employing attractive strategy to make the material more understandable because generally, teachers are less creative in teaching and students only listen to the teacher’s explanation, the teachers rarely used various media in teaching. Automatically, it influenced the atmosphere of the class, because of the fact that students were not very interested in learning writing and getting a little understanding of the materials. The researcher believed that an appropriate strategy may help the teacher in learning and improving students’ writing achievement. There are many effective strategies that can be used in learning writing and one of this strategy is Mind Mapping Technique. Thus, the researcher decided to look at further information about learning writing especially writing paper by using Mind Mapping.

Mind mapping is a visual method for organizing information and developing ideas. According to Kremer, concept maps can be utilized as a tool to tackle educational difficulties as a choice of solutions or as an alternative [12]. The use of concept maps in education can also increase the benefits of the learning process. A concept map is a graphic representation of a notion's relationship and organizational hierarchy [13]. Mind mapping is the easiest way to develop information in a human mind and take information out of the brain. It is a creative and effective way that map our ideas. Mind maps can work as a tool to facilitate the learners to plan ideas in the pre-writing process [14]. The mind-mapping technique was effective to help students in writing descriptive texts. Mind mapping could help students to improve their writing skills in writing descriptive text in terms of enriching vocabulary, increasing creativity, arranging sentences, and organizing ideas [15,16]. As a result, the mind mapping technique would seem to be particularly suited to help students in planning their writing as the approach encourages students to reach for and adapt to a deeper level of understanding of the writing topics and scientific writing. Mind mapping is the easiest way to insert information into the brain and retrieve information from within the brain. Mind mapping was the most creative and effective way to record [17]. Here's a map mapping by Tony Busan which is illustrated like the following figure below.

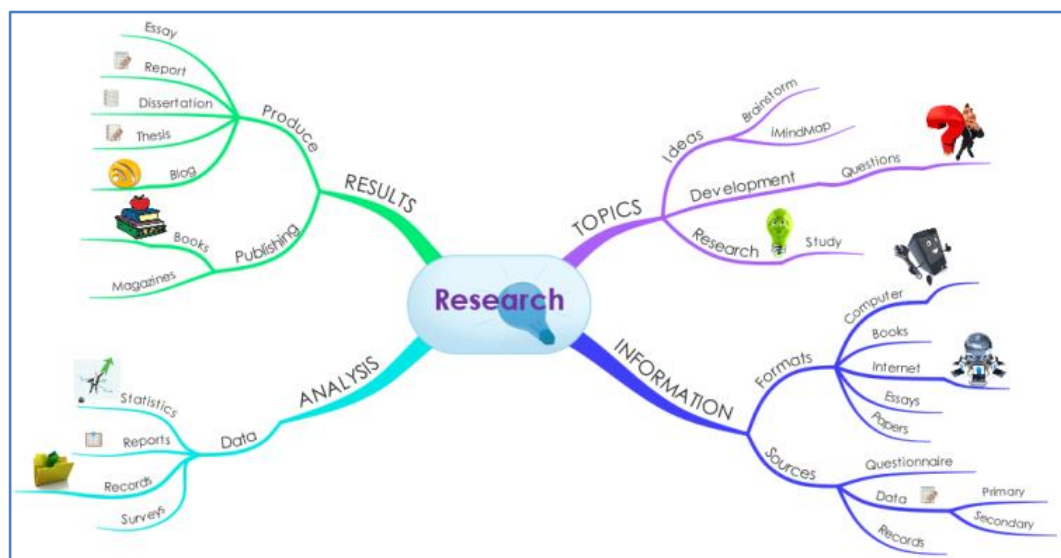


Figure 1. Map Mapping by Tony Buzan

Several studies related to learning with concept mapping as has been done by experts and the researcher used the Vos viewer application to learn more about previous studies related to this study. VOS viewer is a software tool for building and visualizing bibliometric networks. For example, these networks may include journals, researchers, or individual publications, which can be constructed based on citations, bibliographic coupling, co-citations, or co-authorship relationships. Here are 30 articles [18-47] taken from google scholar, Scopus, and the web of science to be analyzed through the Vos viewer application.

