

Strengthening SMA/MA Students' Language Attitudes Towards Indonesian Through the Word Spinner Application

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ABSTRACT

The Influence of the Mind Mapping Model on the Ability to Write Summary Plots of Fiction Short Stories in Grade XI Students of SMA Negeri 1 Besitang". This study aimed to examine the effect of the Mind Mapping model on students' ability to write summaries of the plot of fictional short stories among eleventh-grade students of SMA Negeri 1 Besitang. This study employed a quantitative approach using a quasi-experimental method with a nonequivalent control group design. The population of this study consisted of all eleventh-grade students of SMA Negeri 1 Besitang, while the sample included two classes: an experimental class taught using the Mind Mapping model and a control class taught using conventional learning methods. Data were collected through a writing test that focused on summarizing the plots of fictional short stories. The data were analyzed using statistical tests, including normality testing, homogeneity testing, and hypothesis testing using a t-test. The results of the study indicate a significant difference in students' ability to write summaries of fictional short story plots between those taught using the Mind Mapping model and those taught using conventional methods. The average score of students in the experimental class was higher than that of students in the control class. These findings demonstrate that the Mind Mapping model has a positive effect on students' ability to write summaries of fictional short story plots. Based on the results, it can be concluded that the Mind Mapping model is effective in teaching writing skills, particularly in improving students' ability to summarize the plot of fictional short stories.

Keywords: Mind Mapping, Writing Ability, Plot Summary, Short Stories

I. INTRODUCTION

Mind Mapping, developed by British psychologist Tony Buzan in the 1970s, represents a revolutionary approach to organizing thoughts and information through visual representation. This technique leverages the brain's natural inclination for visual processing and associative thinking, transforming linear note-taking into a radial hierarchical structure that mirrors neural connections. De Porter and Hernacki define Mind Mapping as a technique that utilizes the whole brain through visual imagery and graphic infrastructure to create lasting impressions. This cognitive tool facilitates the connection between ideas and concepts, enabling learners to retrieve information more efficiently while enhancing their creative thinking capacity.

The pedagogical value of Mind Mapping in educational contexts stems from its alignment with constructivist learning theories, which emphasize active knowledge construction through meaningful connection-making. Mind Mapping encourages divergent thinking and supports learners in establishing relationships among disparate pieces of information. Harfika et al. (2020) demonstrated that Mind Mapping techniques facilitate students in connecting ideas and concepts, thereby enhancing their ability to extract information and improve writing skills. The visual-spatial nature of mind maps supports the cognitive processes involved in planning, organizing, and synthesizing information all critical components of effective writing (Harfika et al., 2020).

Writing represents the culminating skill among the four language competencies: listening, speaking, reading, and writing. Unlike receptive skills, writing demands active production and synthesis of linguistic, cognitive, and metacognitive abilities. Gustina (2019) characterized writing as a productive and expressive activity that requires mastery of vocabulary, writing conventions, and language structures. Writing is complex because of its multifaceted nature, which involves content generation, organization, linguistic encoding, and revision processes (Gustina, 2019).

Within the Indonesian educational context, particularly at the senior high school level, students are expected to produce various text types with appropriate attention to social functions, text structure, and linguistic

features. However, pedagogical practice often emphasizes theoretical knowledge over practical application, resulting in limited writing proficiency. Azis (2019) and Rahmadani (2019) note that when writing instruction focuses predominantly on theory without adequate practice opportunities, students fail to develop habitual writing behaviors, consequently struggling to transform ideas into written expression (Azis, 2019)(Rahmadani, 2019).

The challenge intensifies when students confront tasks requiring synthesis and summarization, such as creating plot summaries of fictional narratives. Such assignments require not only comprehension of narrative elements but also the capacity to distinguish essential information from supplementary details, organize content logically, and express ideas concisely. Many students experience difficulty identifying key story elements or tend to retell stories extensively rather than producing focused summaries. This struggle reflects inadequate strategies for information processing and organization—precisely the areas where Mind Mapping demonstrates pedagogical promise.

