



The Effect of the Jigsaw Technique on Students' Narrative Text Writing Skills in the VII Grade at Muhammadiyah 2 Kisaran Private Islamic Senior High School in the 2025/2026 Academic Year

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ABSTRACT

Developing students' narrative writing skills remains a significant challenge in English language education, particularly in fostering effective idea organization and written expression. This study investigated whether the Jigsaw Technique significantly improved narrative writing skills among eleventh-grade students at Muhammadiyah 2 Kisaran Private Islamic Senior High School during the 2025/2026 academic year. A quantitative within-group experimental design was employed, involving 52 students from two classes selected through total sampling. Data were collected using observation sheets, writing assessments (pre-test and two post-tests), and student questionnaires. The findings revealed that students' mean writing scores increased from 62.98 at pre-test to 84.51 following Jigsaw-based instruction, representing a 34.20% improvement. In contrast, conventional instruction yielded a mean score of 72.21, reflecting a 14.66% increase from baseline. A paired-samples t-test indicated a statistically significant difference ($t = 12.618 > 2.008$; $p < 0.001$). These findings suggest that the Jigsaw Technique effectively enhances students' narrative writing performance compared with conventional instruction. The study concludes that incorporating structured collaborative learning through the Jigsaw Technique offers a promising pedagogical approach to improving narrative writing proficiency.

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INTRODUCTION

Writing constitutes a fundamental component of English language proficiency, particularly at the senior high school level, where students must communicate their ideas clearly, coherently, and creatively. As a cognitively demanding process, writing requires divergent thinking that enables students to explore multiple perspectives, generate diverse ideas, and develop meaningful compositions through systematic stages of planning, drafting, revising, and finalizing their work (Nasution, 2022). Effective writing also requires students to demonstrate proficiency in language use, mechanical accuracy, content development, stylistic expression, and critical judgment to produce coherent and academically appropriate texts. Patwary et al. (2023) identify five essential dimensions of writing achievement, namely content, organization, vocabulary, grammatical accuracy, and mechanics, which collectively determine the overall quality of written communication.

Within the senior high school English curriculum, narrative writing represents an essential genre that develops students' linguistic competence, creativity, and ability to communicate experiences through structured storytelling. Narrative texts present fictional or factual events involving characters, settings, and interconnected situations within a logical and coherent sequence to entertain, inform, and convey meaningful messages to readers (Phillips & Fusco, 2015). Through narrative composition, students learn to organize events chronologically, establish relationships between characters and circumstances, and construct meaningful connections between successive developments. Ghosh et al. (2025) emphasize that coherent narrative sequencing enables readers to understand characters' responses to particular circumstances while recognizing the causal relationships that connect events throughout a story.

Despite its pedagogical importance, narrative writing continues to present substantial challenges for students learning English as a foreign language (EFL), particularly those with limited linguistic proficiency and insufficient writing experience. Developing effective written compositions requires students to integrate grammatical accuracy, rhetorical

competence, conceptual understanding, and evaluative judgment throughout the writing process (Fleckenstein et al., 2023). Previous research has identified inadequate writing motivation, insufficient understanding of linguistic structures, and limited knowledge of narrative elements, including orientation, complication, and resolution, as major obstacles to successful narrative composition. These difficulties frequently undermine students' writing confidence, while restricted vocabulary and persistent grammatical weaknesses contribute to disorganized, repetitive, and communicatively ineffective texts (Goolsarran et al., 2020; Márquez et al., 2017).

Preliminary observations conducted on November 26, 2025, at Muhammadiyah 2 Kisaran Private Islamic Senior High School revealed similar difficulties among eleventh-grade students in developing ideas and organizing coherent narrative compositions. Students frequently struggled to elaborate their ideas systematically, establish logical relationships between events, and construct narratives with appropriate structural organization. Their limited vocabulary restricted their ability to communicate intended meanings effectively, resulting in repetitive or inappropriate lexical choices, while recurring grammatical errors compromised sentence accuracy and clarity. These interconnected difficulties appeared to diminish students' motivation, confidence, and engagement in writing activities, potentially contributing to their unsatisfactory academic performance.

Addressing these instructional challenges requires teachers to reconsider conventional teacher-centered approaches and implement innovative cooperative learning strategies that encourage meaningful student participation. The Jigsaw Technique, originally developed by Elliot Aronson and his colleagues, offers a structured cooperative learning approach that distributes learning materials into interconnected sections and assigns individual students responsibility for mastering specific content. Pandya and Saiyad (2025) describe the technique as a collaborative instructional process in which students develop expertise in assigned material before sharing their understanding with members of their original groups, thereby promoting individual accountability and collective knowledge construction. Through structured peer interaction, collaborative discussion, and shared responsibility, the Jigsaw Technique encourages students to organize ideas, expand vocabulary, identify grammatical inaccuracies, and refine written compositions before completing their final drafts (Sistadewi et al., 2023).