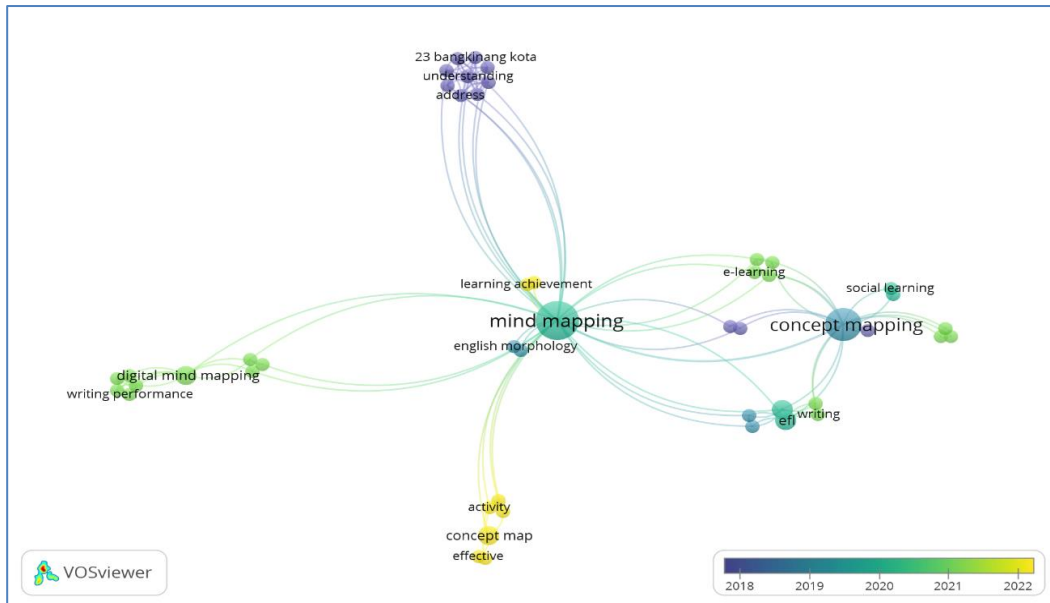


Figure 2. Vosviewer Analysis

The review of previous research revealed that mind mapping had been carried out a lot; this shows the number of co-words about 74 keywords in figures and clusters. However, there is no research has been found that conducts mapping based on co-occurrence analysis of mind mapping in the scientific article. Mind mapping is not new in the field of study, but researchers have yet to see research that connects mind mapping dan scientific article. mind mapping research is more analyzed in this data visualization with variables and interaction. In 2018, researchers conducted more analysis of research on mind mapping variables. Therefore, the researcher concluded that based on data visualization through this Vos viewer, researchers analyzed many research titles related to mind mapping variables. Still, there needs to be an analytical study of the effectiveness of concept mapping (mind mapping) method in improving the quality of students' writing.

This research is essential because papers are mandatory products that students must produce at the end of project-based learning. In addition, by improving the quality of papers, students can obtain better grades and improve their academic achievements. In the context of Hasanuddin University, this research can also positively contribute to improving the quality of its graduates. The results of this research can provide a clear picture of the effectiveness of the implementation of the Mind Mapping Method in improving the quality of papers of Hasanuddin University students. The results of this research can be a reference for other educational institutions in enhancing students' quality of learning and academic achievements. Many factors affect the quality of papers, such as a need for more understanding of the topic, knowledge about writing techniques, and the ability to organize information. To overcome these problems, some universities have implemented the Concept Mapping Method (mind mapping) in paper learning. Mind mapping is a visualization technique used to organize information and develop ideas. This technique can be used in various fields, including paper learning. Therefore, this paper will discuss how effective the Mind Mapping Method is in improving the quality of

student papers and the obstacles and solutions to implementing the Mind Mapping Method.

