JISIP (Jurnal Ilmu Sosial dan Pendidikan)
Vol. 10 No. 4 November 2026
e-ISSN : 2656-6753, p-ISSN: 2598-9944
DOI: *10.36312/jisip.v10i4.11635/http://ejournal.mandalanursa.org/index.php/JISIP/index*

The Effect of Vocabulary Games and Mind Mapping on Students' Vocabulary Mastery

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Article Info
Article history:
Received: 28 October 2026
Publish: 9 November 2026

Keywords:
Vocabulary Mastery;
Vocabulary Games;
Mind Mapping;
Quasi-Experimental Design;
Junior High School.

Abstract
The Effect of Vocabulary Games And Mind Mapping On Students' Vocabulary Mastery Vocabulary mastery is fundamental to English learning, yet many junior high school students in Indonesia continue to struggle to recognize, spell, and correctly use English words. This study examined the effect of combining vocabulary games and mind mapping on students' vocabulary mastery at SMPN 10 Mataram in the 2025/2026 academic year. A quantitative approach with a quasi-experimental, non-equivalent control group pretest-posttest design was employed. Fifty seventh-grade students, drawn through purposive sampling from two intact classes, were assigned to an experimental group (n = 25), which received vocabulary games followed by mind mapping instruction, and a control group (n = 25), which received conventional vocabulary instruction. Vocabulary mastery was measured with a 25-item multiple-choice test covering four indicators meaning, spelling, grammatical function, and part of speech. Data were analyzed descriptively and inferentially using SPSS 18, including the Shapiro-Wilk normality test, Levene's homogeneity test, and the paired-samples t-test. The results showed that the experimental group's mean score increased from 60.24 in the pretest to 87.28 in the posttest, a gain of 27.04 points, while the control group increased only from 57.80 to 63.52, a gain of 5.72 points. Paired-samples t-tests confirmed that both improvements were statistically significant (experimental group t (24) = -18.020, p = .000 control group t (24) = -6.349, p = .000), but the magnitude of improvement was markedly larger for the group taught with vocabulary games and mind mapping. These findings indicate that the alternative hypothesis is supported the combination of vocabulary games and mind mapping has a significant effect on students' vocabulary mastery and outperforms conventional instruction. The study suggests that English teachers integrate game-based activation with visual mind-mapping consolidation to enhance vocabulary learning outcomes.

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1. INTRODUCTION

Vocabulary mastery is a fundamental component of learning English because vocabulary serves as the basis for understanding and using language effectively it supports students' ability to read, write, form sentences, and understand meaning in context [1]. Without adequate vocabulary, students struggle to develop other language skills, since vocabulary underlies reading, writing, speaking, and listening alike [2]. Various reports nevertheless indicate that students' vocabulary mastery in many developing countries, including Indonesia, remains low. Students tend to memorize word lists without understanding the semantic relationships among words, which makes the vocabulary they learn easy to forget, while less varied teaching strategies further reduce their motivation to learn [3]. Vocabulary learning involves more than memorizing word meanings it also

requires learners to develop knowledge of word forms, meanings, and uses through appropriate learning strategies [4]

This condition is also visible in classroom practice, where vocabulary is frequently taught through conventional translation and memorization. Such methods offer limited opportunities for active participation, so students tend to become passive, unmotivated, and unable to organize vocabulary systematically, which in turn depresses learning outcomes and confidence in using English. These limitations point to the need for more innovative and interactive strategies. One such strategy is the use of vocabulary games, which can increase motivation, create an enjoyable classroom atmosphere, and encourage active engagement prior research shows that game-based vocabulary activities significantly improve student participation and learning outcomes [5]. Through games, students encounter and use target vocabulary in communicative contexts rather than through rote memorization alone.

A complementary strategy is mind mapping, a visual technique that helps students organize concepts, connect related words, and strengthen memory retention. Mind mapping enables students to understand relationships among vocabulary items in a more systematic way, and it has been shown to be effective for grouping words by category and visualizing conceptual relationships, while also fostering critical and creative thinking [6]. Vocabulary games and mind mapping are thus complementary games stimulate motivation and communicative engagement [7]. whereas mind mapping supports the cognitive organization of vocabulary through visual association [8]. Visual representations can support learning when words and related visual information are organized meaningfully, helping learners process and connect new information [9]. Applied sequentially - games to activate engagement, followed by mind mapping to consolidate understanding - the two strategies address both the motivational and organizational dimensions of vocabulary learning. This complementarity is theoretically grounded in Dual Coding Theory which holds that learning is more effective when information is processed simultaneously through verbal and visual channels.