Short stories constitute a significant literary form, characterized by brevity, unity of effect, and a concentrated narrative structure. According to Kosasih, short stories are narratives that can be read in approximately 10-30 minutes, typically containing 500-5,000 words. Despite their brevity, short stories encompass complete narrative structures including exposition, rising action, climax, falling action, and resolution. The intrinsic elements of short stories—theme, plot, setting, characterization, point of view, language style, and moral message—work synergistically to create coherent and impactful narratives.

Summarizing fictional narratives requires students to engage in complex cognitive processes, including comprehension, analysis, synthesis, and evaluation. Effective summarization requires an understanding of narrative structure, identification of causal relationships between events, recognition of character motivations, and appreciation of thematic significance. Students must navigate between capturing essential plot developments, maintaining narrative coherence, and adhering to brevity constraints. This multifaceted task aligns with the higher-order thinking skills emphasized in contemporary educational frameworks.

Substantial research evidence supports the efficacy of Mind Mapping in enhancing writing competencies across diverse contexts. Fanita (2021) demonstrated that English writing instruction incorporating Mind Mapping strategies significantly improved student achievement (Fanita, 2021). Similarly, Saharah and Indihadi (2019) found that Mind Mapping techniques positively influenced students' summary writing skills in Indonesian language instruction. Sarumaha (2019) reported notable improvements in expository text writing following Mind Mapping implementation. These studies collectively suggest that Mind Mapping transcends linguistic and textual boundaries, offering versatile pedagogical applications (Saharah, S., & Indihadi, 2019). The effectiveness of Mind Mapping stems from its support for both planning and drafting phases of the writing process. During planning, mind maps enable writers to brainstorm freely, establish hierarchical relationships among ideas, and visualize the overall structure of their work. During drafting, an organized visual representation serves as a scaffold, reducing cognitive load and allowing writers to focus on linguistic expression. Furthermore, Mind Mapping accommodates diverse learning preferences, particularly benefiting visual and kinesthetic learners who may struggle with traditional linear approaches to writing instruction.

Despite the robust evidence base, research specifically examining Mind Mapping's application to plot summary writing of fictional short stories at the senior high school level remains limited. This gap motivates the present investigation, which seeks to contribute empirical evidence regarding Mind Mapping's effectiveness in this specific pedagogical context while providing practical insights for Indonesian language educators seeking to enhance narrative writing instruction.

II. METHODS

A. Research Design

This study employed a quantitative research approach utilizing a quasi-experimental design to investigate the causal effect of Mind Mapping implementation on students' plot summary writing ability. The quasi-experimental approach was selected as most appropriate given the practical constraints of educational research in authentic school settings, where random assignment of individual students to experimental conditions would disrupt established classroom organizations and prove logistically impractical. Quasi-experimental designs offer a reasonable compromise, enabling rigorous causal inference while maintaining ecological validity in naturalistic educational contexts (Arikunto, 2017).

Specifically, this investigation adopted a nonequivalent control group design, a widely-utilized quasi-experimental structure that incorporates both experimental and control groups receiving pre-test and post-test assessments. This design offers several methodological advantages. First, pre-test administration enables the assessment of initial equivalence between experimental and control groups, allowing researchers to account statistically for any pre-existing differences. Second, the inclusion of a control group permits the attribution of

observed changes to the experimental intervention rather than to maturation, testing effects, or other confounding variables. Third, post-test comparison between groups directly addresses the research question regarding Mind Mapping's differential effectiveness compared to conventional instruction.

The experimental group received instruction in plot summary writing incorporating the Mind Mapping model, while the control group received conventional instruction employing lecture and discussion methods typical of standard Indonesian language pedagogy. Both groups experienced equivalent instructional time, used identical short story texts as source material, and completed identical assessment tasks. The primary difference between the two conditions was the organizational strategy taught: Mind Mapping for the experimental group versus traditional outlining approaches for the control group (Sugiyono, 2019).

B. Research Setting and Timeline

This study was conducted at SMA Negeri 1 Besitang, a public senior high school located in Besitang District, Langkat Regency, North Sumatra Province, Indonesia. The school was selected based on several criteria including accessibility for the researcher, administrative support for the investigation, typical characteristics representative of Indonesian public secondary schools, and the presence of student performance challenges in writing that motivated the study.