Previous empirical investigations have demonstrated the pedagogical potential of the Jigsaw Technique across different dimensions of English language learning. Somadani and Wahyuningsih (2021) reported that implementing the Jigsaw Technique significantly improved junior high school students' descriptive writing achievement, producing a 14.30-point increase between pretest and post-test scores. Similarly, Hendrisman (2020) demonstrated that the Jigsaw cooperative learning model enhanced students' speaking performance and communicative competence by creating an interactive learning environment that encouraged active participation and meaningful exchanges. Focusing specifically on narrative writing, Masruroh (2023) identified a statistically significant difference between eleventh-grade students receiving Jigsaw-based instruction and those experiencing conventional teaching at MAN Seluma Bengkulu, with the experimental group achieving a higher normalized gain (N-gain) score.

Collectively, these findings suggest that the Jigsaw Technique can facilitate active participation, collaborative knowledge construction, and greater confidence while supporting students' ability to organize and communicate ideas effectively. Nevertheless, the reviewed studies have primarily examined descriptive writing, speaking proficiency, or narrative writing in different institutional contexts, leaving the effectiveness of Jigsaw-based instruction among eleventh-grade students at Muhammadiyah 2 Kisaran Private Islamic Senior High School insufficiently examined. This contextual gap warrants further investigation into whether structured cooperative learning can address students' observed difficulties in idea development, vocabulary selection, grammatical accuracy, and narrative organization more effectively than conventional instruction. Accordingly, this study aims to investigate the effect of the Jigsaw Technique on eleventh-grade students' narrative writing skills during the 2025/2026 academic year and determine whether its implementation produces a statistically significant improvement in writing performance.

METHOD

This study employed a quantitative approach using a within-group experimental design to examine the effects of instructional methods as the independent variable on students' narrative writing skills as the dependent variable. The research population comprised 52 eleventh-grade students enrolled at Muhammadiyah 2 Kisaran Private Islamic Senior High School during the 2025/2026 academic year, distributed across Class XI-1 (27 students) and Class XI-2 (25 students). The researchers employed total sampling to include all 52 students, thereby ensuring that the sample represented the entire target population within the institution. All participants formed a single experimental cohort

and received two instructional interventions sequentially, enabling the researchers to compare their writing performance following Jigsaw-based instruction and conventional teaching.

The researchers initiated the experimental procedure by administering a pre-test (X) to establish students' baseline proficiency in narrative writing before introducing either instructional intervention. Subsequently, students participated in Jigsaw-based instruction as the primary experimental treatment, after which the researchers administered the first post-test (Y₁) to evaluate changes in writing performance. Following an interval between instructional conditions, the researchers implemented conventional teacher-centered instruction as the comparison treatment and administered a second post-test (Y₂) to assess students' subsequent writing achievement. Table 1 illustrates the sequential within-group experimental design and identifies the assessment stages and instructional interventions implemented throughout the study.

Table 1. Within-Group Experimental Design Layout

Group	Pre-Test	Main Treatment	Post-Test 1	Comparison Treatment	Post-Test 2
All Students (n = 52)	X	Jigsaw Technique	Y ₁	Conventional Method	Y ₂

Notes: X = Pre-test administered before treatment; Y₁ = Post-test administered after Jigsaw-based instruction; Y₂ = Post-test administered after conventional instruction.

The researchers administered the initial narrative writing assessment to identify students' existing proficiency and establish a baseline for subsequent performance comparisons. During the primary intervention, the Jigsaw Technique engaged students in structured cooperative learning activities that encouraged collaborative idea development, peer interaction, and the organization of narrative compositions. The researchers subsequently introduced conventional instruction to the same participants, emphasizing teacher explanations and direct instructional guidance before evaluating students' writing performance through an additional assessment. This sequential procedure enabled within-participant comparisons across assessment stages, although the fixed treatment order and potential carryover effects required consideration when interpreting differences between the instructional approaches.

The researchers employed three complementary instruments—structured observation sheets, narrative writing assessments, and student questionnaires—to collect quantitative data concerning writing performance, classroom engagement, and students' perceptions of the instructional intervention. Arikunto (2006), as cited in Anggraeni and Yonanda (2018), defines a research instrument as a systematic tool that enables researchers to collect information relevant to predetermined research objectives. The researchers selected these instruments to examine both measurable changes in students' narrative writing proficiency and their behavioral and perceptual responses to Jigsaw-based instruction. The following sections describe the observation procedures, writing assessments, and questionnaire administration used throughout the investigation.

The researchers conducted structured classroom observations during the implementation of the Jigsaw Technique to examine students' behavioral engagement and participation in cooperative learning activities. Using an observation sheet, the observers evaluated students' contributions to group discussions, collaboration with peers, attention to instructional explanations, responsibility for assigned tasks, willingness to assist classmates, and confidence in communicating ideas. The observation instrument employed predetermined behavioral indicators to facilitate systematic documentation of students' involvement throughout the instructional process. The researchers used the resulting observational data to complement writing assessment outcomes and provide contextual evidence regarding students' engagement with the cooperative learning intervention.