2. Research Methodology

This study uses Quasi-Experimental Research. It adopts the two groups of quasi experimental design. The study attempts to identify the use of the mind-mapping technique in writing skills. The collected quantitative data is acquired from the pre-test and post-test to measure the differences in performance of samples for both tests according to the total of the writing test.

The samples for this study came from the second semester of medical school at Universitas Hasanuddin. Class A was the controlled group, and Class B was the experimental group. There were 50 students in each class. Purposive sampling was utilized by the researcher. The researcher used random sampling as a sampling technique which was given the same opportunity to be selected as sample members. With a random sampling technique, data is collected through observation, interviews, and document analysis. The sampling step is determined by grouping experimental and control classes. The experimental class is given treatment by using the Mind Mapping method in writing their papers. In contrast, the control class is not given treatment and only follows the process of writing articles as usual done by students. In any scientific research, the instrument for collecting data was absolutely important. The accuracy of the result of the research mostly depends on how accurate the use of the instrument [48].

Writing a scientific paper becomes a project-based learning in the Indonesian Language course programmed by all students. The subjects of this study were second-semester students in the academic year 2022-2023 who were enrolled in the Indonesian Language course. This type of research is experimental. The class is categorized into two sections, with one class being the control group and the other class being the experimental group. The experimental class was given pre-test treatment before the central concept of mind mapping was applied. The pre-test was conducted by asking students to determine the topic of their paper, and then they wrote a brief paper based on their understanding of the chosen topic. After they wrote their paper, an assessment was conducted related to 1) the systematic arrangement of the writing, including a) the relevance of the topic to the described problem, b) the arrangement of sentences, c) the coherence of the relationship between sentences; d) the coherence of the relationship between paragraphs. In addition, aspects of applying EYD rules in their writing and determining their vocabulary were also examined. 2) The structure of the writing includes the body of the writing and the complementary parts of the writing. Writing a Scientific Paper along with the rules and requirements for scientific writing, as shown in the chart below.



Figure 3. Mind Mapping of Writing a scientific paper

The data were analyzed using SPSS 22.0, which included means, percentages, and t-tests to summarize the students' responses on writing skills through the mind mapping technique. The data of quantitative such as students' writing scores are analyzed in descriptive statistics and t-test analysis. The indicators of writing skills are measured based on the writing raters coming from English teachers and colleagues. The writing aspects assessed covered contents, organization, grammar, vocabulary use, and mechanics.

3. Results

Data collected from the pre and post-test were transformed into tables. A total of 100 samples from the control and experimental groups took part in these tests. This study attempted to prove that the research has a positive impact on students' performances in the post-test as compared to their performances in the pre-test. The marks can significantly be proved that the marks were different and the score showed that the marks on the post-test were greater than the pre-test, then there was a piece of the effectiveness of concept mapping (mind mapping) method in improving the quality of students' writing at Universitas Hasanuddin.

This study used 100 subject to collect samples. The following table presents statistics on the capacity to write scientific papers, particularly articles, before (pre-test) and after (post-test) treatment in the study:

Normality test

The normality test is used to test whether a pair test method has a normal distribution. A suitable pair test method has a normal and close-to-normal distribution. A distribution is said to be expected if its significance level > 0.05 , while if its significance level < 0.05 , the distribution is said to be non-normal. The data from the One-Sample Kolmogorov-Smirnov test in this study were analyzed using SPSS 22.0 for the normality test.

Table 1. Tests of Normality of Pre-test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experiment	.225	50	.000	.742	50	.000
Control	.192	50	.000	.925	50	.004

a. Lilliefors Significance Correction

The normality test in this study used the Kolmogorov Smirnov test because the study sample was 50, based on the results in Table 1, the Sig value of the experimental class pre-test was 0.000. While the results of the pre-test in the control class showed a Sig value of 0.000, data are said to be normally distributed if Sig > 0.05 significance level. Therefore, it can be said that the control class and experimental class data are normally distributed.