The research was conducted during the academic year 2025, specifically from August to November, encompassing approximately three months of data collection. This timeline accommodated multiple phases of the research process, including pre-testing, instructional intervention implementation, post-testing, and preliminary data analysis. The extended timeframe enabled sufficient exposure to the Mind Mapping intervention to potentially produce measurable effects while fitting within a single academic semester to minimize confounding from curriculum changes or other temporal factors (Creswell, 2021).

C. Population and Sample

The research population comprised all eleventh-grade students enrolled at SMA Negeri 1 Besitang during the 2025 academic year. The eleventh-grade level was selected because students at this stage possess foundational narrative comprehension skills while still developing advanced writing competencies, making them an appropriate target population for interventions aimed at enhancing summary writing abilities. The total eleventh-grade population consisted of 60 students distributed across two classes: 30 students in the science track (XI MIPA) and 30 students in the Social Sciences track (XI IPS).

Sample selection employed a purposive random sampling technique, combining elements of purposive and simple random sampling to balance practical considerations with the principles of randomization. The purposive component involved selecting the two eleventh-grade classes based on comparability criteria including similar class sizes (both containing 30 students), equivalent prior achievement levels based on previous semester grades, comparable demographic characteristics, and instruction by teachers with similar experience levels. These selection criteria aimed to enhance initial equivalence between groups, strengthening the quasi-experimental design.

Following purposive selection of the two comparable classes, simple random sampling through a lottery method determined experimental condition assignment. Each class was assigned a number, and a random drawing designated one class as the experimental group and the other as the control group. This randomization procedure, while applied at the class rather than the individual level, introduced an element of chance into group assignment that reduced systematic bias and strengthened causal inference.

The final sample consisted of 30 students in the experimental group (XI MIPA class receiving Mind Mapping instruction) and 30 students in the control group (XI IPS class receiving conventional instruction), yielding a total sample size of 60 participants. This sample size provides adequate statistical power for detecting medium-to large-effect sizes while remaining practically manageable within the constraints of a master's thesis research project.

D. Variables

This investigation examined two primary variables: the independent variable (instructional method) and the dependent variable (plot summary writing ability).

Independent Variable: The independent variable, instructional method, consisted of two levels corresponding to the experimental and control conditions. In the experimental condition, the instruction incorporated the Mind Mapping model, wherein students learned to create visual diagrams organizing story elements hierarchically around central concepts. Instruction explicitly taught Mind Mapping principles, provided modeling of the technique applied to short stories, offered guided practice opportunities with feedback, and required students to create mind maps prior to drafting their written summaries. In the control condition, instruction followed

conventional approaches typical of Indonesian language pedagogy, emphasizing lecture-based content delivery, teacher-led discussion, and traditional linear note-taking without the systematic introduction of visual organizational strategies.

Dependent Variable: The dependent variable, plot summary writing ability, was operationally defined as students' performance on a standardized assessment requiring them to read a short story and produce a written summary capturing the essential plot elements. Writing quality was evaluated using a comprehensive rubric assessing eight dimensions: (1) title appropriateness—the extent to which the summary title accurately reflects story content; (2) theme identification—accurate recognition and articulation of the story's central theme; (3) plot organization—logical sequencing of events capturing exposition, rising action, climax, falling action, and resolution; (4) setting description—appropriate identification of temporal and spatial contexts; (5) characterization—accurate identification of main characters and their roles; (6) point of view consistency—appropriate recognition and maintenance of narrative perspective; (7) language style—effective use of descriptive language and varied sentence structures; and (8) language usage—grammatical accuracy, spelling, punctuation, and adherence to standard written Indonesian conventions.

E. *Instrumentation*

Data collection employed a performance-based writing assessment administered as both a pre- and post-test. The assessment instrument consisted of an authentic writing task requiring students to read a short story and compose a summary capturing the essential plot in approximately 200-300 words. The same short story text was used for both pre- and post-test administrations to enable a direct comparison of performance changes over time.

The writing assessment was evaluated using an analytical scoring rubric developed specifically for this study, based on the established principles of narrative analysis and writing assessment. The rubric evaluated eight dimensions of summary quality, each assigned a maximum point value reflecting its relative importance: title appropriateness (8 points), theme (8 points), plot (16 points), setting (16 points), characterization (16 points), point of view (8 points), language style (16 points), and language usage (12 points), yielding a total score of 100 points.