The researchers administered three narrative writing assessments comprising an initial pre-test, a post-test following Jigsaw-based instruction, and a subsequent post-test following conventional instruction. During the pre-test, students composed narrative essays based on an assigned topic, allowing the researchers to evaluate their initial writing proficiency using an analytical scoring rubric covering content, organization, vocabulary, language use, and mechanics. Following the Jigsaw intervention, the researchers administered the first post-test to measure students' writing performance and subsequently introduced conventional instruction before administering the second post-test using a comparable writing task and the same assessment criteria. The researchers compared the assessment scores to examine changes in narrative writing achievement across instructional conditions while considering the potential influence of repeated testing and the sequential treatment arrangement.

The researchers administered a student questionnaire following the Jigsaw-based instructional intervention to investigate participants' perceptions of the cooperative learning experience. The instrument included statements addressing students' interest in narrative writing, learning motivation, classroom participation, and perceived benefits of the Jigsaw Technique. Through structured response options and supplementary open-ended questions, the questionnaire enabled students to evaluate their experiences and communicate additional perspectives regarding the instructional process. The researchers analyzed the questionnaire responses alongside observation records and writing assessment results to provide a more comprehensive interpretation of students' engagement and perceived learning experiences.

The researchers assessed students' narrative writing performance using an analytical scoring framework comprising five dimensions: content, organization, vocabulary, language use, and mechanics. Heaton (1991), as cited in Joeniarni and Mulyoto (2022), identifies these five components as essential criteria for evaluating the quality of written compositions. The assessment rubric assigned performance scores to each dimension according to predetermined descriptors, enabling the researchers to evaluate students' writing proficiency systematically and consistently across assessment stages. Table 2 presents the scoring criteria, performance levels, numerical values, and corresponding descriptions used to evaluate students' narrative compositions.

Table 2. Criteria for Assessing Narrative Essays

Assessment Component	Performance Level	Score	Assessment Criteria
Content	Excellent to Very Good	20	Demonstrates comprehensive subject knowledge, substantial content development, a clearly articulated central idea, and strong relevance to the assigned topic.
	Good to Average	15	Demonstrates adequate subject knowledge and generally relevant content, although the central idea and supporting details require further development.
	Fair to Poor	10	Demonstrates limited subject knowledge, insufficient supporting information, and inadequate development of the assigned topic.
	Very Poor	5	Demonstrates minimal or no relevant subject knowledge, lacks substantive content, or provides insufficient material for meaningful assessment.
Organization	Excellent to Very Good	20	Presents ideas fluently and coherently through a clearly organized structure, logical sequencing, and effective connections between narrative events.
	Good to Average	15	Communicates ideas with reasonable clarity and organization, although some transitions, sequencing, or structural relationships require improvement.
	Fair to Poor	10	Presents disconnected or confusing ideas, demonstrates weak organizational control, and lacks logical sequencing or adequate development.
	Very Poor	5	Fails to establish meaningful organization or coherent communication, providing insufficient evidence for evaluating narrative structure.
Vocabulary	Excellent to Very Good	20	Demonstrates a broad lexical range, accurate word and idiomatic expression choices, appropriate usage, and effective control of linguistic register.
	Good to Average	15	Uses an adequate vocabulary range with occasional errors in word forms, lexical choices, or idiomatic expressions that rarely obscure meaning.
	Fair to Poor	10	Demonstrates restricted vocabulary and frequent inaccuracies in lexical selection, idiomatic usage, or word forms that interfere with communication.
	Very Poor	5	Demonstrates extremely limited English vocabulary, inappropriate word forms, and insufficient lexical resources for meaningful evaluation.
Language Use	Excellent to Very Good	20	Demonstrates effective grammatical control with minimal errors in agreement, tense, number, word order, articles, pronouns, and prepositions.
	Good to Average	15	Constructs generally effective sentences using relatively simple grammatical structures, with occasional errors that rarely obscure meaning.
	Fair to Poor	10	Demonstrates substantial difficulties with simple or complex sentence construction, including frequent grammatical errors, omissions, and inappropriate word order that obscure meaning.
	Very Poor	5	Demonstrates minimal understanding of sentence construction, with pervasive grammatical inaccuracies that prevent effective communication or meaningful assessment.
Mechanics	Excellent to Very Good	20	Demonstrates accurate spelling, punctuation, capitalization, and paragraphing, with only minor mechanical inaccuracies.
	Good to Average	15	Demonstrates generally appropriate writing mechanics, with occasional spelling, punctuation, capitalization, or paragraphing errors that do not substantially affect comprehension.
	Fair to Poor	10	Demonstrates frequent mechanical errors, including difficulties with spelling, punctuation, capitalization, handwriting legibility, and paragraph organization that reduce textual clarity.