Table 2. Tests of Normality of Post-test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experiment	.330	50	.000	.790	50	.000
Control	.192	50	.000	.932	50	.005

a. Lilliefors Significance Correction

Based on the results in Table 2, the Sig value of the experimental class pre-test was 0.000. While the results of the post-test in the control class showed a Sig value of 0.000, data are said to be normally distributed if Sig > 0.05 significance level. Therefore, it can be said that the control class and experimental class data are normally distributed.

The non-normal distribution of both pre and post-test data in both experimental and control groups suggests that the assumption of normality was violated. While this departure from normality might affect the application of certain parametric tests, it is important to consider the robustness of the statistical methods employed, especially when dealing with relatively large sample sizes as in this study. Non-parametric tests or transformations could be considered to ensure the validity of the results.

Furthermore, despite the non-normality, the study's findings regarding the effectiveness of the concept mapping method in improving students' writing skills remain significant. The non-normal distribution does not necessarily negate the observed improvements; it simply prompts a cautious approach in result interpretation and statistical techniques application.

Homogeneity test

The homogeneity test aims to determine whether the two variables have the same variance. If the two variables have the same conflict, then the class is said to be homogeneous. If homogeneity is met, the researcher can proceed to the next step. To simplify data analysis, the researcher uses the SPSS program. The interpretation of the homogeneity test can be seen through the significance value. If the significance value is > 0.05, then the data can be homogeneous.

Table 3. Test of Homogeneity of Variance Pre-test

		Levene Statistic	df1	df2	Sig.
Pretest	Based on Mean	.159	1	95	.691
	Based on Median	.291	1	95	.591
	Based on Median and with adjusted df	.291	1	95	.591
	Based on trimmed mean	.136	1	95	.713

Decision making and concluding hypothesis testing is carried out at a significance level of 5%. If the significance is more than 0.05, it can be concluded that the variance is the same (homogeneous), but if the significance is less than 0.05, the variance is different. Based on the results of the homogeneity test in Table 2, the obtained Sig value is 0.691 > 0.05; it can be said that the two sample classes are homogeneous.

Table 4. Test of Homogeneity of Variance Post-test

		Levene Sstatistic	df1	df2	Sig.
Posttest	Based on Mean	13.713	1	98	.000
	Based on Median	11.203	1	98	.001
	Based on Median and with adjusted df	11.203	1	79.158	.001
	Based on trimmed mean	14.590	1	98	.000

Based on the output table "test of Homogeneity of Variances" above, it is known that the significance value (Sig.) of the variable "score" in the p post-test is 0.000. Since the Sig value of $0.000 > 0.05$ as the basis for decision-making in the homogeneity test above, it can be concluded that the variance of the learning outcomes data in the post-test is the same or homogenous.

These data implies that the concept mapping method had a significant impact on the students' writing skills in the experimental group, as reflected in the post-test scores. The variance in the post-test scores was different between the control and experimental groups, suggesting that the experimental group, exposed to the concept mapping method, exhibited varied levels of improvement compared to the control group.

This disparity in variances signifies the effectiveness of the concept mapping method in enhancing the quality of students' writing. The statistically significant difference in the post-test scores indicates that the experimental group, which utilized the concept mapping method, experienced a notable improvement in their writing abilities compared to the control group.

Test the Hypothesis

Average Difference Test

To see the effectiveness of mind mapping as a treatment to improve student memory, the difference in posttest scores is seen in the following the average difference test was used to test the differences in students' writing skills between the control group and the experimental group. This test uses an independent sample t-test. The following Table 3 presents the results of SPSS calculations related to the different test average writing skills of the control class students and the experimental class.

Table 5. Average Test of Pre-test

Group	Sig.	Mean	Std. Deviation	Std. Error Mean
Pretest Experiment Class	.000	56.80	9.871	1.396
Control Class	.000	58.46	6.286	.889

Based on the results in Table 5, Sig is $0.00 < 0.05$, according to the basis of the test decision making independent sample t-test can be concluded that H_0 is rejected and H_a is accepted, meaning that there is a difference between the average writing skills of experimental and class students' control. While the result of Table 6 average test of post-test below, shows that Sig is $0.00 < 0.05$, according to the basis of the test decision making independent sample t-test can be concluded that H_0 is rejected and H_a is accepted, meaning that there is a difference between the average writing skills of experimental and class students' control.