For each dimension, the rubric specified performance criteria corresponding to different quality levels. Scoring proceeded through systematic application of criteria by trained raters who reviewed each summary holistically before assigning dimension-specific scores. To enhance scoring reliability, a random sample of 20% of the summaries was independently scored by two raters, with inter-rater reliability calculated to ensure consistent application of scoring criteria. Any discrepancies exceeding one point on any dimension were resolved through discussion and consensus.

F. *Data Collection Procedures*

Data collection proceeded through a systematic, multi-phase process. First, pre-testing was conducted during the initial week of the study, before any instructional intervention. Students in both the experimental and control groups received identical instructions to read a short story and compose a summary capturing the essential plot. Students worked independently under standardized conditions, with 60 minutes allocated for reading and writing. Pre-test responses were collected, de-identified by assigning numeric codes, and scored using the analytical rubric.

Second, the instructional intervention was implemented over a six-week period, with each group receiving three 90-minute instructional sessions per week, focusing on narrative analysis and summary writing. In the experimental group, the instruction systematically introduced Mind Mapping principles through explicit teaching, demonstrative modeling, guided practice with feedback, and independent application. Sessions progressed from teacher-led demonstrations of Mind Mapping applied to short stories, through collaborative small-group creation of mind maps, to independent student construction of mind maps as pre-writing tools for their summaries.

The instructional activities in the experimental group included: (1) introduction to Mind Mapping principles and demonstration of basic mapping techniques; (2) teacher modeling of Mind Mapping applied to analyzing short story structure; (3) collaborative mind mapping in small groups with teacher guidance; (4) individual mind map creation for assigned short stories; (5) peer feedback on mind maps prior to drafting; (6) composition of written summaries based on mind maps; and (7) revision of summaries with attention to organizational coherence.

In the control group, instruction followed conventional approaches, including (1) teacher lecture on narrative elements and summary writing principles; (2) whole-class discussion of short stories; (3) teacher-led identification of plot elements; (4) note-taking in linear outline format; (5) drafting summaries based on linear

notes; and (6) teacher feedback on completed drafts. While the control group instruction addressed identical content regarding narrative elements and summary writing, it did not incorporate visual-spatial organizational techniques or systematic strategy instruction.

Third, post-testing was conducted during the week immediately following completion of the instructional intervention. The post-test employed procedures identical to the pre-test: students in both groups read the same short story used for pre-testing and composed summaries under standardized conditions with 60 minutes allocated. Post-test responses were collected, de-identified using the same coding system, and scored using the identical rubric applied to the pre-tests. Importantly, raters remained blind to whether any given summary represented a pre-test or post-test response and whether it came from experimental or control conditions, minimizing potential scorer bias.

G. Data Analysis

Data analysis employed both descriptive and inferential statistical procedures to address the research questions. Descriptive statistics, including means, standard deviations, minimum and maximum scores, and frequency distributions, were calculated for all variables to characterize the sample performance and identify any data irregularities. Descriptive analyses were conducted separately for the experimental and control groups at both pre- and post-test occasions, and for each of the eight writing quality dimensions as well as total scores.

Prior to inferential testing, the data were screened for statistical assumption violations. The normality of score distributions was assessed using the Shapiro-Wilk test, with non-significant results ($p > 0.05$) indicating an acceptable approximation to a normal distribution. The homogeneity of variance between groups was evaluated using Levene's test, with non-significant results indicating that the equivalent variance assumptions were met. Visual inspection of histograms and normal probability plots supplemented formal statistical tests to ensure appropriate interpretation.

The primary inferential analysis employed independent samples t-test to compare post-test performance between the experimental and control groups. This parametric test evaluates whether the mean differences between groups exceed what would be expected by chance alone, providing direct evidence of the effectiveness of Mind Mapping compared to conventional instruction. Statistical significance was evaluated using an alpha level of 0.05, with p-values below this threshold indicating significant differences. Effect size was calculated using Cohen's d to quantify the magnitude of group differences independent of sample size.

Additionally, paired-samples t-tests were used to compare pre-test and post-test scores within each group to evaluate changes over time. These within-group analyses provided evidence regarding whether each instructional approach produced significant improvements, thereby contextualizing the between-group comparison. The pattern of results across within-group and between-group tests enabled a comprehensive interpretation of Mind Mapping's effects.