Although previous studies have examined vocabulary games and mind mapping separately - [3] on mind mapping through classroom action research, [5] on word-mapping games, and [6] on mind mapping's effect on vocabulary outcomes - relatively few studies have quantitatively tested the combined, sequential use of both strategies within a single experimental design. This gap motivates the present study, which examines whether the integration of vocabulary games and mind mapping produces a significant effect on students' vocabulary mastery. Specifically, this study addresses the question is there a significant effect of vocabulary games and mind mapping on students' vocabulary mastery at SMPN 10 Mataram in the 2025/2026 academic year? The objective of this study is to examine that effect, with the expectation of contributing both theoretically - to the development of complementary, dual-coding-based vocabulary teaching strategies - and practically, by offering teachers an innovative, empirically tested alternative to conventional vocabulary instruction. This approach is consistent with Dual Coding Theory, which explains that verbal information and nonverbal mental representations can contribute to cognitive processing and memory[10]

2. RESEARCH METHOD

This study employed a quantitative approach using a quasi-experimental design, specifically the Non-Equivalent Control Group Pretest-Posttest Design [11]. This design was selected because random assignment of individual students to experimental and control groups was not practically or ethically feasible within the intact classroom structure of the school. Two existing classes were assigned, without randomization, as the experimental group (receiving vocabulary games followed by mind mapping instruction) and the control group (receiving conventional vocabulary instruction). Both groups completed a pretest before treatment and a posttest afterward, allowing the researcher to determine whether the treatment produced a statistically significant effect on vocabulary mastery [12]

Table 1. Non-Equivalent Control Group Pretest-Posttest Design

Group	Pre-test	Treatment	Post-test
Experimental group	O_1	X	O_2
Control group	O_3		O_4

The population of this study consisted of all seventh-grade students of SMPN 10 Mataram in the 2025/2026 academic year, comprising five classes (VII-A to VII-E) with 25 students each, for a total of 125 students. Using purposive sampling, two intact classes were selected as the sample: Class VII-A (25 students) as the experimental group and Class VII-B (25 students) as the control group, yielding a total sample of 50 students. Purposive selection of intact groups was considered appropriate given the constraints of a quasi-experimental design conducted within a real school setting [12].

The research instrument Vocabulary mastery was measured using a multiple-choice test adapted directly from the English textbook used at the school, ensuring alignment with the curriculum and students' proficiency level. The test comprised 25 items for the pretest and 25 equivalent items for the posttest (50 items in total), each with four answer options, covering the four indicators of meaning, spelling, grammatical function, and part of speech. Both the pretest and posttest were administered within a 40-minute time limit.

Data was collected through a three-stage procedure. First, both groups completed the 25-item pretest to establish baseline vocabulary mastery. Second, the experimental group received treatment across multiple sessions: a games phase in which students searched for and used target vocabulary in an interactive, competitive format, followed by a mind-mapping phase in which students organized the vocabulary encountered into a branched visual diagram grouped by word category. The control group received conventional vocabulary instruction over the same period. Third, both groups completed a 25-item posttest equivalent in format and difficulty to the pretest.

3.RESULTS AND DISCUSSION

A. Research Results

Descriptive analysis was conducted to summarize the pretest and posttest scores of the experimental and control groups, as presented in Table 3.

Table 2. Descriptive Statistics of Pretest and Posttest Scores

Group	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experimental	25	42	75	60.24	10.549
Posttest Experimental	25	60	100	87.28	12.106
Pretest Control	25	42	75	57.80	10.851
Posttest Control	25	44	84	63.52	12.169

As shown in Table 2, the experimental group's mean score increased from 60.24 (SD = 10.55) at pretest to 87.28 (SD = 12.11) at posttest, a gain of 27.04 points. The control group's mean score also increased, from 57.80 (SD = 10.85) at pretest to 63.52 (SD = 12.17) at posttest, but by a considerably smaller margin of 5.72 points. The maximum posttest score reached 100 in the experimental group compared with 84 in the control group, indicating that students who received vocabulary games and mind mapping instruction achieved a substantially wider range of improvement than those taught conventionally.

Because each group consisted of 25 students, the Shapiro-Wilk test was used to examine whether the data were normally distributed, as shown in Table 2.

Table 3. Shapiro-Wilk Normality Test

Group	Statistic	df	Sig.
Pretest Experimental	.901	25	.019
Posttest Experimental	.893	25	.013
Pretest Control	.927	25	.074
Posttest Control	.943	25	.174

Table 3 shows that the pretest and posttest scores of the control group were normally distributed ($p = .074$ and $p = .174$, respectively, both $> .05$). The experimental group's scores, however, deviated from a strictly normal distribution (pretest $p = .019$ posttest $p = .013$, both $< .05$). This deviation is common in small-sample, gain-oriented experimental data and, given the robustness of the paired-samples t-test to moderate departures from normality at this sample size, the parametric test was retained this is nonetheless noted as a limitation of the study and discussed further below.