Table 6. Average Test of Post-test

Group	Sig.	Mean	Std. Deviation	Std. Error Mean
Posttest Experiment Class	.050	85.20	2.733	.387
Control Class	.050	59.54	6.572	.929

Data description about the different test between the treatment group and the control group above proves that there are differences in the level of remembering that students who were given mind mapping techniques in counseling treatment with students who were not given mind mapping techniques in counseling treatment. The level of ability to

remember students who were given mind mapping technique interventions in counseling was higher than students who did not receive mind mapping techniques in counseling.

The observation results of the writing skills of the control class and the experimental class are presented in Figure 3.

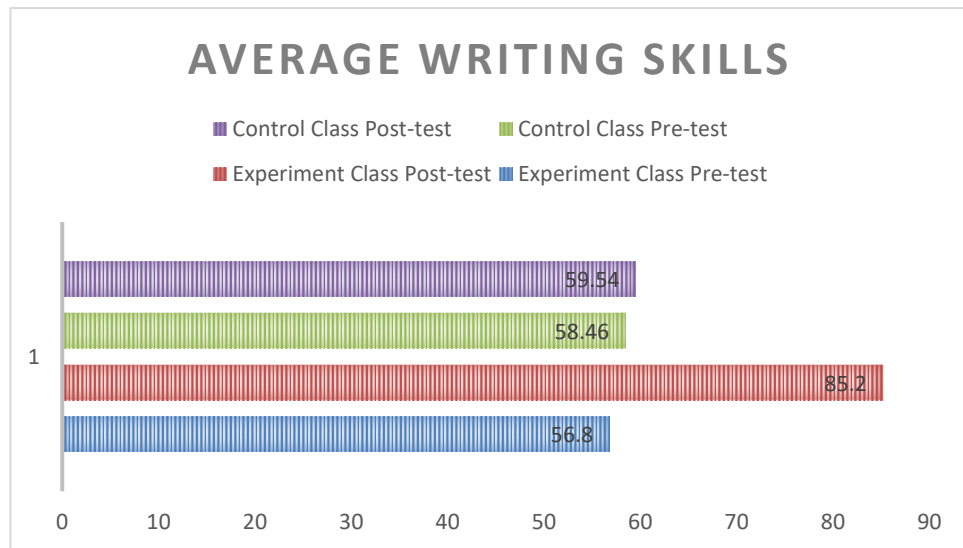


Figure3. Average of Writing Skills

The results of the pre-test observation or before learning in the control class with 'material gained an average score of 56.80 for experiment class and 58.46 for control class, then increased to score of 85.20 for experiment class and 59.54 for control class in the results of post-test observation or after learning with mind mapping. Meanwhile, the results of the pre-test observation or before learning using concept mapping in the experimental class obtained an average score of 56.80, then increased to 85.20 in the results of post-test observations or after learning using the concept mapping.

The findings of this study provide compelling evidence of the effectiveness of mind mapping techniques in enhancing students' writing abilities. The substantial increase in the post-test scores of the experimental group compared to the control group clearly demonstrates the positive impact of employing mind mapping strategies in teaching. The significant improvement observed in the experimental group's writing skills implies that the utilization of mind mapping facilitated better understanding, organization, and retention of information. By visually representing concepts and connections, mind mapping likely enhanced the students' ability to structure their thoughts coherently, resulting in improved writing quality.

Furthermore, the observed difference between pre-test and post-test scores in the experimental group (an increase from 56.80 to 85.20) is indicative of the effectiveness of the mind mapping intervention. This substantial improvement underscores the potential of mind mapping techniques as a valuable pedagogical tool, particularly in enhancing students' writing proficiency.

N-Gain Test

N-Gain test to determine the difference in increase between the value of the pre-test and post-test in the experimental class and the control the results of the N-Gain test can be seen in Figure 4.