To examine the differential effects across writing quality dimensions, supplementary analyses compared the experimental and control groups separately for each of the eight rubric dimensions. These dimension-specific analyses illuminated whether Mind Mapping's effects were uniform across all aspects of writing quality or concentrated in particular areas, providing insights into the mechanisms underlying the observed effects.

Finally, normalized gain scores (N-gain) were calculated to assess the magnitude of improvement relative to potential for growth. N-gain quantifies the proportion of possible improvement achieved, and is calculated as follows: $N\text{-gain} = (\text{post-test score} - \text{pre-test score}) / (\text{maximum score} - \text{pre-test score})$. N-gain values were interpreted using conventional thresholds: ≥ 0.70 indicates high gain, 0.30-0.69 indicates moderate gain, and < 0.30 indicates low gain. N-gain analysis provided complementary evidence regarding instructional effectiveness accounting for initial performance levels.

All statistical analyses were conducted using SPSS software version 26, and data management and preliminary descriptive analyses were performed using Microsoft Excel. Results were reported following the American Psychological Association (APA) guidelines for statistical reporting, including test statistics, degrees of freedom, p-values, effect sizes, and confidence intervals, where appropriate.

III. RESULTS AND DISCUSSION

A. Descriptive Statistics

Analysis of pre- and post-test data revealed substantial performance differences between the experimental and control groups, with students in the experimental group demonstrating markedly superior plot summary writing ability following Mind Mapping instruction. Table 1 presents comprehensive descriptive statistics for both groups across all measurement occasions.

Table 1. Descriptive Statistics of Writing Performance by Group and Test Occasion

Group	Test Occasion	N	Mean	SD	Minimum	Maximum
Experimental	Pre-test	30	66.0	8.3	48	80
Experimental	Post-test	30	89.0	5.2	78	98
Control	Pre-test	30	59.0	9.1	42	75
Control	Post-test	30	65.3	8.7	50	82

Pre-test results indicated that both groups began the study with adequate-level writing competency, with the experimental group ($M = 66.0$, $SD = 8.3$) performing slightly higher than the control group ($M = 59.0$, $SD = 9.1$). This 7-point difference, while noticeable, suggested reasonably comparable baseline competency between groups, validating the quasi-experimental design assumption of initial equivalence.

The post-test results revealed a dramatic divergence between the groups. The experimental group achieved a mean score of 89.0 ($SD = 5.2$), representing excellent performance and a 23-point improvement from the pre-test. In contrast, the control group attained a mean of 65.3 ($SD = 8.7$), representing adequate performance and only a 6.3-point improvement from the pre-test. The 23.7-point difference between groups at the post-test provides preliminary evidence of Mind Mapping's substantial effectiveness in enhancing plot summary writing ability.

B. Performance by Writing Quality Dimensions

To understand more precisely where Mind Mapping produced advantages, Table 2 presents the mean scores for each of the eight writing quality dimensions assessed by the analytical rubric.

Table 2. Mean Scores by Writing Quality Dimension and Group (Post-test)

Dimension	Max Score	Experimental Group Mean	Control Group Mean	Difference
Title Appropriateness	8	7.8	6.4	1.4
Theme	8	7.6	6.6	1.0
Plot	16	14.2	10.1	4.1
Setting	16	13.9	9.8	4.1
Characterization	16	13.7	9.5	4.2
Point of View	8	7.4	6.2	1.2
Language Style	16	13.5	9.1	4.4
Language Usage	12	10.9	7.6	3.3

These dimension-specific results illuminate Mind Mapping's differential effects across aspects of writing quality. The largest advantages for the experimental group appeared in plot organization (4.1-point difference), setting description (4.1-point difference), characterization (4.2-point difference), and language style (4.4-point difference). These dimensions involve organizing and synthesizing information about story elements—precisely the cognitive processes that Mind Mapping is designed to support.

Smaller but still substantial advantages appeared in language usage (3.3-point difference), title appropriateness (1.4-point difference), perspective (1.2-point difference), and theme identification (1.0-point difference). The

relatively smaller effects in these dimensions may reflect that they depend somewhat less on organizational abilities and more on other competencies such as grammatical knowledge or literary interpretation that Mind Mapping addresses less directly.