Assessment Component	Performance Level	Score	Assessment Criteria
	Very Poor	5	Demonstrates pervasive mechanical inaccuracies that substantially compromise readability and interfere with the communication of intended meaning.

The researchers employed the analytical scoring rubric to ensure that each narrative composition received a structured evaluation based on clearly defined performance indicators. Alfaruqy (2021) emphasizes that assessment rubrics support accurate evaluation by establishing explicit criteria, describing different levels of achievement, and facilitating constructive feedback on students' written performance. By applying identical scoring dimensions across the three writing assessments, the researchers sought to maintain consistency in evaluating students' development in content, organization, vocabulary, grammatical accuracy, and mechanics. The resulting scores provided quantitative indicators of narrative writing achievement and supported comparisons between students' performance before and after the instructional interventions.

The researchers analyzed observation records and questionnaire responses using descriptive statistical procedures to summarize students' engagement, participation, and perceptions of Jigsaw-based instruction. For classroom observations, the researchers assigned scores to predetermined behavioral indicators using a four-point rating scale: 1 = Poor, 2 = Fair, 3 = Good, and 4 = Very Good. The questionnaire employed a four-point Likert scale comprising Totally Agree, Agree, Disagree, and Totally Disagree, alongside open-ended questions that explored students' interest, motivation, participation, and perceived instructional benefits. The researchers summarized the numerical responses through frequencies and percentages, while descriptive interpretations of open-ended responses supplemented the quantitative findings.

The researchers calculated percentage scores by dividing the total score obtained for each indicator by its maximum possible score and multiplying the resulting value by 100. This calculation enabled the researchers to express observation and questionnaire outcomes using a standardized percentage-based measurement. The researchers applied the following formula to calculate the percentage values for the respective assessment indicators. The resulting percentages provided descriptive evidence concerning students' participation, cooperation, attention, responsibility, confidence, and perceptions of the teaching and learning process.

$$P = \frac{F}{N} \times 100\%$$

Where:

- P = Percentage score
- F = Total score obtained
- N = Maximum possible score

The researchers presented the observation and questionnaire findings in tables accompanied by percentage distributions and descriptive interpretations. The observation results illustrated students' behavioral participation during collaborative activities, particularly their engagement in discussions, cooperation with peers, attention to instructional tasks, and responsibility for completing assigned work. Questionnaire responses provided supplementary information regarding students' motivation, interest, confidence, and perceived benefits of Jigsaw-based instruction. The researchers integrated these descriptive findings with the writing assessment results to develop a broader understanding of students' learning experiences and performance throughout the intervention.

The researchers examined instrument validity to determine whether the assessment procedures adequately measured the intended dimensions of students' narrative writing proficiency. Arikunto (2019), citing Scarvia B. Anderson, explains that an assessment instrument demonstrates validity when it effectively measures the specific construct or characteristic that it intends to evaluate. To investigate the statistical relationship between individual assessment items and their corresponding total scores, the researchers employed the Pearson product-moment correlation coefficient as an item-validity analysis procedure. The researchers calculated the correlation coefficient using the following formula, which expresses the relationship between paired observations while accounting for the number of participants and the distribution of their scores.

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

The researchers evaluated instrument reliability to determine the consistency and stability of the measurements obtained through the assessment procedures. Reliability extends beyond the immediate accuracy of an individual measurement because it concerns the extent to which an instrument produces consistent results when assessing the same underlying characteristic. Scarvia B. Anderson, as cited in Arikunto et al. (2023), conceptualizes reliability as the consistency and stability with which a measurement instrument represents the attribute under investigation. The researchers specified the Spearman–Brown prophecy formula to estimate the reliability coefficient from the correlation between two halves of an assessment instrument, as presented below.

$$r_{11} = \frac{2 \cdot r_{1/21/2}}{(1 + r_{1/21/2})}$$

RESULT AND DISCUSSION

Description of Research Results

The researchers collected empirical data from 52 eleventh-grade students through three complementary research instruments: structured classroom observations, narrative writing assessments, and student questionnaires. The observation instrument documented students' engagement and collaborative behaviors during the implementation of the Jigsaw Technique, while the writing assessments measured their performance across three assessment stages. The researchers administered an initial pre-test, a first post-test following Jigsaw-based instruction, and a second post-test following conventional instruction to examine variations in students' narrative writing achievement. The following sections present the observation findings, individual writing assessment scores, and comparative performance across the five principal dimensions of narrative writing proficiency.

Results of the Observation Sheet Analysis

The researchers evaluated students' classroom engagement during Jigsaw-based instruction using an observation sheet comprising six behavioral indicators. Across the 52 participants, the instrument generated a cumulative empirical score of 1,141 out of a maximum possible score of 1,248, calculated by multiplying the number of students by the maximum individual score of 24. The researchers calculated the overall engagement percentage by dividing the observed score by the maximum possible score and multiplying the result by 100, as illustrated below. This calculation yielded an overall engagement rate of 91.43%, indicating a high level of participation across the observed behavioral dimensions.

$$P = \frac{1141}{1248} \times 100\% = 91.42\%$$

The observation findings placed students' overall engagement within the "Very Good" category according to the classification criteria adopted in the study. The researchers recorded an average observation score of 21.94 out of 24 points per student, reflecting consistently high engagement during cooperative learning activities. Students demonstrated active participation in group discussions, frequent communication with peers, and a strong sense of collective responsibility when completing assigned learning tasks. These findings suggest that the Jigsaw Technique supported an interactive classroom environment characterized by collaborative participation, shared accountability, and sustained engagement throughout the instructional process.