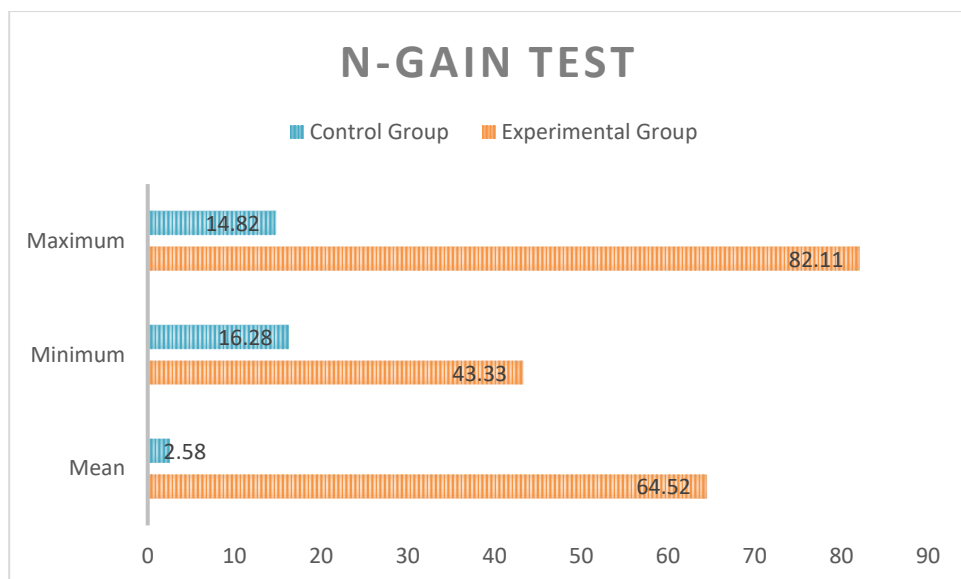


Figure 4. N-Gain Test

Based on Figure 4, it can be seen the percentage of N-Gain acquisition of students' writing skills. In the control class, there are no students who are in the high N-Gain category or the percentage is 0%, while in the experimental class students reach a high category of 82.11%. This shows that the acquisition of writing skills of students in the experimental class is better than the control class, as well as the creator of the effectiveness of concept mapping (mind mapping) method in improving the quality of students' writing at Universitas Hasanuddin as evidenced by the results of the experimental class N-Gain in the medium category.

The data reveals a clear contrast in writing skills improvement between the control and experimental groups, with the experimental group showing a remarkable 82.11% enhancement. This stark difference underscores the efficacy of the concept mapping (mind mapping) method in elevating students' writing abilities. The exceptional post-test results further confirm the success of the teaching approach in providing students with a deep understanding of scientific writing.

In the realm of education, where effective communication of scientific ideas is crucial, the study's outcomes are highly promising. The ability of students to write scientific papers proficiently not only signifies academic achievement but also equips them with essential skills for future research endeavors and professional pursuits. The findings emphasize the significance of innovative teaching methods, such as concept mapping, in enhancing the educational experience and empowering students to excel in their academic pursuits.

4. Discussion

The Students typically have more time to consider when writing than when speaking. They can use what they know in their heads as well as dictionaries, grammar books, and other reference materials to assist them. Writing is frequently used to prepare for another activity, particularly when students create phrases as a precursor to discussing activities. Writing can also be utilized as part of a broader activity in which the emphasis is on something else, such as language practice, acting out, or speaking. The term "writing system" has two distinct meanings, one associated with broad ideas of writing and the other with specific languages [49].