C. Statistical Inference Tests

C.1. Normality and Homogeneity Assumptions

Prior to conducting parametric statistical tests, data were evaluated for conformity with statistical assumptions. Shapiro-Wilk tests of normality yielded non-significant results for all distributions (all $p > 0.05$), indicating an acceptable approximation to a normal distribution. Levene's test for homogeneity of variance comparing the experimental and control groups also produced non-significant results ($p = 0.142$), indicating equivalent variance between groups. These results confirmed the appropriateness of the parametric independent samples t-test for between-group comparisons.

C.2. Between-Groups Comparison

An independent samples t-test comparing post-test scores between the experimental and control groups yielded highly significant results: $t(58) = 12.47$, $p < 0.001$, two-tailed. The experimental group's mean post-test score ($M = 89.0$, $SD = 5.2$) significantly exceeded that of the control group ($M = 65.3$, $SD = 8.7$). Cohen's d effect size calculation yielded $d = 3.25$, indicating an extremely large effect well exceeding the conventional thresholds for large effects ($d = 0.80$). This enormous effect size reflects that the experimental and control group distributions showed minimal overlap, with the typical experimental group student substantially outperforming the typical control group student.

C.3. Within-Groups Change Analysis

Paired-sample t-tests were used to examine pre-test to post-test changes within each group separately. For the experimental group, the 23-point improvement from pre-test ($M = 66.0$) to post-test ($M = 89.0$) was statistically significant: $t(29) = 18.63$, $p < 0.001$, Cohen's $d = 3.42$. For the control group, the 6.3-point improvement from pre-test ($M = 59.0$) to post-test ($M = 65.3$) was also statistically significant: $t(29) = 4.21$, $p < 0.001$, Cohen's $d = 0.77$. These results indicate that both instructional approaches produced significant improvements, but the magnitude of improvement in the experimental group far exceeded that in the control group—3.66 times larger in raw score terms and 4.44 times larger in effect size terms.

C.4. Normalized Gain Analysis

Normalized gain (N-gain) scores were calculated to quantify improvement relative to potential for growth. The experimental group achieved a mean N-gain of 0.68, approaching the threshold for "high gain" (≥ 0.70) and firmly within the "moderate gain" range (0.30-0.69). The control group achieved a mean N-gain of 0.15, which fell within the "low gain" range (< 0.30). These results corroborate the substantial differential effectiveness of Mind Mapping compared to conventional instruction, accounting for differences in baseline performance and ceiling effects.

D. Discussion

The results of this quasi-experimental investigation provide compelling evidence that Mind Mapping instruction significantly enhances eleventh-grade students' ability to write plot summaries of fictional short stories. The experimental group, which received systematic instruction in applying Mind Mapping to narrative analysis and summary composition, substantially outperformed the control group, which received conventional lecture-based instruction addressing identical content. The 23.7-point difference between groups at post-test, representing a Cohen's d effect size of 3.25, ranks among the largest effects documented in educational intervention research and substantially exceeds typical effect sizes for writing interventions.

These findings align with and extend previous research documenting the effectiveness of Mind Mapping across diverse writing tasks and educational contexts. The magnitude of effects observed here parallels or exceeds those reported in prior studies. For instance, Yamtinah et al. (2021) reported a 15-point improvement across instructional cycles using Mind Mapping for general writing tasks, which is—somewhat smaller than the 23-point improvement observed here (Yamtinah et al., 2021). Marlisa (2020) documented improvements from 74.45 to 85.00 (10.55 points) for narrative writing—again somewhat smaller than current findings. Ikbāl (2021) reported increases in competency attainment from 59.45% to 86.48% alongside score improvements from 73.51 to 84.32, representing substantial but still somewhat smaller effects than those observed in the present study (Maulina et al., 2021).

The particularly large effects documented in this study may reflect several factors. First, plot summary writing may represent an especially suitable application for Mind Mapping because it requires the kinds of organizational and synthesizing processes that Mind Mapping explicitly supports. Unlike some writing tasks that emphasize creative imagination or persuasive argumentation, summarizing fictional narratives centrally involves identifying structural elements, recognizing relationships among story components, and organizing information hierarchically—all processes directly facilitated by Mind Mapping's visual-spatial structure (MUKHLIFIDA, 2021).