Results of the Writing Tests

The researchers assessed students' narrative writing proficiency through three successive writing tests to examine changes in performance following different instructional approaches. The pre-test established students' initial writing achievement, while Post-Test 1 measured their performance following Jigsaw-based instruction and Post-Test 2 evaluated their subsequent achievement after conventional teaching. The researchers analyzed individual assessment scores to identify variations in students' performance, examine score distributions, and compare achievement patterns across the instructional conditions. Tables 4.1 and 4.2 present the individual scores and corresponding statistical components used to examine students' narrative writing performance.

Comparison of Pre-Test and Post-Test 1 Scores Following Jigsaw-Based Instruction

Table 3 presents the individual writing assessment scores obtained before and after the implementation of the Jigsaw Technique. The researchers documented each student's pre-test score (X), first post-test score (Y_1), squared scores, and cross-product values to facilitate subsequent statistical analysis. These data provide a detailed account of individual performance changes and enable the identification of differences in writing achievement across participants. The comparison illustrates students' narrative writing performance before Jigsaw-based instruction and their subsequent achievement following the collaborative learning intervention.

Table 3. Scores of Pre-Test and Post-Test 1 (Jigsaw Condition)

No.	Student Code	X	Y_1	X^2	Y_1^2	$X \times Y_1$
1	AHR	70	90	4900	8100	6300
2	ALS	70	90	4900	8100	6300
3	AAP	60	75	3600	5625	4500
4	AAL	50	75	2500	5625	3750
5	AF	70	95	4900	9025	6650
6	AZ	45	80	2025	6400	3600
7	ARG	55	80	3025	6400	4400
8	CA	50	85	2500	7225	4250
9	DKN	85	100	7225	10000	8500
10	DS	60	85	3600	7225	5100
11	DC	60	85	3600	7225	5100
12	DTM	45	80	2025	6400	3600
13	FAW	60	85	3600	7225	5100
14	FAZ	70	85	4900	7225	5950
15	IA	30	75	900	5625	2250
16	IDT	65	85	4225	7225	5525
17	IPS	65	95	4225	9025	6175
18	IP	60	90	3600	8100	5400
19	IZ	55	75	3025	5625	4125
20	IAS	50	75	2500	5625	3750
21	JAN	50	85	2500	7225	4250
22	KNF	60	75	3600	5625	4500
23	KAK	65	90	4225	8100	5850
24	MBT	75	95	5625	9025	7125
25	MMF	65	75	4225	5625	4875
26	MAS	55	80	3025	6400	4400
27	MT	60	75	3600	5625	4500
28	MT	75	80	5625	6400	6000
29	MAL	75	90	5625	8100	6750
30	NWT	70	85	4900	7225	5950
31	NSN	50	85	2500	7225	4250
32	NSA	75	90	5625	8100	6750
33	NB	65	90	4225	8100	5850
34	NSP	90	95	8100	9025	8550
35	N	80	95	6400	9025	7600
36	PMA	80	90	6400	8100	7200
37	RB	80	90	6400	8100	7200
38	R	65	85	4225	7225	5525
39	RRP	50	75	2500	5625	3750
40	SZ	65	90	4225	8100	5850
41	SK	45	80	2025	6400	3600
42	SZM	65	85	4225	7225	5525
43	SZM	50	75	2500	5625	3750
44	SAP	60	80	3600	6400	4800
45	SRD	75	85	5625	7225	6375
46	SRF	60	75	3600	5625	4500
47	TNF	80	85	6400	7225	6800
48	TWN	70	95	4900	9025	6650
49	WAM	65	80	4225	6400	5200
50	ZNF	60	85	3600	7225	5100
51	ZAS	55	85	3025	7225	4675

No.	Student Code	X	Y ₁	X ²	Y ₁ ²	X × Y ₁
52	ZRR	65	85	4225	7225	5525
Total		3275	4395	213275	373825	279550

The pre-test results revealed considerable variation in students' initial narrative writing proficiency, with scores ranging from 30 to 90 and a mean score of 62.98. Among the 52 participants, one student scored 90, one scored 85, four scored 80, five scored 75, six scored 70, ten scored 65, ten scored 60, four scored 55, seven scored 50, three scored 45, and one obtained the lowest score of 30. The concentration of scores between 50 and 75 indicated that many students entered the intervention with moderate or relatively limited writing proficiency, particularly when evaluated against the assessment dimensions established in the study. This baseline distribution highlighted substantial differences in students' initial writing achievement and provided a reference point for examining subsequent changes following Jigsaw-based instruction.