The data in the experimental class above stated that the average score on the pre-test was 56.60 and the average score on the post-test was 85.20. While in the control class the

average score on the pre-test was 58.46 and the average score on the post-test was 59.54. This means that mind mapping techniques are effective in Apply in teaching writing in the classroom and can improve students' writing skills. Mind maps, it assists pupils remember information because they store it in a way that the mind finds easy to recall and quick to review [50]. It also assists pupils in developing innovative and creative thinking skills [51,52]. Furthermore, mind maps can be utilized to build learning environments in which students are eager to learn and can be used at various phases of the learning process. The mind-mapping technique appears to be particularly appropriate to assisting students in preparing their writing because the strategy enables students to develop ideas and adopt a deeper degree of understanding of the writing themes. Students in this subject are tasked with organizing small descriptive texts using several phases of mind maps. As a result, the mind mapping technique has an impact on students' capacities to prepare and arrange their ideas for writing projects under exam settings. Mind mapping is also very useful for developing a complete grasp of all the major concepts involved in a subject area as well as boosting creativity, organization, productivity, and memory [53].

When using the mind mapping technique, the treatment period was followed by a posttest in which the learners attempted a writing post-test. The data were examined and provided a clear picture of the learners' performance prior to and following the treatment phase. Mind mapping can facilitate students in composing ideas into complete paragraphs [54]. The findings of this study revealed that there was a substantial difference in the grades of learners who were taught using mind mapping techniques vs those learners (controlled portion) who were taught writing using some standard procedures. It became clear that the mind-mapping approaches improved the writing talents of the experimental group's students more than the traditional teaching strategies. Mind mapping strategies can help students enhance their writing skills during the teaching writing process, as well as increase their attractiveness and attention on the teaching-learning process since they can attain their learning goal. As a result, it is possible to conclude that students' writing skills in the experimental class were superior to those in the control class.

Learning with the mind mapping method has the advantage of motivating students to be more imaginative or imaginative. In the control class, the classroom atmosphere was less conducive and the learning process less efficient when compared to the experimental class. It's seen that while learning continues, there are still a lot of students who are busy with their own work. From the findings, there's a difference. Learning activities that take place between the control class and the experiment class. The awarding of a posttest in both classes with the same subject after learning continued showed that the posttest results obtained by students in the experimental class and the control class seemed significantly different. It shows that the overall use of mind mapping methods has a significant influence on the ability of students to write scientific papers.

Based on the post-test results obtained after the learning of scientific writing, all students scored in the excellent group. This suggests that the learning approach successfully equipped students with a good understanding of how to write scientific papers. This is a highly encouraging outcome, indicating that the learning method used effectively improved students' scientific writing skills. Students must be able to write scientific papers in order to succeed in school. Students who can write scientific papers can improve their critical and analytical thinking skills as well as have a deeper understanding of the topics being studied. As a result, the post-test results indicating that all students attained an exceptional category in writing scientific articles are very encouraging and provide hope that students can improve scientific writers in the future.

5. Conclusion

After conducting data analysis as described in the results and discussion section above, it can be concluded that students' academic writing ability level, specifically in scientific papers, in the pre-test phase before using the mind mapping method is categorized as fair, with an average score of 56.8-. Meanwhile, students' academic writing ability level, specifically in scientific papers, in the post-test phase after using the mind mapping method is categorized as excellent, with an average score of 85.2. This result indicates a significant improvement in the student's writing ability. It proves that the implementation of the mind mapping method is highly effective in enhancing the quality of students' writing.

Writing is regarded as one of the most difficult activities by both students and lecturers since it entails various processes, one of which is thinking in the language. Mind mapping allows students to memorize aloud, visualize material, and store it in their minds for subsequent recall. It is a successful note-taking system that may be used to subjects other than languages. Though the number of participants and duration of the intervention were limited in this study, the benefits received from that location are numerous. As a result, because mind mapping is a technique for introducing new knowledge, which is also the central purpose of language learning, it may be more actively integrated into the curriculum.

The following advantages will result from this research. Mind mapping will be widely pushed for its utility in helping students write better scientific papers. In the instructor training curriculum, the University will provide teaching on how to employ the writing process using numerous ways, including mind mapping. Students will attempt to create relationship frameworks for writing in order to improve their academic performance. Finally, investigations with other subjects will be conducted utilizing larger sample sizes and a full quantitative survey to examine the impact of visual, not just in literature but also in several domains of expertise or another subject.

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