Second, the initial performance levels of participants in this study (pre-test means of 59.0-66.0) indicated substantial room for improvement, potentially enabling larger gains than would be possible with higher-performing students approaching ceiling performance. The moderate baseline competency combined with high-quality instruction created optimal conditions for demonstrating intervention effects.

Third, the extended six-week intervention period with multiple instructional sessions provided sufficient exposure for students to internalize Mind Mapping strategies and apply them fluently. Brief interventions may produce smaller effects because students lack adequate time to master new techniques. The relatively intensive intervention implemented in this study likely contributed to the robust effects observed (Nugraha et al., 2019). Several theoretical mechanisms likely explain how Mind Mapping enhances plot summary writing ability. First, Mind Mapping provides an explicit external representation of story structure that reduces cognitive load during comprehension and composition processes. Cognitive load theory posits that working memory capacity limitations constrain simultaneous information processing. Complex tasks, such as summarizing narratives, impose heavy cognitive demands, including comprehending the source text, identifying key elements, organizing information, planning the composition, linguistically encoding ideas, and monitoring output quality. When these processes must occur simultaneously without external support, working memory becomes overloaded, impairing performance.

Mind Mapping addresses this challenge by externalizing the organizational component of the task. Once students create mind maps representing story structures, they can visually inspect the relationships among elements without taxing their working memory to maintain this information internally. This externalization frees cognitive resources for other aspects of composition such as linguistic expression and revision, potentially explaining the observed improvements not only in organizational dimensions but also in language style and usage (Puspitasari & Niopani, 2021).

Second, Mind Map's hierarchical, radial structure aligns with the inherent structure of narratives, facilitating the recognition of relationships among story elements. Narratives are naturally organized around central conflicts with related characters, settings, and events that constitute subordinate elements. The visual format of mind Mapping, with central concepts radiating to connected subordinate ideas, mirrors this narrative structure. When students create mind maps of short stories, the technique's structure prompts them to identify central conflicts, recognize how characters and settings relate to these conflicts, and trace causal sequences of events—all essential for producing coherent plot summaries.

Third, Mind Mapping engages multiple cognitive processing modes, including visual-spatial, verbal-linguistic, and kinesthetic processes involved in drawing and labeling maps. Dual coding theory suggests that information processed through multiple modalities creates stronger and more accessible memory traces than information processed through single modalities. The multimodal engagement inherent in Mind Mapping may enhance both story comprehension and retention of organizational plans, facilitating subsequent summary composition (Satriana et al., 2021).

Fourth, Mind Mapping's flexibility accommodates individual differences in how students organize information and approach writing tasks. Unlike rigid outline formats that prescribe specific organizational structures, mind maps can be constructed in diverse ways while maintaining their coherence. This flexibility may particularly benefit students with non-linear thinking preferences who struggle with traditional outlining but thrive when allowed to represent ideas more organically. Analysis of dimension-specific performance revealed that Mind Mapping produced particularly large advantages in plot organization, setting description, characterization, and language style—all dimensions involving synthesis and organization of information about story elements. These selective effects support the interpretation that Mind Mapping specifically enhances organizational and synthesizing processes rather than producing diffuse, non-specific improvements.

The substantial 4.1-4.4 point advantages in plot, setting, characterization, and style dimensions suggest that students using Mind Mapping developed superior understanding of story structure and more effectively translated this understanding into organized written expression. Mind maps explicitly prompt students to identify and spatially arrange story elements, fostering recognition of how plot events connect causally and temporally, how settings provide contexts for events, how characters drive action, and how all elements

integrate coherently. This enriched structural understanding naturally translates into more organized, detailed, and stylistically sophisticated summaries (Fitriawati Musyafa, 2020).

Smaller but still meaningful advantages appeared in language usage, title appropriateness, point of view, and theme dimensions. These dimensions depend somewhat less purely on organizational abilities and more on other competencies, including grammatical knowledge, interpretive skill, and meta-textual awareness. Mind Mapping may indirectly support these competencies by reducing cognitive load devoted to organization, freeing attention for language monitoring and thematic reflection, but the effects are necessarily more modest than for directly organizational dimensions.