Following the implementation of the Jigsaw Technique, students demonstrated a marked improvement in narrative writing achievement, with Post-Test 1 scores ranging from 75 to 100 and a mean score of 84.52. The score distribution showed that one student achieved 100, six obtained 95, ten scored 90, sixteen achieved 85, eight obtained 80, and eleven scored 75, indicating a substantial concentration of achievement within the upper performance range. Compared with the initial mean score of 62.98, the post-test mean increased by approximately 21.54 points, representing a relative improvement of 34.20% from baseline. These descriptive findings indicate that students achieved higher narrative writing scores following Jigsaw-based instruction, although the statistical significance and causal interpretation of this improvement require consideration of the study's inferential analysis and experimental design.

Comparison of Pre-Test and Post-Test 2 Scores Following Conventional Instruction

Table 4 presents the individual writing assessment scores obtained during the initial pre-test and the second post-test administered after conventional instruction. The researchers documented students' baseline scores (X), second post-test scores (Y₂), squared values, and corresponding cross-products to facilitate the quantitative comparison of writing performance. The assessment results provide information about students' achievement following teacher-centered instruction and allow the researchers to examine differences between the observed outcomes of the two instructional conditions. The comparison also illustrates the extent to which students' writing scores differed from their initial proficiency levels after completing the sequential instructional procedures.

Table 4. Scores of Pre-Test and Post-Test 2 (Conventional Condition)

No.	Student Code	X	Y ₂	X ²	Y ₂ ²	X × Y ₂
1	AHR	70	80	4900	6400	5600
2	ALS	70	85	4900	7225	5950
3	AAP	60	65	3600	4225	3900
4	AAL	50	70	2500	4900	3500
5	AF	70	75	4900	5625	5250
6	AZ	45	70	2025	4900	3150
7	ARG	55	70	3025	4900	3850
8	CA	50	65	2500	4225	3250
9	DKN	85	75	7225	5625	6375
10	DS	60	70	3600	4900	4200
11	DC	60	75	3600	5625	4500
12	DTM	45	65	2025	4225	2925
13	FAW	60	75	3600	5625	4500
14	FAZ	70	70	4900	4900	4900
15	IA	30	55	900	3025	1650
16	IDT	65	70	4225	4900	4550
17	IPS	65	80	4225	6400	5200
18	IP	60	60	3600	3600	3600
19	IZ	55	60	3025	3600	3300
20	IAS	50	70	2500	4900	3500
21	JAN	50	70	2500	4900	3500
22	KNF	60	70	3600	4900	4200
23	KAK	65	70	4225	4900	4550
24	MBT	75	80	5625	6400	6000

No.	Student Code	X	Y ₂	X ²	Y ₂ ²	X × Y ₂
25	MMF	65	75	4225	5625	4875
26	MAS	55	75	3025	5625	4125
27	MT	60	60	3600	3600	3600
28	MT	75	70	5625	4900	5250
29	MAL	75	75	5625	5625	5625
30	NWT	70	85	4900	7225	5950
31	NSN	50	80	2500	6400	4000
32	NSA	75	70	5625	4900	5250
33	NB	65	75	4225	5625	4875
34	NSP	90	85	8100	7225	7650
35	N	80	90	6400	8100	7200
36	PMA	80	80	6400	6400	6400
37	RB	80	75	6400	5625	6000
38	R	65	60	4225	3600	3900
39	RRP	50	55	2500	3025	2750
40	SZ	65	70	4225	4900	4550
41	SK	45	70	2025	4900	3150
42	SZM	65	75	4225	5625	4875
43	SZM	50	65	2500	4225	3250
44	SAP	60	70	3600	4900	4200
45	SRD	75	85	5625	7225	6375
46	SRF	60	70	3600	4900	4200
47	TNF	80	85	6400	7225	6800
48	TWN	70	70	4900	4900	4900
49	WAM	65	75	4225	5625	4875
50	ZNF	60	65	3600	4225	3900
51	ZAS	55	75	3025	5625	4125
52	ZRR	65	75	4225	5625	4875
Total		3275	3755	213275	274225	239425

The pre-test scores presented in Table 4 represent the same baseline assessment used in the comparison with Post-Test 1, thereby maintaining a consistent reference point across the two instructional conditions. Students' initial scores ranged from 30 to 90, with a mean of 62.98, indicating considerable variation in their narrative writing proficiency before the instructional interventions. The score distribution showed that one student achieved 90, one obtained 85, four scored 80, five achieved 75, six obtained 70, ten scored 65, ten scored 60, four obtained 55, seven scored 50, three obtained 45, and one scored 30. These baseline findings demonstrate that students entered the instructional sequence with heterogeneous writing abilities, particularly in their capacity to develop coherent narratives and communicate ideas through appropriate linguistic structures.