Table 4. Paired Samples Test

Grup	Mean Diff.	Std. Dev.	Std. Error Mean	t	df	Sig. (2-tailed)
Pretest-Posttest Experimental	-27.040	7.503	1.501	-18.020	24	.000
Pretest-Posttest Control	-5.720	4.505	.901	-6.349	24	.000

As presented in Table 4, the paired-samples t-test for the experimental group yielded t(24) = -18.020, p = .000, and for the control group, t (24) = -6.349, p = .000. Since both significance values are far below the .05 threshold, the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted for both groups: vocabulary mastery improved significantly from pretest to posttest in both conditions. Critically, however, the mean gain in the experimental group (27.04 points) was more than four times larger than the mean gain in the control group (5.72 points), even though Levene's test confirmed that the two groups began with statistically comparable variance. This pattern indicates that while conventional instruction alone produced a modest, statistically detectable improvement, the combination of vocabulary games and mind mapping produced a substantially larger effect, supporting the alternative hypothesis that vocabulary games and mind mapping have a significant effect on students' vocabulary mastery.

B. Discussion

The findings of this study confirm that integrating vocabulary games and mind mapping significantly improves students' vocabulary mastery, and that this combined strategy is considerably more effective than conventional instruction alone. The experimental group's substantial gain, from a mean of 60.24 to 87.28, reflects improvement across the four measured indicators of meaning, spelling, grammatical function, and part of speech, whereas the control group's smaller gain suggests that conventional translation-and-memorization instruction produces only limited improvement over the same instructional period.

These results align with and extend previous research. [5] found that word-mapping games effectively improved students' vocabulary mastery, while Akbar, Korompot, and [6] demonstrated that mind mapping alone produced a significant improvement in vocabulary learning outcomes [3] likewise showed that mind mapping improved vocabulary mastery through classroom action research. The present study extends these single-strategy findings by showing that sequencing the two strategies - using games to activate motivation and engagement before using mind mapping to consolidate and organize the vocabulary encountered - produces a markedly larger improvement than either strategy would be expected to produce alone, or than conventional instruction produces. This is consistent with Dual Coding Theory because vocabulary games engage the verbal channel through communicative language use and mind mapping engages the visual channel through graphic organization, students in the experimental group processed target vocabulary through two complementary channels, which likely strengthened encoding and retention relative to the single-channel, translation-based approach used with the control group.

The strong positive correlations between each group's pretest and posttest scores (r = .789 for the experimental group and r = .930 for the control group, both p = .000) indicate that students' relative standing was stable across the two measurement points, which strengthens confidence in the paired comparisons. At the same time, the lower correlation in the experimental group, together with its non-normal score distribution (Table 2), suggests that the treatment did not simply shift every student's score by a similar amount rather, individual students appear to have benefited from the games-and-mapping treatment to differing degrees, an effect worth exploring in future item-level or qualitative analysis.

These findings should be interpreted alongside several limitations. First, the quasi-experimental design used intact classes rather than random assignment of individual students, which leaves open the possibility that pre-existing class-level differences, rather than the treatment alone, partly contributed to the outcome, although the homogeneity of variance test suggests the two groups were comparable. Second, the experimental group's pretest and posttest scores departed from strict normality, which is a caveat for the parametric paired-samples t-test and suggests that a non-parametric alternative (e.g., the Wilcoxon signed-rank test) could usefully corroborate these results in future work. Third, the study did not include an independent-samples comparison of the two groups' posttest scores directly, relying instead on within-group pre-post comparisons; future studies

could incorporate an independent-samples t-test or ANCOVA controlling for pretest scores to more directly quantify the between-group effect size. Finally, the sample was limited to 50 seventh-grade students from a single school, which constrains the generalizability of the findings to other grade levels, schools, or regions.

4. CONCLUSION

This study examined the effect of combining vocabulary games and mind mapping on the vocabulary mastery of seventh-grade students at SMPN 10 Mataram. The results show that both the experimental group (taught with vocabulary games followed by mind mapping) and the control group (taught conventionally) experienced statistically significant improvement from pretest to posttest ($p = .000$ for both). However, the experimental group's improvement (27.04 points) was substantially larger than the control group's (5.72 points), indicating that the combined strategy is markedly more effective than conventional vocabulary instruction. These findings support the alternative hypothesis that vocabulary games and mind mapping have a significant effect on students' vocabulary mastery, and they lend empirical support to the theoretical proposition that sequencing motivational, communicative activities with visual, organizational activities produces more effective vocabulary learning than either approach used alone.

Pedagogically, these findings suggest that English teachers can enhance vocabulary instruction by first engaging students through interactive vocabulary games and then consolidating that exposure through mind-mapping activities that visually organize newly learned words. For future research, it is recommended that subsequent studies employ random assignment where feasible, apply non-parametric confirmatory tests given the observed departures from normality, include a direct independent-samples comparison of posttest scores between groups, and extend the investigation to other grade levels, language skills, and school contexts to strengthen the generalizability of these findings.

5. ACKNOWLEDGMENTS

The researcher would like to express sincere gratitude to the Department of English Education, Mandalika University of Education, and to the two supervisors,Aprianoto,M.Pd. and Terasne, M.Pd., for their guidance and support throughout this research. Appreciation is also extended to SMPN 10 MATARAM, its teachers, and the seventh-grade students who participated as respondents in this study.

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