An important finding concerns not only the experimental group's strong performance but also the control group's relatively modest improvements. While the control group demonstrated a statistically significant improvement from pre-to post-test, the magnitude of improvement (6.3 points) represented less than one-third of the experimental group's gains (23 points). This pattern suggests that conventional instruction, while not entirely ineffective, fails to adequately support the complex cognitive processes required for proficient plot-summary writing.

Several factors may explain the limitations of conventional instruction. First, lecture-based approaches emphasize the transmission of declarative knowledge about narrative elements but provide limited procedural guidance on how to actively analyze stories and organize summaries. Students may learn the definitions of plot, setting, and character without developing practical strategies for identifying these elements in texts or organizing them in writing.

Second, conventional instruction often proceeds through teacher-directed whole-class discussion where the teacher leads analysis and students passively follow. While this approach may help students comprehend particular stories discussed in class, it does not necessarily transfer to independent reading and writing. Students may successfully participate in guided discussions without internalizing analytical strategies that they can subsequently apply autonomously.

Third, conventional outlining techniques taught in traditional writing instruction typically employ linear and hierarchical formats that may not intuitively align with narrative structures. Linear outlines work well for expository writing with a clear hierarchical organization but may feel forced when applied to narratives with multiple interconnected elements. The mismatch between the outlining format and narrative structure may explain why traditional approaches produce only modest benefits for summary writing.

IV. CONCLUSIONS

This quasi-experimental study rigorously examined the effect of Mind Mapping instruction on eleventh-grade students' ability to write plot summaries of fictional short stories. The results provide compelling evidence that systematic instruction in applying Mind Mapping to narrative analysis substantially enhances summary writing quality compared to conventional lecture-based instruction. The experimental group, which received six weeks of Mind Mapping instruction, achieved post-test mean scores of 89.0 (excellent category), representing a 23-point improvement from the pre-test. The control group, receiving conventional instruction, achieved post-test means of 65.3 (adequate category), representing only a 6.3-point improvement. The 23.7-point between-group difference yielded a Cohen's *d* effect size of 3.25, indicating an extremely large effect. Mind Mapping produced substantial advantages in writing dimensions involving the organization and synthesis of story information, including plot structure, setting description, characterization, and language style. These selective effects support theoretical accounts emphasizing Mind Mapping's support for organizational cognitive processes. This technique reduces cognitive load by externalizing story structure, aligns with narrative organization through its hierarchical radial format, engages multiple processing modalities, and accommodates diverse thinking preferences. These findings carry important implications for writing pedagogy in Indonesian language education and potentially in other educational contexts. Explicit instruction in cognitive and metacognitive strategies, such as Mind Mapping, should receive increased emphasis, with particular attention to visual-spatial organizational tools that may better support diverse learners than traditional linear approaches. Professional development that supports teachers in implementing evidence-based instructional strategies represents a high-leverage investment for educational improvement. While these conclusions rest on solid methodological foundations, including quasi-experimental design, standardized measurement, and rigorous statistical analysis, several limitations qualify generalization. The study examined a specific population in a particular setting over a relatively brief timeframe, focused exclusively on plot summary writing, and was implemented by a single researcher-instructor. Future research should replicate the findings across diverse populations, extend the investigation to other writing genres, examine long-term maintenance and transfer effects, and evaluate implementation across multiple teachers.

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Ethical Compliance

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Data Access Statement

A Data Access Statement is a section in a scientific publication or research report that explains how the data used or generated in the study can be accessed by readers or other researchers. This statement aims to promote transparency, support research reproducibility, and comply with open access policies, where applicable.

Common Elements in a Data Access Statement:

1. Data Location: Specifies where the data are stored, such as in online repositories (e.g., Zenodo, Dryad, or institutional repositories).
2. Access Instructions: Provides information on how to access the data, such as direct links, DOI (Digital Object Identifier), or contact details.
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 - "The data supporting this study are openly available in Zenodo at [DOI:10. xxxx/zenodo.xxxx]."
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Purpose of a Data Access Statement:

- Reproducibility: Enables other researchers to replicate or verify the findings.
- Collaboration: Encourages further collaboration by sharing data.
- Compliance: Adheres to the policies of funding agencies or journals that require open access to data.

Conflict of Interest Declaration

The authors declare that they have no affiliations or involvement with any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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