Following conventional instruction, students obtained Post-Test 2 scores ranging from 55 to 90, with a mean score of 72.21. The distribution revealed that one student achieved 90, five obtained 85, five scored 80, thirteen achieved 75, seventeen obtained 70, five scored 65, four obtained 60, and two received the lowest score of 55. Compared with the baseline mean of 62.98, the second post-test mean increased by approximately 9.23 points, representing a relative improvement of 14.66%. Although the second post-test results exceeded the initial assessment scores on average, they remained below the scores recorded after Jigsaw-based instruction, indicating a smaller observed improvement relative to baseline under the sequential assessment arrangement.

Comparative Analysis of Narrative Writing Achievement

The researchers further examined students' writing performance across five assessment dimensions to identify patterns of achievement associated with the instructional conditions. These dimensions comprised content development, textual organization, vocabulary selection, language use, and writing mechanics, reflecting the analytical scoring framework applied throughout the investigation. Table 4.3 summarizes the reported cumulative scores for each writing component and presents the overall mean scores obtained during the pre-test and two subsequent post-tests. This comparative presentation provides a basis for examining the relative strengths and weaknesses of students' narrative writing performance across the three assessment stages.

Table 5. Summary of Students' Writing Achievement Scores

Assessment Aspect	Pre-Test Total	Post-Test 1 (Jigsaw)	Post-Test 2 (Conventional)
Content	765	1,025	825
Organization	710	980	800
Vocabulary	655	935	770
Language Use	595	790	775
Mechanics	550	690	625
Mean Score	62.98	84.51	72.21

The comparative results presented in Table 5 indicate that students demonstrated higher overall narrative writing achievement following Jigsaw-based instruction than at baseline or following conventional instruction. The mean score increased from 62.98 in the pre-test to 84.51 in Post-Test 1, representing an improvement of approximately 34.20%, whereas Post-Test 2 produced a mean score of 72.21, corresponding to a 14.66% increase relative to baseline. The reported component scores suggest that students achieved particularly notable gains in content development and textual organization following Jigsaw-based instruction, indicating stronger performance in generating relevant ideas and arranging narrative events coherently. Although conventional instruction also yielded higher scores than the baseline assessment, the descriptive comparison suggests that Jigsaw-based instruction was associated with more substantial improvements in overall narrative writing achievement, subject to the methodological limitations of the sequential within-group design.

Questionnaire Results

The researchers administered a student questionnaire following the Jigsaw-based instructional intervention to evaluate participants' interest, motivation, and perceptions of the cooperative learning experience. The questionnaire generated a cumulative score of 1,815 out of a maximum possible score of 2,080, calculated from 52 participants responding to 10 statements using a four-point Likert scale. The researchers calculated an overall response percentage of 87.26%, which fell within the "Strongly Agree" category according to the classification criteria adopted in the study. With an average individual response score of 34.90 out of 40, these findings indicate that students generally perceived the Jigsaw Technique as an engaging and motivating instructional approach that supported their narrative writing activities and helped alleviate writing-related anxiety.

Classical Assumption Testing and Instrument Validation

The researchers conducted a Kolmogorov–Smirnov normality test using manual calculations to examine whether the pre-test and post-test score distributions satisfied the normality assumption. The analysis yielded calculated D-statistics of 0.104058905 for the pre-test, 0.144648664 for Post-Test 1, and 0.155983582 for Post-Test 2. Each calculated statistic fell below the reported critical value of 0.1886 for a sample of 52 participants, indicating that the test did not detect statistically significant departures from normality under the adopted decision criterion. Table 4.4 presents the calculated statistics, critical values, comparison criteria, and corresponding conclusions for the three assessment stages.

Table 6. Results of the Kolmogorov–Smirnov Normality Test

No.	Assessment	Calculated D-Statistic	Critical D-Value	Decision Criterion	Conclusion
1	Pre-Test	0.104058905	0.1886	Dcalculated < Dcritical	Normality not rejected
2	Post-Test 1	0.144648664	0.1886	Dcalculated < Dcritical	Normality not rejected
3	Post-Test 2	0.155983582	0.1886	Dcalculated < Dcritical	Normality not rejected

The results presented in Table 6 show that all three calculated Kolmogorov–Smirnov statistics remained below the reported critical threshold of 0.1886. Specifically, the pre-test produced the lowest D-statistic (0.104058905), followed by Post-Test 1 (0.144648664) and Post-Test 2 (0.155983582). These comparisons indicate that the researchers did not identify sufficient statistical evidence to reject the normality assumption for any of the three score distributions under the reported testing procedure. Nevertheless, the interpretation of the paired-samples t-test also requires examination of the distribution of paired score differences, because the normality of individual assessment distributions alone does not establish this assumption.

The researchers also evaluated the validity and reliability of the research instruments to establish their suitability for measuring students' writing performance and instructional engagement. Two expert validators, identified as SM and AA, reviewed the observation sheets and questionnaires and reported favorable evaluations of their content validity. The researchers subsequently applied Pearson product-moment correlation analysis and obtained validity coefficients of 0.66 for Post-Test 1 and 0.63 for Post-Test 2, which they classified within the high-validity category according to the criteria adopted in the study. These findings provide preliminary evidence concerning the measurement properties of the instruments, although a comprehensive evaluation of validity also requires clarification of the validation procedures, scoring criteria, and interpretation of the reported correlation coefficients.

The researchers further examined the reliability of the writing assessments using the Spearman–Brown formula to estimate the consistency of the measurement instruments. The analysis yielded reliability coefficients of 0.79 for Post-Test 1 and 0.77 for Post-Test 2, indicating relatively strong reliability according to the classification criteria employed in the study. These coefficients suggest that the assessments demonstrated an acceptable degree of measurement consistency within the specified reliability framework. The reported findings support the use of the instruments for evaluating students' narrative writing performance, although the interpretation of these coefficients depends on the appropriateness of the split-half procedure and the characteristics of the writing assessment rubric.

Hypothesis Testing

The researchers employed a paired-samples t-test using Microsoft Excel to examine whether students' narrative writing scores differed significantly between Post-Test 1 and Post-Test 2. This statistical procedure compared the paired assessment outcomes obtained from the same 52 participants following Jigsaw-based instruction and conventional teaching. The researchers formulated the null hypothesis (H_0) as the absence of a statistically significant mean difference between the two post-test scores, while the alternative hypothesis (H_a) proposed a statistically significant difference between the paired measurements. Table 4.5 presents the reported mean scores, calculated t-statistic, two-tailed significance level, and statistical interpretation of the hypothesis test.

Table 7. Summary of the Paired-Samples t-Test Results

Variable Group	Mean Score	Calculated t-Value	Sig. (2-Tailed)	Statistical Interpretation
Post-Test 1 (Jigsaw)	84.51	12.618	< 0.001	Statistically significant difference; H_0 rejected
Post-Test 2 (Conventional)	72.21	—	—	Comparison assessment

The reported statistical analysis identified a difference between the mean scores obtained following Jigsaw-based instruction (84.51) and conventional instruction (72.21), representing a mean difference of 12.30 points. The calculated t-statistic of 12.618 exceeded the reported critical two-tailed t-value of 2.008 at the 0.05 significance level, indicating a statistically significant difference between the paired assessment scores. The reported significance value, conventionally expressed as $p < 0.001$ rather than $p = 0.000$, also fell below the predetermined significance threshold of $\alpha = 0.05$. On the basis of these reported statistical results, the researchers rejected the null hypothesis and supported the alternative hypothesis that students' narrative writing performance differed significantly between the two post-test assessments.

The higher mean score recorded following Jigsaw-based instruction suggests that students demonstrated stronger narrative writing performance at that assessment stage than after conventional instruction. This finding aligns with the descriptive results, which indicated greater improvements in students' content development, textual organization, vocabulary use, grammatical accuracy, and writing mechanics following the cooperative learning intervention. The observed difference provides statistical evidence of an association between the assessment stage and students' writing achievement, although the sequential within-group design limits the extent to which the difference can be attributed exclusively to the instructional technique.

CONCLUSION

The findings of this study demonstrate that students achieved higher narrative writing scores following the implementation of the Jigsaw Technique at Muhammadiyah 2 Kisaran Private Islamic Senior High School, with their mean scores increasing from 62.98 in the pre-test to 84.51 in Post-Test 1, compared with 72.21 in Post-Test 2 following

conventional instruction. The reported paired-samples t-test indicated a statistically significant difference between the two post-test assessments ($t = 12.618 > 2.008$; $p < 0.001$), supporting the rejection of the null hypothesis while acknowledging that the sequential within-group design limits definitive causal conclusions. Classroom observations (91.42%) and student questionnaire responses (87.26%) further indicated that Jigsaw-based instruction encouraged active participation, collaborative engagement, shared responsibility, and greater confidence through structured interactions within home and expert groups. These findings suggest that the Jigsaw Technique offers a promising pedagogical approach to supporting students' narrative writing proficiency across five essential dimensions: content, organization, vocabulary, language use, and mechanics.

English teachers should consider integrating the Jigsaw Technique into narrative writing instruction by organizing structured home and expert group activities that encourage collaborative idea generation, peer feedback, and shared responsibility throughout the writing process. Educational institutions should support its implementation through professional development programs, appropriate instructional resources, and classroom environments that facilitate meaningful cooperative learning and sustained student engagement. Future researchers should employ randomized or counterbalanced experimental designs, incorporate appropriate comparison groups, and investigate longer intervention periods to minimize potential carryover effects and establish stronger evidence regarding the technique's causal effectiveness. Further investigations should also examine students' long-term writing development, individual differences in learning outcomes, and the contribution of collaborative interactions to specific writing dimensions to strengthen the empirical foundation for implementing Jigsaw-based instruction in English language education.

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